FÉDÉRATION INTERNATIONALE D´ÉDUCATION PHYSIQUE ET SPORTIVE

Physical Education and Physical Activities of Children, Youth and Adults and Healthy Active Living

Researches – Best Practices – Situation

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Introduction

You are holding a book that is one of the intellectual outcomes of the ERASMUS + project 613045-EPP-1-2019-1-NL-SPO-SCP "New Health". This project, addressed in 2019 - 2022, is focused on supporting healthy active living of young and adults in EU. Project coordinator is New Health Foundation from the Netherlands. Full partners are Sport Sciences School of Rio Maior (ESDRM) in Portugal, Europe Active in Belgium, Lithuanian Association of Health and Fitness Clubs in Lithuania, Fitness federation in Belgium, Association Europea Deporte, Ejercicio Y Salud (AEDESA) in Spain and Comenius University in Bratislava in Slovakia. Expert panel is representing by European Network of Sport Education (ENSE) in Austria, Movisie, Knowledge Center Sports Netherlands (KCSportNL), NL Active and Jan Middelkamp in the Netherlands

The book is also part of the 4th Physical Education Worldwide Survey on Quality Physical Education, which is carried out by UNESCO in cooperation with FIEPS and its partners. The publication is part of one of its lines, focusing on mapping the basic characteristics of physical education and physical activities of children and youth in the world at individual levels of schools, from pre-school education to universities. Book is focused on selected topics related health of youth, adults, and elderly persons.

In 2017 the book "Physical Education in Primary School: Researches - Best Practices - Situation", edited by D. Collela, B. Antala and S. Epifani, was published by Pensa Multimedia in Italy and has 502 pages. 102 authors from 27 countries and 5 continents participated. In 2018, it was followed by a publication "Physical Education in Secondary School: Researches - Best Practices - Situation", published by the University of Montenegro in cooperation with the Montenegrin Sport Academy. The editors were S.Popovič, B.Antala, D.Bjelica and J.Gardaševič. It had 343 pages and was prepared by 84 authors from 24 countries and 5 continents. The publication "Physical Education in Early Childhood Education and Care: Researches - Best Practices -Situation" was published in Slovakia by the Slovak Scientific Society for Physical Education and Sport in 2019. Its editors were B. Antala, G. Demirhan, A. Carraro, C. Oktar, H. Oz and A. Kaplánová. It had 464 pages. 120 authors from 32 countries from 5 continents participated. In 2020 a book "Physical Education in Universities: Researches - Best Practices -Situation" was prepared. Its editors were M. Bobrík, B. Antala and R. Pělucha. 136 authors from 28 countries and 5 continents participated in the book. In 2021 was published 5th book in the series "Physical Education and Sport for Children and Youth with Special Needs: Researches – Best Practices – Situation". 178 authors from 32 countries and 5 continents participated in the book, editors of book were G. Balint, B. Antala, C. Carty, J.M. Aleokol Mabiémé, I. Ben Amar and A. Kaplánová and book was published in Slovakia by the Slovak Scientific Society for Physical Education and Sport.

A series of these 4th Physical Education Worldwide Survey publications is closed in 2022 by this publication "Physical Education and Physical Activities of Children, Youth and Adults and Healthy Active Living: Researches - Best Practices - Situation".

The book is divided into 5 parts. In the first part of "New Health" we bring the results of the scientific part of the project focused on literature reviews in participating countries of the project. In the second part of the publication called "Researches", we bring the latest research findings aimed at exploring the physical education and physical activities of children, youth and adults and healthy active living. The third part, the "Best Practices" brings examples of good practice from different countries of the world and fourth part "Situation" is focused on presenting knowledge related to the characteristics of the state of the issue in various countries of the world. Last, fifth part of the book is focused on French language write articles. Due the agreement between FIEPS and CONFEJES, the book was open for articles write in French language also. Nine articles, especially from African countries, are situated in this last part of the book.

155 authors from 32 countries and five continents participated in the book, of which 15 were European countries (Belgium, Croatia, Czech Republic, Greece, Hungary, Italy, Luxembourg, Netherlands, Poland, Portugal, Russia, Slovakia, Spain, Switzerland, Ukraine) 3 countries from America (Colombia, Mexico, USA), 5 countries from Asia (China, Lebanon, Malaysia, Oman, Singapore), 6 countries from Africa (Algeria, Benin, Burkina Faso, Gabon, Morocco, Senegal) and 3 countries from Oceania (Australia, New Zealand, Samoa). Therefore, the publication brings a broad international perspective on the issue of pre-school physical education and physical activities in pre-school facilities.

A thank you goes also to the reviewers who, through their comments and advice, helped the authors improve the quality of their contributions.

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With the support of the Erasmus+ Programme of the European Union

New Health

New Health EU Project - For a Healthier Future!

John van Heel

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Abstract

The ERASMUS + project 613045-EPP-1-2019-1-NL-SPO-SCP "New Health", addressed in 2019 - 2022, is focused on supporting healthy active living of young and adults in EU. Project coordinator is New Health Foundation from the Netherlands. Full partners are Sport Sciences School of Rio Maior (ESDRM) in Portugal, Europe Active in Belgium, Lithuanian Association of Health and Fitness Clubs in Lithuania, Fitness federation in Belgium, Association Europea Deporte, Ejercicio Y Salud (AEDESA) in Spain and Comenius University in Bratislava in Slovakia. Expert panel is representing by European Network of Sport Education (ENSE) in Austria, Movisie, Knowledge Center Sports Netherlands (KCSportNL), NL Active and Jan Middelkamp in the Netherlands. Project combined information about the new active living guidelines, the anti-doping code for professionals and consumers. The innovative character of the New Health Project is focused on: the Lifestyle is Medicine coach course that contains the new active living guidelines, the anti-doping code and a part of coaching health behaviour change including behaviour change models and theories and practical application tools, the creation of a European Healthy Lifestyle promotors network (network of professionals and volunteers that support family, friends, neighbours, colleagues in their lifestyle), recognition of the New Health Healthy Lifestyle promotor education on EQF level 2 by Europe Active Positive Health.

Key words: Healthy lifestyle promotor, Exercise as a medicine, Brain as a medicine, Food a medicine

Introduction

The WHO and the Health Council developed guidelines for healthy active living and improvement of the quality of life. Unfortunately, most adults and the elderly of today, as well as professionals in education, care, welfare and sports, have never learned these new healthy living guidelines. Socially, too, there is still insufficient movement in the direction of people learning to organize and manage their health in a preventive way. Unfortunately, the youth of today also do not receive these essential insights, with the result that many will follow the same path of health care to come, at one point, to the conclusion that one must change something in the lifestyle. And even then, for many it is still often a search for the right information. In this project the most important essential insights for a healthy life, body and mindset are summarized in short, enjoyable to watch mini documentaries, intended for everyone who wants to live healthier and all professionals who want to help and inspire people to a healthier lifestyle.

If people have the knowledge about the at this moment available healthy living guidelines, and what they can bring to health and quality of life if applying, but also what harm they bring if not, people would take steps and make choices to start a healthier life.

The aim of this project is:

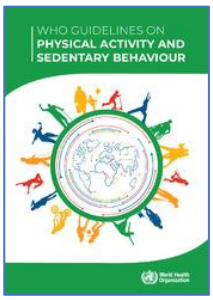
1. to educate professionals, volunteers, and
2. via the professionals and volunteers educate the consumer, especially the low SES, and when necessary, guide and coach them to a lifelong healthier live.

Within the project we use a New Health platform for online learning and communicate New Health lifestyle is medicine educational and inspirational material. The project will be developed within 36 months, and we are working with partner organisations in 6 EU countries; The Netherlands, Spain, Portugal, Lithuania, Slovakia and Belgium.

Goals of the New Health project:

- Improve the participation of sport and active living, especially among low SES and younger adults
- Improve a healthy lifestyle, consisting of physical activity, healthy food, a health mindset and social interaction between people
- Increase the knowledge about a healthy lifestyle, of professionals, volunteers and consumers, especially among low SES and younger adults
- Strengthened cooperation between institutes, foundations and (educational) organisation
- Sharing best practices between institutes and organisation in the field of sports and active/healthy living

New Health essential education



The 'New Health' program is informing and educating consumers and professionals/volunteers in sports and fitness about four guidelines.

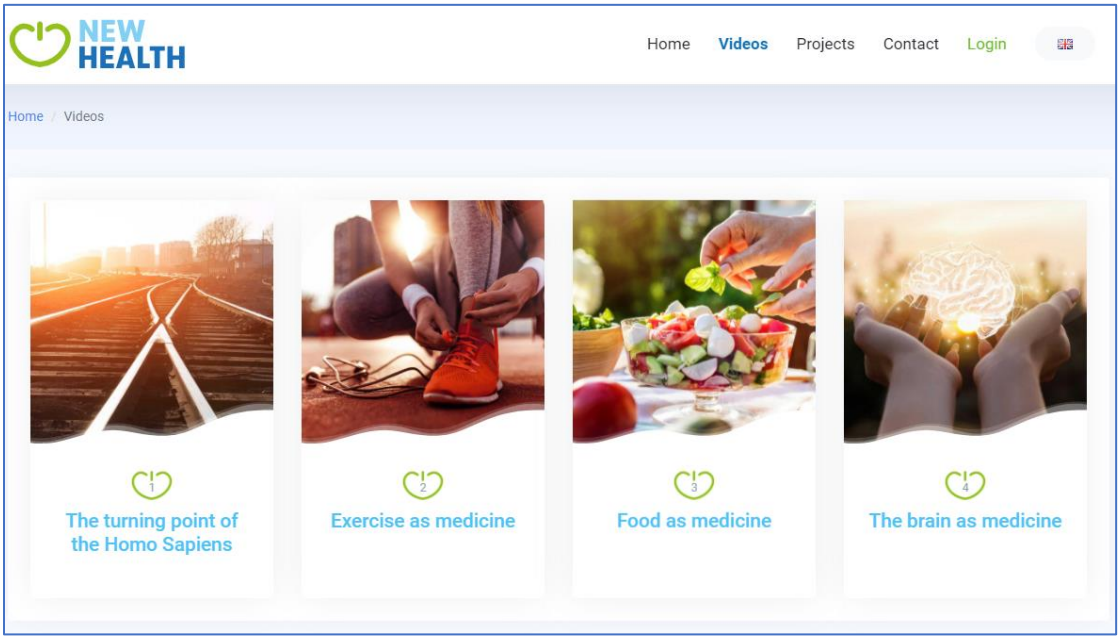
1. The WHO 'Global Guidelines of Physical Activity and sedentary behaviour'
2. The Health Council 'guidelines of good food 2015'
3. Up to date knowledge about developing a growth mindset
4. Positive Health Model
5. World anti-doping code, keeping doping away from recreational sports

Together these guidelines and this knowledge form an ideal health & prevention approach. Working on one of these theme's results in health gain, working on more than one themes, results in more health gain.

According to the WHO and Health council, applying the 15 lifestyle themes of the guidelines can lower the risk of chronic diseases with 50 to 80%. A second educational focus for professionals and volunteers is health behaviour guidance and coaching, learning about the most effective ways to help people to change their behaviour.

Essential healthy lifestyle knowledge for every human being!

New Health is developing a digital lifestyle & prevention education platform, with the essential knowledge, that every human being should have.



This programme is presented in 7 languages: Dutch, English, Spanish, Portuguese, France, Lithuanian and Slovaks.

New Health – Healthy Lifestyle documentary

Part one is the healthy lifestyle course and documentary. Consumers and professionals can join and walk true the following chapters:

Introduction: The turning point of the Homo Sapiens
- Chapter 1 - OUR HEALTH! - The current situation
- Chapter 2 - OUR EVOLUTION - 60.000.000 years
- Chapter 3 - OUR HABITS - How did we use our body and how did we eat
- Chapter 4 - OUR HISTORY OF SPORTS - Further evolution of our physical activity
- Chapter 5 - OUR INDUSTRIAL REVOLUTIONS - How machines made us less active!
- Chapter 6 - OUR FOOD INDUSTRY - Where did we lose control?
- Chapter 7 - OUR FUTURE - And the future of our children

Part 2: Exercise as medicine
- Chapter 1 – The inactive Homo Sapiens
- Chapter 2 – The effect of our inactive lifestyle
- Chapter 3 – Healthy active living recipe
- Chapter 4 – Exercise as medicine, how do we do that?
- Chapter 5 – The Homo Sapiens… back into active living

Part 3: Food as medicine
- Chapter 1: The history of our food
- Chapter 2: Programmed unhealthy
- Chapter 3: How do we eat now?
- Chapter 4: The healthy eating 'recipe'
- Chapter 5: Making the food switch

Part 4: The brain as medicine
- Chapter 1: The history of our brain
- Chapter 2: Phases of behavior change
- Chapter 3: Our levels of consciousness
- Chapter 4: Food for our sub-consciousness
- Chapter 5: The strength of our 3 brains
- Chapter 6: Essential conditions for change
- Chapter 7: Neuroplasticity, placebo and mindset
- Chapter 8: Developing more control over our mind
- Chapter 9: Mind(re)set strategy
- Chapter 10: Lifestyle and mindset

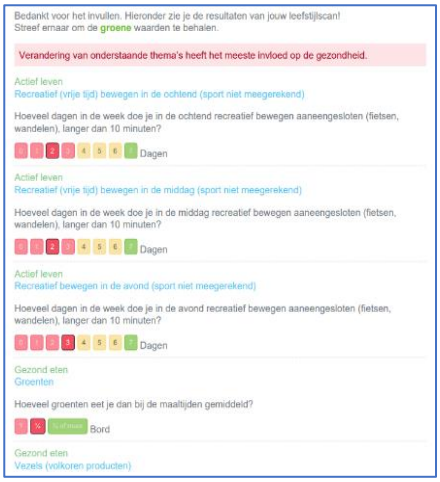
A New Health lifestyle scan and library for everyone!

The second part is the online health library, lifestyle scan and SWITCH program, where trainers, coaches, health care workers, volunteers etc. can together with consumers, do a lifestyle scan with themes of The World Health Organisation 'Global Guidelines of Physical Activity and sedentary behaviour' and the 'Health Council 'guidelines of good food 2015'.

Filling in this lifestyle scan, consumers receive a clear overview on what parts of their lifestyle harm their health significantly. Alone or together with a coach, users use a SWITCH choice to work on in the upcoming month. The program helps the user with the health library, that gives insight about the what, why and how of every lifestyle aspect in the scan.

Participants who work with the **New Health** program get access to the **New Health** personal online portal and library, where they can;

1. find background information (a factsheet) per theme
2. use the **New Health** lifestyle coach App
3. download and use inspirational posters per lifestyle theme.



The inspirational posters and Factsheet can be used by professionals and companies who want to use **New Health** for their employees.

Company's use this poster (to hang up in the employee room, at the coffee machine) to get the conversation going within the company about that specific health theme and to invite employees to start the coach tip program in their own portal.

Sports organisations together with educational organisations

In this project we connect sport and fitness organisations with educational organisations. The educational organisations educate the volunteers and professionals about the four guidelines and about a coach strategy to educate and coach the consumers about the health enhancement lifestyle SWITCH.

The volunteers and professionals will get insight about the healthy living guidelines and about the most effective way to help people mentally to overcome their personal barriers. With this extra mindset knowledge, it is possible to help people to a sustainably healthier lifestyle.

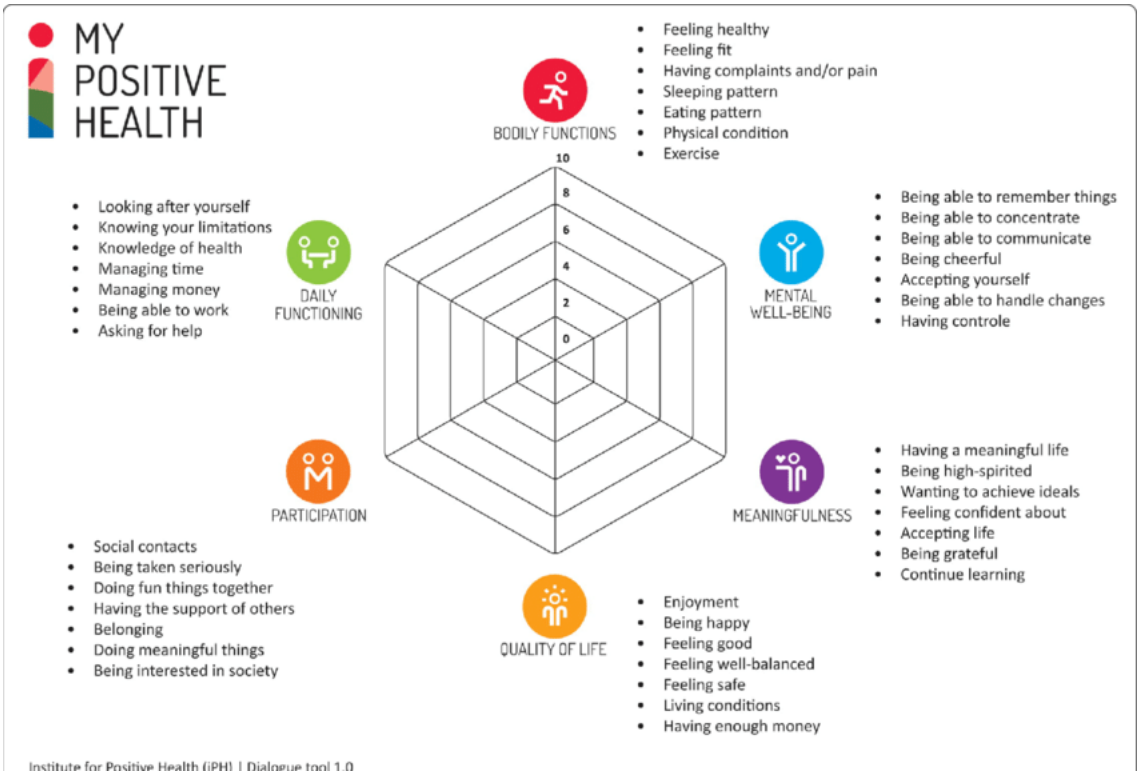
Innovative parts of the New Health 2022 project
What is the innovative character of the New Health Project?

- Combined information about the new active living guidelines, the anti-doping code for professionals and consumers
- The Healthy Lifestyle promotor course that contains the new active living guidelines, the anti-doping code and a part of coaching health behaviour change including behaviour change models and theories and practical application tools.
- The creation of a European Healthy Lifestyle promotors network (network of professionals and volunteers that support family, friends, neighbours, colleagues in their lifestyle).
- Recognition of the New Health Healthy Lifestyle promotor education on EQF level 2 by Europe Active
- Positive Health (see below)

Positive Health!

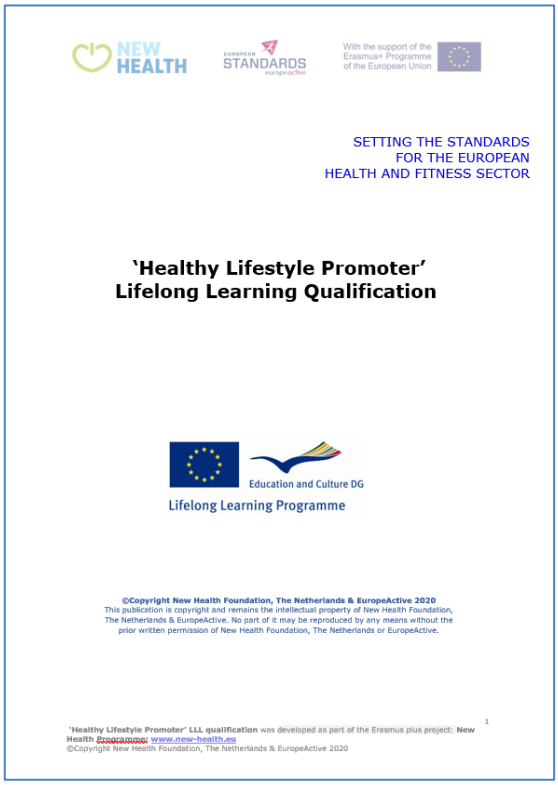
Positive Health is a new look at health and prevention. Physician and researcher Machteld Huber developed the Positive Healthy Spider Web based on the vision that health is 'the ability to adapt and take control in the light of the physical, emotional and social challenges of life'.

This model, including tools and working methods, will be added to the New Health toolbox for professionals.



Healthy Lifestyle Promotor

In collaboration with Europe Active and the New Health 2022 partners, a competency profile has been developed at level EQF 2. Level 2 has been deliberately chosen so that consumers can easily join in and so that it can be used as a 'Lifelong learning' training program for professionals.


NEW HEALTH
EUROPEAN STANDARDS europeactive
With the support of the Erasmus+ Programme of the European Union

SETTING THE STANDARDS
FOR THE EUROPEAN
HEALTH AND FITNESS SECTOR

'Healthy Lifestyle Promoter'
Lifelong Learning Qualification

Education and Culture DG
Lifelong Learning Programme

'Healthy Lifestyle Promoter' LLL qualification was developed as part of the Erasmus plus project: New Health Programme: www.new-health.eu

This is the first EQF competency profile in which substantive knowledge is immediately provided to participants, in e-learning/documentary form, free of charge for all participants.

Professionals can also choose to take a short Healthy Lifestyle Promotor course by any of the project partners and to take the recognized exam and obtain the official 'Healthy Lifestyle promoter' certificate.

Spreading the word!

The main challenge is, nationally and internationally, that governments don't have any money (or don't spend it on prevention) to make these guidelines known among the public and professionals, they leave that to the market. In the Netherlands, within one-year, New Health build a network of almost 400 professionals and volunteers, that receive the health enhancement inspirational material every two month to spread it to their own network.

New Health combines lifestyle issues like active living, healthy food, mental wellness, healthy aging and positive health for consumers and reaches professionals the tools to educate and coach people on these topics to create a change for live.

Project coordinator, partners, and expert panel

Project coordinator

- New Health Foundation: The Netherlands

Full partners

- Sport Sciences School of Rio Maior (ESDRM): Portugal
- Europe Active: Belgium

- Lithuanian Association of Health and Fitness Clubs: Lithuania
- Fitness federation: Belgium
- Association Europea Deporte, Ejercicio Y Salud (AEDESA): Spain
- Comenius University in Bratislava (Faculty of Physical Education and Sports): Slovakia

Expert panel

- European Network of Sport Education (ENSE): Austria
- Movisie: The Netherlands
- Knowledge Center Sports Netherlands (KCSportNL): The Netherlands
- NL Active: The Netherlands
- Jan Middelkamp: The Netherlands

With the support of the Erasmus+ Programme of the European Union

This program is supported by the Erasmus+ programma of the European Union.
Project information: https://ec.europa.eu/programmes/erasmus-plus

New Health mission for the future!

With the development of the New Health program, we try to bridge the gap between the essential healthy living guidelines of the WHO and the Health Council and the citizens who need this essential knowledge. Awareness about these essential insights is the foundation of making healthy choices. Because the guidelines are only fairly recent, generations of people have not been learning them on a structural basis and unfortunately most people have unwittingly started living so unhealthy that this takes a heavy toll on people's health and health care. Millions of citizens can be reached with the information of the New Health program through a European network of professionals in care, education, welfare and sport and through volunteers. Professionals and volunteers also gain insight into the basic insights of behavioral change guidance and developing a healthy mindset, but consumers can also go through this matter, so that they can take more control over their own lifestyle.

1000 professionals and 100,000 citizens!

An objective in a follow-up project of New Health is to train 1000 volunteers and professionals to become a Healthy Lifestyle promoter. These 1000 Healthy Lifestyle promoters each provide at least 100 people with the New Health documentary and have them go through the Lifestyle Scan.

Snowball effect!

Because the program is presented Dutch, English, Spanish, Portuguese, France, Lithuanian and Slovaks, we hope that we, together with the partners, will train thousands of Healthy Lifestyle promotors more in the upcoming years, and that the documentary will reach millions of people.

Lifestyle education in primary education

A long-term goal of the New Health foundation is getting the Healthy Lifestyle education integrated in primary education. When we don't teach our youth about the foundation and guidelines of healthy living, how than will they ever be able to make healthy choices. We should not let our health and lifestyle dependent on coincidence but should take responsibility for the health of the growing generations. Because we currently must assume that today's parents have also not received this essential knowledge, the implementation in primary education is a crucial step to effectively organize primary prevention for a healthier future. To realize this, we will have to translate the essential insights of a healthy lifestyle and healthy mindset into the perception of young people. A considerable project, which requires manpower, specialism, and budget, but where there is a perspective and mission, there will come solutions. For anyone who would like to contribute to the realization of this mission, feel free to contact us via info@new-health.eu

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info@new-health.eu

Partners Presentation

Asociación Europea Deporte, Ejercicio y Salud - AEDESA

Asociación Europea Deporte, Ejercicio y Salud (AEDESA) is an Association that aims to offer knowledge of sport and physical activity through the promotion, giving information and organizing sport events. Our mission as physical exercise professional is to believe in physical activity for the integral development of the humans. Promotion, conscience and educate in the importance of physical movement as felicity and good wellness. AEDESA aims to maintain relationships with all kinds of public and private organizations and entities within Spain, Europe and the rest of the world in defence of their interests. We develop informative and training actions through our entity, and we have qualified professionals for this purpose. In addition, AEDESA has various collaborations with various companies and entities in the sector, to promote the complementary training of professionals. Our actions are aimed at professionals in the physical activity and sports sector; students, monitors, sports technicians, etc; coordinators, directors or managers of facilities or companies in the sports or fitness sector.

The New Health project is very important for AEDESA because Spain needs to increase the rates of practice of physical and sports activity of its population to reach the levels of the most developed European countries and, consequently, reduce the rates of sedentary lifestyle, obesity and overweight that have such a negative impact on health and the economy of citizens, especially boys, girls and adolescents. In this sense, the objective is to aspire to have the same level as other countries with very low rates of sedentary lifestyle, where only 4% of its citizens do not perform physical activity in a normal week, in addition to having an average weekly hour dedicated to physical activity of 12.8 hours, according to the Ipsos Report "Global views on exercise and team sports" (2021).

Participating in this project is both for the organization and on a personal level, an opportunity to collaborate in the promotion of healthy habits and the practice of physical exercise in the European population. A way of offering quality, safety and qualified supervision of all those professionals who provide services to improve people's health and physical condition.

Within the New Health project, AEDESA collaborates with the other European partners in the development of tools and courses for disseminating scientific and quality information to improve physical activity, healthy eating, mental health, positive health and a healthy lifestyle. Those tools include the free consumer lifestyle platform, courses for those who promote health and healthy lifestyle; e-learning (electronic learning) and the creation of the figure of the promoter of a healthy lifestyle.

EuropeActive

EuropeActive is the leading not-for-profit organisation representing the European fitness and physical activity sector. According to the Deloitte Market Report in April 2020 (pre- COVID-19 pandemic) the sector serves nearly 62 million consumers, it generates 27.2 billion Euro in revenues, employs over 750,000 people, and consists of 62,000 facilities, and was growing at 3-4% a year compounded. Fitness is the largest participation sport (Special Eurobarometer, 2014 & 2018) and alongside its significant economic contribution, the sector has a major role to play in making a more active and healthier Europe, and in promoting the importance of healthy lifestyles for all. EuropeActive currently represents approximately 30,000 facilities it has 23 National Associations and a membership spread across 30 countries in Europe, which includes operators, suppliers, National Associations, training providers, higher education, and accreditation institutions.

EuropeActive can trace its origin to 1995 with the establishment of the European Network of Fitness Associations, and from 2001-2015 as the *European Health and Fitness Association (*EHFA), and then into EuropeActive. EuropeActive was one of the first members of the *Advisory Board for the European Week of Sport* and remains one of its most active partners. For several years EuropeActive has been represented on High Level Groups and in EU Expert Groups, including being an observer in the former EU Expert Group on *Health Enhancing Physical Activity*[1] and the EU Expert Group on Skills and Human Resources Development (2020)[2]. Through the close involvement with these Expert Groups and other EU initiatives, EuropeActive has been proactive in informing and supporting its members in a number of key policy areas. Between 2015-2017, EuropeActive successfully ran the Erasmus+ projects Promoting Active and Healthy Ageing (PAHA) and Active Learning for Children in Schools (ALCIS 1 and 2) encouraging 28,000 + Europeans into adopting physical activity at a level that is beneficial to their health. These projects were targeting school children (aged 8 to 12) and older inactive adults (aged 55 to 65) across 16 EU Member States.

Between 2018-2020, EuropeActive has run the Let's #BEACTIVE project to promote physical activity (PA) and to encourage citizens to lead healthy lifestyles and as recommended in the EU and World Health Organisation Physical Activity Guidelines. From 2017, EuropeActive organised the #LetsBEACTIVE campaign together with its members, partners, fitness clubs, and our national fitness associations. The event represented the European fitness sector contribution to the European Week of Sport.

EuropeActive is currently running two E+ projects to promote HEPA. The first is through the highly successful National Fitness Days to promote the European Week of Sport in 4 non-EU

[1] European Commission: Expert Groups (EU Work Plan for sport 2014-2017), Brussels 2017.
[2] https://op.europa.eu/en/publication-detail/-/publication/8f28e3a0-6f11-11ea-b735-01aa75ed71a1

countries through effective campaigns which are based on the success experiences from Ukactive and Ireland Active, and the second called Active Ageing Communities which is an intergenerational approach to encourage older adults to become more active and to adopt healthy lifestyles.

In 2020 EuropeActive launched a new strategy in a Sectoral manifesto comprised of 4 pillars – Health, Digital, Community and Standards. Under the community pillar EuropeActive promotes the concept of active citizenship and is working to align our businesses and organisations with specific UN Sustainable Development Goals, including environmental protection and Co2 reductions, and to have an inclusive approach to citizens and consumers.

EuropeActive had no hesitation in becoming a partner in the New Health Project, targeted as it is on promoting healthy, active lifestyles across Europe. EuropeActive's role in the project has been essentially twofold, that is to produce a set of educational standards that would support the on-going training of healthy lifestyle promoters across Europe and to oversee a comprehensive communication plan to effectively disseminate the objectives and activities of the New Health Project, in order to maximise its scope and implementation. This dissemination plan includes the running of multiplier events in partner countries as well as a final conference in Amsterdam to promote the healthy lifestyle assessment tools, supporting information and Healthy Lifestyle Promoter role.

In its development of educational standards to support a Healthy Lifestyle Promoter role, EuropeActive's Professional Standards Committee formed a Technical Expert Group (TEG) made up of educational experts from across the fitness and physical activity sector. These experts over the course of a number of TEG meetings developed the first draft of an EQF Level 2 Healthy Lifestyle Promoter Lifelong Learning Qualification. The job purpose of this Healthy Lifestyle Promoter was identified as *'To promote healthy lifestyle information to communities and individuals using available tools and educational materials.'* Within this job purpose, units of learning outcomes were developed focusing on organisational, legal and ethical issues associated with the role; the promotion of healthy lifestyles; lifestyles assessment tools and sources of healthy lifestyle information. These draft Standards were then put out to external consultation across the European fitness and physical activity sector before being established on EuropeActive's Sector Qualifications Framework. It is hope they will be the basis for the training of an army of Healthy Lifestyle Promoters across Europe who will positively impact on the health and vitality of European citizens for many years to come.

FITNESS.BE

Fitness.be is the working name of the Belgian Fitness Organisation, which provides social and economic support to the fitness sector. It does so via the not-for-profit professional association

BBF&W (Belgian professional association for fitness and wellness companies), and by providing training courses and continuing education via the Fitness.be Faculty. Their main objectives are to represent interests, provide services and issue communications related to the structured promotion of a professional and high-quality fitness sector. Fitness.be aims to position the fitness sector as a fully-fledged economic entity within the preventive healthcare sector.

Vision: Fitness, group fitness and personal training provide an ideal solution to the increasing sedentary nature prevalent in society. This safe, efficient, pleasant type of exercise, suitable for everyone, can help us all strive towards a healthier society.

Mission: To use the fitness and group fitness offering to raise awareness of healthy physical exercise, without the use of performance- and image-enhancing drugs. To convince fitness professionals, partners, the government and its officials to work together to achieve this goal, based on the quality of exercise on offer.

The role of Fitness.be in the New Health Project

As a project partner, our task is to provide feedback, translations and dissemination. We will also be rolling out the project in Belgium, where we have already made major advances in terms of getting out the word with respect to the lifestyle scan – over 10,000 people in Belgium have already completed the scan, making them aware of their strengths and, more importantly, their points for attention. The scan has also shown them how they can turn certain weaknesses into strengths.

The New Health Project can have a major impact when it comes to awareness on the part of all participants. Health statistics in Belgium are not heading in the right direction, with cases of obesity, diabetes and cardiovascular disease rising each year. Furthermore, these diseases of affluence are afflicting people at an increasingly younger age.

Our mission is to make as many people as possible aware of their unhealthy lifestyle and to provide solutions, which is why we will train as many people as we can to become healthy lifestyle promoters so that they in turn can help others to make the move to a healthier and more active lifestyle

The Sport Sciences School of Rio Maior - ESDRM

POLITÉCNICO DE SANTARÉM
ESCOLA SUPERIOR DE DESPORTO DE RIO MAIOR

The Sport Sciences School of Rio Maior (ESDRM) is a Portuguese public higher education school integrated in the Polytechnic Institute of Santarém (IPSantarém) (https://siesdrm.ipsantarem.pt/esdrm/si_main). ESDRM was establish in 1997, in the city of Rio Maior (near to the capital – Lisbon), as known by "City of Sport" (https://www.desmor.pt/).

Actually, ESDRM has 5 bachelor's degrees: Physical Activity and Lifestyle (European bachelor); Sport Coach; Fitness & Health; Outdoor Activities and Sport Tourism; Sport Management); and 3 master's degrees: Sport Coach; Physical Activity and Health; Sport and Recreation; and also 1 professional programmes (EQF-level 5) in Surfing.

ESDRM is integrated in the consortium of 3 research centre's: Research Centre in Sport, Health & Human Development (CIDESD) (https://cidesd.utad.pt/); Research Centre for Quality of Life (CIEQV) (https://www.cieqv.pt/pt/inicio/); and Centre for Tourism, Research, Development and Innovation (CiTUR) (http://citur-tourismresearch.com/pt/), all of them supported by the National Foundation for Science & Technology (FCT).

ESDRM Key activities are Training/education; Research; Consultation and community projects; Development of the technical, scientific, and cultural exchange with national and international, private and public institutions, which have similar goals; Participation in national and international cooperation I&D projects. ESDRM has: 135 staff members (42 teachers full-time; 73 teachers part-time; 20 staff workers); 1019 students (887 bachelor; 95 masters; 37 EQF-level 5 programmes).

Susana Franco and Carla Borrego are Associate Professors of ESDRM, and Vera Simões is Assistant Professor of ESDRM, and work in New Health 2022 project. Their activities in the project are: Participate in development of EuropeActive occupational standards for Healthy Lifestyle Promoter; Translation the course and voiceover into Portuguese; Support researcher in coach program, portal, app; Educating Healthy Lifestyle Promoter; Evaluation report.

Particularly in Portugal, more than half of the population are obese or overweight, and more than 2/3 of the population never engage in exercise or play sport. Also, Portuguese eating habits have been getting worse, and levels of depression and anxiety are increasing. It's urgent to educate Portuguese population for them to improve their healthy lifestyle. The Portuguese have worse and worse lifestyles, with the consequent quality of life, diseases and financial burden for governments to treat. It's necessary to invest more on health prevention. That's why New Health 2022 project it's so important to contribute to this objective.

LSKA – Lietuvos sveikatingumo klubų asociacija

LIETUVOS SVEIKATINGUMO KLUBŲ ASOCIACIJA

Lithuanian Association of Health and Fitness Clubs (www.lska.lt) was established on April 4th, 2013 m. The members of LSKA are the biggest chains of H&F clubs in Lithuania ("Impuls", "Lemon Gym", "Gym+", "Apelsinas"), also other sports clubs, studios, exercise professionals. Since 2014, LSKA is a member of Europe Active. The mission of LSKA is to engage more Lithuanian population to fitness and physical activity for better health and quality of life. The main aims of LSKA are:

- To promote the active lifestyle and sports activities of the Lithuanian people and initiate projects for health promotion and physical literacy
- To increase attendance at sports and health clubs
- To improve the country's legal and tax framework governing the activities of fitness clubs
- To introduce classification indicators for fitness clubs
- To introduce qualification requirements in the work of employees of fitness clubs, and to contribute to the development of educational programs
- To publicize the positive image of health and fitness activities and conduct research on the Lithuanian fitness market
- To collaborate with sports, health and educational institutions to achieve interrelated goals.

LSKA is a mediator between H&F clubs and universities, training providers, annually provides conferences, educational lectures, webinars for fitness professionals and general population. EuropeActive on 2015 signed the Memorandum of Understanding and Trust with the LSKA. LSKA started to be recognized as the approved body of EREPS (*European Register of Exercise Professionals*) in the country, ensuring that fitness professionals hold the required European level of qualification. Being a part of EuropeActive, EREPS and participating in various European H&F events, LSKA shares with the newest worldwide fitness trends, training principles and methods, and ensures the highest competency level for exercise professionals and employers. LSKA successfully participated in the international projects:

- Erasmus+ Sport programme supported by EC Project – ALCIS - Promoting Action Learning for Children in School (2015) and ALCIS 2 (2016)
- International project supported by EASE, UNI Europa Sport and EC - Supporting the test phase of the European Sectoral Social Dialogue Committee for sport and active leisure (2016-2017).
- Erasmus+ Sport programme supported by EC Project – Let's #BEACTIVE (2018-2021).

LSKA is actively involved in many processes related to the increasing impact of community-based interventions in healthy ageing through a more active society. The proportion of physical inactivity of citizens in the EU and Lithuania remains unacceptably high. Around half of Lithuania citizens do not exercise or play sport at all. In addition, Lithuania faces with low level of health literacy, which is associated with less healthy choices, riskier health behaviors, poorer health, higher costs, and misuse of health services. This might indicate that the message about the importance of sport and physical activity for an individual's health and wellbeing has still not got through to significant segments of the population. It is also notable that participation levels are much lower among those who have lower levels of education, and among those in a more difficult financial situation.

New Health Programme 'Lifestyle is medicine' is to provide sports- and lifestyle organizations, professionals, volunteers, and consumers with easy to obtain and to understand knowledge and

tools to improve physical activity and healthy lifestyle. Increasing health and physical literacy provides citizens with more opportunities to develop personal and collective knowledge and skills, to create a health-enhancing environment, and health policies. People gain more self-confidence by making positive decisions about their health, changing their lifestyle and living conditions. Health literates are more active in economic prosperity, have higher incomes and employment, are better educated and informed, contribute more to community activities and enjoy better health and well-being. Therefore, participating in the project for health promotion and physical literacy is important target for LSKA.

PhD Simona Pajaujiene and PhD Aurimas Maciukas are persons who drive this project In Lithuania. Simona and Aurimas believe, that with this project Lithuanian inactive part of population will become more active due to impact of promoters for healthy lifestyle.

Comenius University in Bratislava
Faculty of Physical Education and Sports

Faculty of Physical Education and Sports is a public state-funded academic, educational and research institution within the oldest Slovak university – Comenius University in Bratislava. The faculty is a leading institution in Slovakia within the field of sport sciences and education of sport professionals cooperating with other key organizations, for instance Slovak Ministry of Education, Science, Research and Sport of SR, Slovak Academy of Sciences, Slovak Olympic and Sport Committee and National Sport Centre. Besides education, the research focus of the faculty with the longest history lies within functional assessment of physical performance ranging from school children to top athletes, followed by prescription of exercise programs for various populations. Another main area of scientific activities represents studying the aspects of physical activity as a preventive and treatment modality. Aging and Lifestyle Diseases Research Centre has been created in 2013 and in 2020 was open Centre for Active Aging (CAA).

Key activities: all university level education of sports and PE professionals (coaches, P.E. teachers), research in majority of sport sciences fields (exercise physiology, sport humanities, antidoping, health oriented exercise programs), promotion of physical activity for health, collaboration at national and international level with universities and other sport related bodies (e.g. Slovak Olympics Committee, Slovak Anti-doping Agency, FIEPS, sports associations and federations), development of national guidelines for physical activity (e.g. children, elderly population)

Affiliations: Slovak Anti-doping Agency, National Sport Centre, Slovak Olympic and Sport Committee, 32 Erasmus+ university bilateral agreements, FIEPS, ICSSPE, Slovak Ice Hockey Federation, Slovak Canoe Association, Slovak Weightlifting Association, Slovak Basketball Association, Slovak Volleyball Federation, Slovak Swimming Federation, etc.

Exercise as a Medicine – Selected Findings from Literature Review in Slovakia

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Abstract

The "Exercise as a medicine" section deals with the positive effects of exercise on the health of people of different ages or people who have been diagnosed with different types of the disease. Properly selected types of exercise programs of moderate intensity of continuous physical activity or high-intensity interval physical exercise with a longer duration of the training unit seem to demonstrably improve somatic indicators, contribute to better physical and functional performance of people and eliminate harmful effects of long-term sedentary work or unhealthy lifestyle. Long-term inactivity can result in a number of health complications and cause cardiovascular as well as respiratory problems. It can also reduce the elasticity of muscles and their atrophies, inflammatory processes in the body or osteoporosis.

Key words: Exercise, health, lifestyle, medicine

In article which is focus on active older adults Kováčiková et al. (2020) constate that limited physical functional performance as a consequence of aging is considered as a possible contributor to falls in older adults, even in physically active ones. Purpose: This study determines which clinical and laboratory tests simulating activities of daily living could distinguish age-related differences in functional performance of physically active older adults. Material and Methods: In this study, 30 participants aged 60–69 years (23 females and 7 males; age 65.5 ± 1.9 years; height 168.0 ± 10.4 cm; weight 74.7 ± 13.0 kg) and 20 participants aged 70–79 years (14 females and 6 males; age 74.9 ± 5.0 years; height 166.7 ± 10.5 cm; weight 70.2 ± 12.7 kg) underwent battery of clinical and laboratory tests. Time to complete the five-repetition sit-to-stand test (5RSTS), maximal reaching distance in the frontal and sagittal plane and centre of pressure (CoP) sway in the anteroposterior (AP) and mediolateral (ML) directions during bipedal stance were evaluated. In addition, CoP sway and its AP and ML components during stair descent (CoPAP and CoPML) and in the first 5 s of re-stabilization (CoPAP-5 and CoPML-5) were evaluated. Results: Older adults over 70 years of age achieved significantly longer time in the 5RSTS test (12.3%, P = .035, d =.632) and had significantly higher values of CoP sway in the first 5 s of re-stabilization (CoPAP-5 19.4%, P = .003, d = .889; CoPML-5 15.7%, P = .044, d = .593) compared to those aged 60–69 years. Conclusions: Differences in balance control attributable to ageing were more readily seen under more challenging conditions. Only the 5RSTS test and stair descent from one step onto a compliant surface test were able to reflect differences in functional performance between two groups of physically active older adults.

Aim of Oreská et al. (2020) research focused on physical performance in the elderly was to identify the effect of the multimodal strength-endurance and aerobic-coordination training on the parameters of physical performance in the elderly, such as maximal walking speed and 5x sit-to-stand test. Volunteers were distributed into two groups. 1) training group took part in the 12-week multimodal strength-endurance and aerobic-coordination training programme, and the 2) control group participated in the stretching exercises. According to the effect of the training programme, the training group improved in the 10m maximal walking speed test and 5x sit-to-stand test. The study may have a beneficial impact on the commercial area, for coaches and medical practitioners, who work with the elderly population.

Sedentary behaviour of older people was topic of research of Pechová et al. (2019). Older adults are considered the most sedentary and the most fragile group in our society. Understanding how seasonal and meteorological factors impact the sedentary behaviour (SB) is important for developing of strategies to improve their health. Therefore, the purposes of the present study were to examine: (1) potential spring-autumn variation in SB patterns among older adults from Central Europe, and (2) possible interactions between weather conditions and SB patterns. Methods: 83 participants aged 55+ were repeatedly measured by accelerometers for one year – in spring and autumn months. Data about SB, physical activity (PA) and meteorological factors (daylight length, average precipitation and temperature) have been collected during both seasons. SB intervals (bouts) with a duration of 1–4, 5–9, 10–19, 20–29, 30–39, 40–59, and 60+ minutes were extracted to observe the spring-autumn differences. Results: In older adults, total sedentary time was 412min and 435min in spring and autumn, respectively ($p<0.001$). In both seasons, approximately 85% of

daily bout frequency comprised bouts ≤10 minutes long. Regarding to sedentary bout duration, about 45% of the daily sedentary time was accumulated in bouts ≤10 minutes long. No significant differences between spring and autumn about the duration of sedentary bouts ($p>0.05$) and frequency of sedentary bouts lasting ≥20 minutes were found. Looking at weather conditions, SB was significantly lower when the temperature was above 10°C in the autumn ($p<0.01$). Daylight length and average precipitation were significantly associated with total sedentary time; however, the associations differed in seasons. Conclusions: Although total sedentary time was slightly higher in autumn compared to spring, SB patterns did not differ significantly between spring and autumn. Overall, weather conditions appear to be important factors related to SB in elderly. Both, total sedentary time and SB patterns in relation to weather conditions should be considered when targeting older adults' SB and PA interventions in different seasons.

Agility performance in middle-aged and older subjects was topic of study of Horníková, Doležajová and Zemková (2018). Both reaction time and agility times increase with advancing age. However, it is not whether and to what extent regular practise of sport such as table tennis contributes to faster decision-making and movement speed in middle-aged and older adults. The aim of this study was to compare agility time in table tennis players and sedentary subjects of different ages and also to investigate the relationship between agility time and age in these groups. Forty-four young, early middle-aged, late middle-aged and older table tennis players and forty-eight sedentary subjects of matched age performed the agility test consisting of movement reactions to visual stimuli. ANCOVA revealed a significant difference in agility time between table tennis players and sedentary subjects when the effect of age was controlled ($F(1, 89) = 46.1$, $p < .001$). Agility time was significantly shorter in early middle-aged (435.8 ± 35.6 ms and 483.8 ± 36.5 ms, respectively; $p = .006$), late middle-aged (481.0 ± 36.8 ms and 530.7 ± 31.8 ms, respectively; $p = .004$) and older (500.9 ± 24.4 ms and 564.5 ± 44.9 ms, respectively; $p = .007$) table tennis players than sedentary subjects. In addition, there was a significant relationship between agility time and age in sedentary subjects ($rp = .73$, $p < .001$) and table tennis players ($rp = .53$, $p < .001$). Agility time is shorter in early middle-aged, late middle-aged and older (≥ 60 years) table tennis players compared to age-matched sedentary subjects (9.9%, 9.4%, and 11.3%, respectively).

Nemček, Labudová and Kraček (2012) were focused in their research on quality of life. Life satisfaction of a man is closely related to the assessment of quality of life, but it also reflects the lifestyle, which should include the regular participation in physical activity. Therefore, this research contributes to knowledge of the life satisfaction of the population in relation to sport. The largest percentage of our group (n = 452) consisted of recreational athletes (59.5 %), 25.7 % of all respondents were elite athletes and 14.8 %, sedentary people. To collect an empirical data we used a standardized questionnaire SWLS. We evaluated the significance of differences between the level of life satisfaction and groups of respondents, by the Chi – square. The results showed notable differences in levels of life satisfaction in terms of sports, where a significantly higher satisfaction with life, showed the group of people regularly performing sport activity (elite and recreational levels) compared to the population favouring a sedentary lifestyle. Sport and active lifestyles are important resources that contribute to increase life satisfaction of citizens.

Evaluation of the effect of aerobic exercise was topic of research of Lipková and Kyselovičová (2011). The aim of the study was to evaluate the effect of aerobic exercise on blood (BP) and intraocular pressure (IOP). A group of six female patients, mean age 54 + 3,4 years, with pharmacologically treated open angle glaucoma were enrolled in 3-months aerobic exercise program (formed by aerobics and fit ball exercises) with frequency of sessions 2-times per week. The values of intraocular pressure varied before intervention in the normal range. After the program IOP was reduced more, with exception of one slight increase, but the value does not exceed the standard. There were no differences in blood pressure between input and output values. No significant pressure variation during the day, neither hypotension was found out. In patients with borderline low blood pressure a slight increase in systolic and diastolic pressure was recorded after the intervention. Regarding the impact of acute exercise on blood pressure the unambiguous assessment cannot be done. However, in some cases the pressure was increased immediately after the exercise, and a reduction in systolic and diastolic pressure was recorded as well. The results of our study suggest a positive impact of aerobic program on retention the risk factors of glaucoma under the control.

Vandáková, Péliová and Kyselovičová (2018) was focused in their study on physical activity of women. In the study theiy determined the influence of a special, 3 months training program on selected somatic and metabolic parameters of two different age groups in adult women. Based on an invitation offered in the "Mrs.Sporty" fitness centre in Senec, 180 women volunteered in the research. Volunteers were divided in two groups based on age: the "A" group comprised of 90 women aged 25-45, while the "B" group consisted of 90 women aged 46-65. For the period of three months, all women regularly participated in a special aerobic circuit training three times a week. By comparing the input and the output data, we monitored changes in observed somatic characteristics (body weight, BMI, visceral fat level, total fat level, active muscular tissue, WHR) and metabolic characteristics (basal metabolic rate, metabolic age). In both groups, the results for somatic parameters confirmed a statistically significant decrease of values ($p \leq 0.01$) in favour of the output data. In case of most parameters, comparing differences between groups proved statistically insignificant. Significant differences ($p \leq 0.01$) in favour of older women were detected in case of the WHR. In both groups, the results for metabolic parameters of the showed an insignificant increase of basal metabolic rate values, along with a statistically significant decrease of metabolic age ($p \leq 0.01$). Discovered differences in metabolic parameters between the groups proved to be statistically insignificant. Based on the result we conclude that regular aerobic activities combined with targeted exercise, particularly the "Mrs.Sporty" training program, have a demonstrably positive effect on changes in selected somatic and metabolic parameters in the adult healthy women.

Physical activity of women was topic also of study of Rýzková and Labudová (2019). Aquafitness is a vertical position physical exercise in the water. It is still growing in popularity because of a positive influence on the physical fitness and health of various population groups. The aim of work was to investigate the effects of aquafitness programs in shallow water with moderate intensity continuous and high intensity interval physical loading on the selected biological and motor parameters of postmenopausal women, and thereby contribute to widen this field of knowledge. Thirty

postmenopausal women participated. The groups were continuous exercise (n = 10), interval exercise (n = 10), and control (n = 10). Exercise groups completed a 12-week aquafitness programs with continuous or interval physical loading and a frequency of sessions three times per week. The control group with sedentary behaviour did not participate in any organized physical activity. We examined selected parameters using the methods of measurement and testing. Lipid profile included total cholesterol, HDL-cholesterol, triglycerides (all measured by Reflotron Plus), LDL-cholesterol (Friedewald equation) and the ratio of total cholesterol to HDL cholesterol. The level of physical fitness was measured by the PWC150 test and the motor tests. After 12 weeks of aquafitness programs, both continuous exercise and interval exercise, showed a significant decrease in waist circumference ($p > 0,01$), hip circumference ($p > 0,05$), body fat ($p > 0,01$), triglycerides ($p > 0,05$ for continuous exercise group, $p > 0,01$ for interval exercise group), cholesterol ratio ($p > 0,01$ for continuous exercise group, $p > 0,05$ for interval exercise group). Both exercise groups significantly improved dynamic balance, flexibility of the hamstrings and lumbar spine and strength endurance of the lower extremities ($p > 0,05$). Only continuous exercise group significantly decreased their body weight, BMI, total cholesterol and significantly increased their HDL-cholesterol ($p > 0,05$). Only interval exercise group significantly increased their aerobic power ($p > 0,01$). Based on our findings and in coherence with authors researching similar problematic, we can recommend implementation of moderate intensity continuous physical loading with longer duration of training unit as well as high intensity interval physical loading (Tabata) with shorter duration of training unit into aquafitness programs for women after menopause.

Rýzková, Labudová, Grznár and Šmída (2018) were focused in their study on physical activity of college students. The aim of the study was to investigate the effect of a 10-week aquafitness program with the inclusion of high intensity interval training on selected biological and motor parameters of female college students. Sixteen volunteers (age: 21.1± 3.2 years, body height: 171.0 ± 5.6 cm and body mass: 60.62 ± 5.5 kg) were randomly divided into two groups. A control group (CG, n=8) continued with their regular daily activities without involvement in any physical exercise program. An experimental group (EG, n=8) completed a 10-week shallow water training program with a frequency of 50-minute sessions twice per week. Three blocks of HIIT (Tabata format) were included into the continuous aerobic training unit. The physical activity intensity level was measured by the heart rate monitor (Polar RS400). EG showed a significant decrease in waist circumference, body fat percentage, waist to hip ratio, resting heart rate, an improvement of static balance, flexibility of the hamstrings and lumbar spine ($p < 0.05$) and dynamic balance ($p < 0.001$). Aquafitness with inclusion of HIIT can offer significant benefits in physical fitness of female college students.

Physical activity of male college students was topic of research of Tibenská, Nagyová and Ludvig (2019). The research was focused on the changes in some anthropometric characteristics of students of the Faculty of Pharmacy, Comenius University in Bratislava. The investigated set consisted of 35 male students in a 1st year of study, who's mean (average) age was 19.05 ± 0.82. After successful passing four semesters of the "Physical Education and Sport" course, decrease in thickness of skin fold Biceps and Supraspinal was investigated, respectively. There was found

increase in thickness of skin fold Triceps, Subscapular and index of centrality value as well. None of the changes observed was considered statistically significant.

Pělucha a Hančák (2019) were in their research focused on physical activity of college students. The aim of their work was to find out the developmental trends of aerobic performance in the seven-year period of 1st year students of FCHPT STU in Bratislava and to find out the differences between men and women. The research sample consisted of 3330 students of FCHPT STU (967 men and 2363 women). The aerobic performance was calculated based on endurance Beep test (20 m sections per signal) (Moravec et. al. 2002). The developmental tendencies of aerobic performance are similar in men and women. Both show a variable character, with a decreasing trend. When determining the effect of a seven-year period on aerobic performance, we found out significant relationships in both men and women ($\chi^2 = 39.59$; $p < 0.05$; $\chi^2 = 86.9$; $p < 0.01$). When looking for the relationship between the levels of aerobic performance in the seven-year period, we found out a significant relationship in both men and women ($\chi^2 = 39.59$; $p < 0.05$; $\chi^2 = 86.9$; $p < 0,01$). Looking for differences in aerobic performance between men and women, we found out statistically significant differences in all categories ($p < 0,01$).

Physical activity of college female students was topic of the study of Harmadyová, Scíranka and Pavlíková (2019). The aim of study was to extend findings about free time activities of the female students of selected faculties of Comenius University. 200 female students of Faculty of Natural Sciences and Faculty of Arts of Comenius University in Bratislava participated. To obtain empirical data, we used a non-standardized questionnaire. To process data the Chi-quadrate (χ^2) was used. Based on the results, we found out that the most frequent leisure activities include reading books, hang out with friends and listening to music, and sports was chosen for the fourth place. The most important aspect of sport was the health aspect. We found a statistically significant.

Research focus on physical fitness was made by Šmída, Macejková and Rýzková (2018). Aim of this study was to investigate changes in blood sugar level after aerobic workout on rowing ergometer. Tested group consisted of Slovak rowers (n: 6, average age: 22.2±4.9 years, average height: 183.5±4.0 cm, average weight: 79.5±6.0 kg). Group undertook 4 tests: lactate curve, glycaemic profile, rowing exercise at intensity of anaerobic threshold (IANT) and rowing exercise at intensity of aerobic threshold (IAT). Blood sugar level was measured during 120 min. intervals before workout and after workout with Accu-Chek Active unit. We used nonparametric Wilcoxon signed-rank test ($p<0.05$) for dependent files for evaluation of the results. Results have shown that the difference between average fluctuation of blood sugar during 120 minutes post- and pre-workout is not significant. Difference of glycaemia (by 2.2 mmol.l-1, 46% resp.) immediately before and after the IANT test was significant ($p<0.05$). Difference of glycaemia (by 0.4 mmol.l-1, 7% resp.) immediately before the IAT test and after the test was not significant.

Research on physical fitness was presented by Baran (2015). The aim of his work was to assess the most common injuries, which occur during training and competition in diving, to analyse their causes and propose a model for strength training for divers, which would have contributed to minimise the risk of these injuries.

The same topic has study of Ferenc (2017). Today people are giving hight importance to stretching in sport or physiotherapy sphere. At the end of the training, most athletes do not like to do stretching exercise or they don´t have a time for it. Likewise, in some sports is stretching on secondary place despite of it is prevention of the damage and activity for improving performance in sport. From a physiological aspect is confirmed, that doing stretching immediately after the end of training, can help to faster regeneration and relaxation of the muscles. In many cases, it has been shown, that the well-chosen type of stretching before to starting of training has a positive effect on the performance in sport. In his contribution it was strive to importance and irreplaceability of stretching exercises performed before or immediately after the end of any type of sport, whether winter or summer.

Physical fitness was also topic of the research of Belás and Rýzková (2018). The aim of the research was to assess the impact of a long-term training program built from conventional cycling on the development of the current population. Trainer's effectiveness indicators were general exercise performance tests. The experimental set achieved statistically significant gains in general exercise performance tests after completing the training program when compared to a control group that did not complete the training program.

Physical activity and bone metabolism was topic of research of Kovárová and Hamar (2015). The susceptibility of bones to external mechanical stress represents the possibility of influencing bone tissue even without pharmacological preparations. The paper describes the structure of bone tissue and the nature of the mechanical stress that elicits an osteogenic response in the body. Synthesizes knowledge about the influence of age and regular physical activity on bone density. Finally, it offers partial results of research monitoring the acute response of bone metabolism to the strength training.

Dobay, Bánhidi and Šimonek (2018) were focus in their study on health habits of adults. The purpose of the research was to present results of an international study are presented regarding the traveling habits of adults who participated in outdoor education programs during their childhood. Materials and methods: in the survey, 2965 Slovak and 2404 Hungarian adults were studied to determine if there is any correlation between school experience and travel behaviour. In both countries, there are serious discussions as to why school education should offer and support school camps, which teach children sport skills while they are away from home. The data were processed using the Statistica program. Results: In both countries, one out of every five individuals (21.6% SK; 22.2% HU) participating in the study take a vacation in the summer months. As children, many (84.5% SK, 92% HU) of the participants took part in school water sport camps. Of these participants, 65.8% of the Slovaks and 60.2% of the Hungarians rated the time spent there as very positive. Among the positive values, 44.2% indicated that the mountains were a favourite and frequently a chosen travel destination. Twenty-five percent of the respondents spend more than four hours hiking during their vacation. Conclusions: Based on the results of our survey we can conclude that the camps in the mountains can be considered as a useful outdoor program (5-7 days), where the students can experience traveling, living together and having fun.

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Exercise as a Medicine – Selected Findings from Worldwide Literature Review

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Abstract

Research by many experts suggests that the promotion of physical activity, for example, reduces the risk of sarcopenia, which is characterized by loss of muscle mass, strength and function. Resistance exercises with load control performed under the supervision of experienced trainers or physiotherapists have demonstrably eliminated problems caused by the physiological process of aging or a number of chronic diseases. In addition, research into the susceptibility of bones to external mechanical stress provides much stimulating information for the development of exercise programs aimed at injury prevention through special strength training. In addition, physical activity has been shown to be beneficial for patients with diabetes mellitus. Not only was there a reduction in the use of drugs or their discontinuation in some patients, but positive findings were also recorded in somatic parameters and their levels of triglycerides and HDL, "good cholesterol". Controlled weight reduction in overweight women has also been shown to be very significant, as rapid weight loss has been positively correlated with the risk of ring cancer due to estrogen overproduction.

Key words: Exercise, Medicine, Physical activity

Thomson (2007) wrote that Sarcopenia is the loss of skeletal muscle mass resulting in a reduction of physical strength and ability to perform activities of daily living. This loss of skeletal muscle leads to diminished quality of life, loss of independence, and mortality. This loss of independence represents a high economic healthcare burden and area of high medical need. 33% of people 65+ years are put into long-term healthcare facilities due to their physical frailty and their inability to maintain prerequisite activities of daily living, with most frail elderly facing > years of self-care disability at the end of life. If people don't work their muscles before sarcopenia becomes higher, it won't matter the therapy you do because there are no therapy that can restore the muscle in those conditions. Even though growth hormone replacement to subjects with growth hormone deficiency has been shown to improve muscle mass, it is less clear if growth hormone replacement is efficacious in elderly sarcopenic subjects. Nowadays there are no therapies that can help you to stop sarcopenia when it is already advanced. However, what we can do is do a little bit of physical activity each day to prevent it from the beginning.

Lurati (2018) constates that nowadays, there are many jobs that involve many hours of sitting without any physical activity, which leads to a huge amount of health issues and long-term consequences. These may include cardiovascular and respiratory problems, cell aging, less muscle elasticity and atrophy, inflammation, osteoporosis, decreased level of hormones and growth factors, and even psychological outcomes. Due to all these problems, employees need to be provided with an educational program so they can reduce risks and combine those sedentary activities with physical guidelines.

Breathing literally completes exercise; with a good breathing technique it proper's posture, shortens recovery periods, and helps oxygen to reach muscle cells. The good breathing technique involves breathing from your stomach, deepen your breath, breath fundamentally through your mouth, never hold the breath, and don't believe that groaning or grunting are good signs of quality breathing (Steven T. Devor, 2010)

Jamie S. McPhee et al. (2016) wrote that evidence shows that regular physical activity improves physical and mental functions, and reduces the risk of chronic diseases, in a way that also helps older people to stay active and independent. Despite this, a large majority of older people in the UK do not get enough physical activity, increasing the risk of bad health, cardiovascular disease, obesity, falls, cognitive impairment and muscle weakness. In this study, the authors encourage the authorities to promote physical activity in the elderly, as well as doctors, family and friends, who can be influential. You can practice different activities, keeping costs low, facilitating enjoyment and group activities.

Much is known about the benefits of exercise for people with cardiovascular disease. However, it is known less about the effectiveness of combined aerobic and resistance training. Therefore, this study compared the results of applying resistance training, aerobic training, and a combined training of both, in terms of cardiovascular risk factors (Schroeder at al. 2019). The study showed that a combined aerobic and resistance training, of as little as 8 weeks, can provide more complete

benefits in terms of cardiovascular risk reduction than exclusively aerobic or exclusively resistance training.

In recent decades, there has been a progressive increase in the proportion of older people in the population, leading to an increase in patients with non-communicable diseases. (Nomura at al. 2018). This article focuses on sarcopenia, which is the decrease in muscle mass in the lower extremities. Furthermore, diabetes has been shown to enhance sarcopenia. Therefore, in this study it is considered necessary to promote the use of physical activity to reduce the risk of suffering from both sarcopenia and diabetes, through resistance exercises, always under the supervision of exercise professionals and physiotherapists, controlling loads to avoid greater risks or possible injuries. Finally, they conclude that one of the main problems is the motivation of patients to carry out physical activity, which is why it is one of the most important challenges.

Due Goh et al. (2019) exercise is an effective treatment for osteoarthritis, although its effects may vary depending on each patient. The objective of this study was to carry out a bibliographic review of clinical trials to evaluate the efficacy of exercise in terms of pain, functionality, performance and quality of life in patients with knee and hip osteoarthritis. It was concluded that exercise significantly reduces pain and improves functionality, performance and quality of life for people with knee and hip osteoarthritis, after an 8-week program. These effects continue to strengthen after 2 months, although they slowly diminish. However, treatment continues to work as a preventive method against the effects of osteoarthritis. Furthermore, it has been observed that younger subjects benefit more from physical activity therapy.

In review study of Cornelissen & Smart (2013) the effects of endurance, dynamic endurance, combination training, and isometric training on blood pressure were examined. In this way, the objectives were to compare and quantify the changes in blood pressure for each type of training. For this, clinical trials were studied that applied these types of workouts and that lasted more than 4 weeks, in healthy adults. It was concluded that conventional resistance training, dynamic resistance training and isometric resistance training reduce both systolic blood pressure and diastolic blood pressure. The combined training only lowered diastolic blood pressure. Additionally, other studies suggest that isometric resistance training has the potential to achieve the greatest reductions in systolic blood pressure.

Lack of physical activity is one of the main causes of obesity and functional disability in the elderly. A study by Marcos-Pardo, Martínez-Rodríguez, and Gil-Arias (2018) examined the impact of a 12-week motivational resistance training program on adherence and body composition in the elderly. The experimental group significantly reduced its percentage of fat mass and increased muscle mass compared to the control group. The motivational resistance training program for older people has led to positive significant changes at the physical, psychological and social levels.

Martins at al. (2020) show that physical activity (PA) and sedentary behaviors (SB) influence health. Since most people engage in different combinations of both behaviors every day, understanding the socio-demographic characteristics of adults with distinct PA and sitting time (ST) patterns is

important to contribute to evidence-based planning of public health strategies. Data from a national survey on diet and activity behaviours (IAN-AF, 2015/16) including 1724 adults (50.5% women, 18–64 years) from a representative sample of Portuguese adults was used in this study. Participants were interviewed face-to-face, and the International Physical Activity Questionnaire (IPAQ) was used. Logistic regression examined the associations between socio-demographic factors each of the four-low/high PA-ST groups. PA low/high categories were defined as in IPAQ, while ST low/high categories were defined according to ST tertiles (≤180 min/day, ≥360 min/day). A 'higher risk' behaviour pattern (low PA/high ST) was present in 37.3% of the adults and was likely associated with a middle household income, and with having 12 or more years of education. The 'lower risk' (high PA/low ST) represented 26.6% of the sample and was likely associated with middle-aged adults and with having a lower educational level. Being male, young and highly educated was related to being physically active and spending large amounts of time in ST. Besides adding to the body of mixed evidence on this theme, the identification of the socio-demographic factors associated with each PA/ST pattern will permit national public health authorities to define policies and tailored actions to promote PA and reduce ST.

Study of Teixeira at al. (2020) describes levels of self-reported physical activity, frequency of selected opportunistic nonsedentary behaviors, and preferences of leisure-time activities in a representative sample of Portuguese adults, using data from a national survey on diet and activity behaviors (National Food, Nutrition and Physical Activity Survey, IAN-AF, 2015–2016). Methods: Participants were 3873 Portuguese adults (1827 men). They were interviewed face to face, and the short version of the International Physical Activity Questionnaire was used. Regular leisure-time programmed activities, and 6 additional items, forming the activity choice index questionnaire, were used to assess 6 discrete nonsedentary behaviors. Using the International Physical Activity Questionnaire categories, 42.3% of the sample were classified as low active, 30.6% as moderately active, and 27.1% as highly active. Walking, health/fitness activities, running, group gymnastics classes, swimming/pool activities, football/futsal, and cycling were the most popular leisure-time activities. Between 15% (parking further away from destinations) and 48% (using the stairs instead of elevators) of participants reported that they frequently adopted commonly recommended nonsedentary activities. This study updates self-reported physical activity prevalence for Portugal adults, including older adults. In addition, it uniquely describes leisure-time activity preferences in the population and also the relative frequency of several nonsedentary activities of daily living

Ageing is associated with a progressive decline in cognitive function, which occurs according to heterogeneous trajectories, dependent on multiple physiological and environmental components (pereira at al. 2019). To tackle this major chal-lenge, we designed a project to test the effect of a tailored physical exercise intervention program in the cog-nitive function of a Portuguese elderly cohort, included in the AGA@4life project. The exercise program included aerobic and strength components, prescribed in a personalized approach according to the AGA@4life model, andimplemented under direct control of two experienced professionals. The 33 included elderly participants were divided into two groups (intervention group–IG–and control group–CG) according to their willingness to participate in the physical training program. Cognitive function was evaluated with the Cambridge Neuropsychological Test Automated Battery (CANTAB)

platform at baseline ant three-months after the inter-vention period in all the participants. The groups had similar clinical and demographic characteristics atbaseline. After the intervention program, significant improvements in cognitive function were observed in theIG, but not in the CG. Particularly, a significant improvement in motor control, spatial working memory andvisuospatial associate learning were depicted in the IG, which revealed an overall better cognitive performanceas compared with the CG after the follow-up period. The results clearly identify physical exercise as an effectivenon-pharmacological tool to positively modulate age-related decline in cognitive function in older adults, par-ticularly when prescribed in a personalized approach with a multicomponent structure as foreseen in the in-novative AGA@4life model

Study of Silva at al. (2020) aims to assess cardiovascular and metabolic risk factors in Portuguese middle-aged adults according to gender and level of PA. Equipment and methods This cross-sectional study evaluated cardiovascular and metabolic risk factors in 275 Portuguese adults (33.0 ± 7.3 years old) according to gender and level of physical activity. Subjects' body weight, height, waist circumference, blood pressure and fasting blood glucose were assessed. Body mass index was subsequently calculated and body fat was assessed by bioelectrical impedance. Results The majority of inactive men was obese (69.7%) and 21.7% was overweight; 71.2% of the inactive women were obese (33.3 ± 4.2 kg/m²) and 28.8% was overweight. There were no inactive women presenting normal BMI. Although there were no significantly differences in age ($P \geq 0.05$) between active and inactive participants, there were significant differences ($P < 0.05$) among other cardiovascular and metabolic risk factors. In inactive participants of both sexes, high levels of body fat, waist circumference and fasting blood glucose, and hypertension were risk factors for developing cardiovascular and metabolic diseases, with the fasting blood glucose ≥ 100 mg/dl being the most significant (OR = 4.21). Inactive women were more likely to be at greater cardiovascular and metabolic risk than inactive men, which emphasizes the need for greater awareness about primary prevention of cardio-metabolic diseases in early ages, especially in women.

To establish the effect of three types of treatment – multicomponent exercise (MEX); the oral hypoglycaemic drug metformin (MET); combined therapy comprising exercise plus metformin (MEXMET) – on cardiovascular risk in older adults with type 2 diabetes (T2D) and with comorbidities in an early stage of the disease (HbA1c < 7.5%). A sample of 284 participants was evaluated for multifactorial cardiovascular risk at baseline and at 24-month intervention according to anthropometric and hemodynamic components, lipid profile, glycaemia and cardiorespiratory fitness (CRF). Participants underwent one of three conditions: MEX (n = 59), training in three sessions per week; MET (n = 30), using metformin 850 mg twice daily; MEXMET (n = 195), combining exercise and metformin. After the 24-month intervention MEX and MEXMET showed more positive results than MET therapy. MEX decreased body mass (BM; 4%), waist circumference (WC; 4%), body mass index (BMI; 3%), systolic blood pressure (SBP; 11%), diastolic blood pressure (DBP; 11%), triglycerides (21%), and glycaemia (12%), and increased cardiorespiratory fitness (CRF; 18%). Conversely, the MET group showed increased WC (2%), waist-to-hip ratio (WHR) (3%), and SBP (5%). Differences between MEX and MET groups presented large effect sizes for BM, WC, WHR, SBP, DBP and CRF, and moderate effect sizes for BMI and glycaemia. MEX was the most effective therapy in decreasing cardiovascular risk in the

early stage of T2D in older adults with multimorbidity and attenuated the adverse effects of pharmacological therapy in MEXMET treatment (Baptista et al. 2018)

Study of Oliveira et al (2018) includes, for the first time, estimates of general and abdominal obesity prevalence for all ages of the Portuguese population, using common standardized methodologies. Results are compared by sex, age groups, educational level and geographical regions. Participants were a representative sample of the Portuguese population aged between 3 months and 84 years of age (n= 6553), enrolled in the National Food, Nutrition and Physical Activity Survey, 2015–2016. Objective anthropometric measurements included length/height, weight and body circumferences, performed according to standard procedures. Body mass index (BMI) was classified according to the World Health Organization (WHO) growth charts for children and adolescents, and WHO criteria for adults. Abdominal obesity was defined in adults as waist-hip ratio≥0.85 in women or≥0.90 in men. Prevalence estimates and 95% confidence intervals (95%CI) were weighted according to a complex sampling design, considering stratification by seven geographical regions and cluster effect for the selected Primary Health Care Unit. The national prevalence of obesity is 22.3% (95%CI: 20.5–24.0), significantly higher in women. Obesity prevalence is much higher in the elderly (39.2%, 95%CI. 34.2–44.2), while children and adolescents have the lowest prevalence around8–9%. In a regression model, three knot points denoting an inflection of obesity prevalence across the life span were observed around 5, 15 and 75 years. The prevalence of pre-obesity at national level is 34.8% (95%CI: 32.9–36.7), higher in men, and almost 18% of children and 24% of adolescents have pre-obesity. The sex- and age-standardized prevalence of obesity ranged from 38.3% (95%CI: 34.6–42.1) to 13.1% (95%CI: 10.3–15.9)for the less and the most educated individuals, respectively. Although some geographical region disparities, obesity prevalence did not significantly differ across regions (p=0.094). The national prevalence of abdominal obesity in adults is 50.5% (95%CI: 47.9–53.1), particularly high in the elderly (80.2%). Almost 60% of the general Portuguese population is obese or pre-obese. Women, elderly and less educated individuals present the highest obesity prevalence. Abdominal obesity, in particular, seems to be a relevant public health problem among the elderly men.

Physical activity and self-rated wellbeing have important benefits to health. However, scientific knowledge regarding their relationship among older adults is scarce (Peralta at al 2018). Thus, the aim of this study was to examine the associations between physical activity frequency and several dimensions of self-rated wellbeing, in a representative sample of European older adults from 28 countries. Methods: This study is based on the European Social Survey round 6, 2012. It had a total sample size of 12,341 older adults (5100 men, 7241 women) with mean age 73.8 ± 6.6 years. Information was collected through a questionnaire, filled-in during an hour-long face-to-face interview. Physical activity was accessed using the question "On how many of the last 7 days you were physically active continuously for 20 minutes or longer?" and six dimensions of self-rated wellbeing were used. Results: Physical activity in the last 7 days was linearly related with all dimensions of the self-rated wellbeing and with wellbeing total score for both sexes (men, $\beta = 0.09$, 95% CI: 0.07 to 0.10, $p < .001$; women, $\beta = 0.10$, 95% CI: 0.09 to 0.11, $p < .001$). Conclusions: Physical activity promotion should be stressed as a meaningful strategy to improve people's wellbeing overall. This strategy has special importance when considering the older adult population.

Physical activity (PA) is a keystone of diabetes management, but although self-exercise is beneficial, supervised exercise (SE), adapted to individual characteristics, and is more effective. Objectives (Esteves at al. 2019). The main research goal is to compare SE patterns among diabetic and non-diabetic Portuguese adults. Methods. A total of 484 participants (85 diabetics, 399 non-diabetics), aged 41-90 years old (mean=58.9; SD=11.9) were interviewed. PA level was assessed using short form of the International Physical Activity Questionnaire. Attendance in different SE programs was evaluated across three kinds of PA programs providers: gym/health-clubs; swimming pools and other club/ sports facilities. Itens like Barriers to Exercise; Intention to participate; Importance of the structure and PA information sources were also evaluated. Independent t-tests were used to examine the difference between the group means, and Levene's test was used to check the homokedasticity of the groups' variances. Results. PA level of diabetics (32% low; 25% moderate; 44% high) and non-diabetics (29% low; 33% moderate; 39% high) display no differences. 90% of diabetics do not attend SE. The main barrier for diabetics' non-participation is the perception that the exercise is not adequate to their health. Doctors are the preferred information source for diabetics, and they rely less on information provided by the Internet, with may impair on-line campaigns. Conclusion. Promoting exercise in diabetics should shift the focus from "promoting physical activity" to "promoting SE".

Study of Marques et al. (2014) aims to assess awareness of physical activity levels among adults and to investigate the variables associated with different types of awareness. The participants were 1042 men and 1316 women aged 31–60 years old (43.3 ± 6.1). Data were collected on physical activity behaviour, physical activity awareness, perceptions and psychological factors. Awareness was assessed by comparing self-rated physical activity with achieving physical activity guidelines. Chi-square and logistic regression analyses were applied to the results. About 32.4% were considered active. Moreover, 61% accurately reported their physical activity (38.3% realistic inactive and 22.7% realistic active), 29.2% overestimated their physical activity (overestimators) and 9.7% incorrectly described themselves as inactive (underestimators). Perception of an excellent health status (odds ratio, OR = 4.07, 95% confidence interval, CI: 2.07–8.00, $p < 0.001$) was the strongest positive association with being realistic active, followed by having a high socio-economic status (SES) (OR = 1.53, 95% CI: 1.10–2.12, $p < 0.05$). Overestimator participants were more likely to have an excellent perception of health (OR = 2.58, 95% CI: 1.47–4.52, $p < 0.01$) and had a good experience in physical education (OR = 1.46, 95% CI:1.03–2.08, $p < 0.05$). Almost half of these participants erroneously perceived themselves as physically active. Gender, body mass index (BMI) and the quality of physical education at school were associated with those who misperceived their physical activity.

The situation in Belgium according to the results of the 2018 health survey is presented in article of Drieskens, Charafeddine and Gisle (2018). The fact that nearly half (49.3%) of the adult population aged 18 years and older is overweight and 15.9% is obese, prevalence that have been observed since the first health survey in 1997 (41.3% and 10.8%, respectively). %) have only continued to increase, makes this a major public health problem. Overweight and obesity are more common in men, in the 35-74 age group and the less educated, making them important target groups in terms of prevention. In addition, the situation is worst in the Walloon Region (51.8%

and 18.0% respectively, percentages significantly higher than in the Flemish and Brussels Regions). One in five (19.0%) young people aged 2 to 5 17 years of age are overweight and 5.8% are obese. The problem is greatest among toddlers aged 2-4 years (24.4% respectively, so almost one in four, and 11.7%). The situation among young people is more favorable, in the sense that this prevalence have remained constant compared to the previous survey years (except 1997). Here too, attention should be paid to young people from households with a low educational level, because two out of five (40.5%) of these young people are already overweight and 14.0% are obese. As far as young people are concerned, the situation is only in the Brussels Region (27.3% and 10.5% respectively, percentages significantly higher than the Flemish Region, but not the Walloon Region).

In the study of Pot et al. (2020) researchers examined the effect of this treatment method in an initial 438 participants. Ultimately, they were able to include data from 234 participants in the analyzes. The program consists of an intensive coaching program of 6 months followed by a follow-up program of 18 months. It is intended for patients with diabetes who are already on medication. During the treatment the focus is on nutrition, exercise, sleep and relaxation. The guidance is provided by a dietician, exercise coach and nurse. The patient's GP is also closely involved in the treatment. We work with a combination of individual and group sessions, supplemented with online support. Some results**:**

• After 2 years, 67% of the participants used less sugar-lowering drugs, and 28% were even able to stop using this medication completely.

• Of the 66 participants who received insulin at baseline, 71% were no longer using insulin after 2 years.

• The participants weighed an average of 7 kg less after the study and had a smaller waist circumference (average -8.2 cm). Their triglycerides (blood fats) and HDL ("good" cholesterol) levels were also improved.

• Mean HemoglobinA1c (HbA1c) levels, on the other hand, did not change much in the participants. Hemoglobin is a protein that can bind sugar in the blood. The value of this "saccharified" hemoglobin or HbA1c gives a good picture of the average blood sugar level. The proportion of "normal" HbA1c levels increased in the participants from 45% at the start of the lifestyle program to 53% after 2 years.

• The program had a positive effect on the participants' quality of life: they were less tired and felt healthy.

Researchers Teras at al. (2019) and Drieskens at al. (2018) examined whether women who lose weight had a lower risk of developing breast cancer. Previous research has shown that the risk of breast cancer is higher in overweight or obese women. This could be because they produce more estrogens than healthy weight women. Those estrogens can cause breast cells to grow, which can lead to breast cancer if that growth is out of control. To find an answer to the research question, the researchers collected data from ten large cohort studies with women over 50 years old. During the follow-up, the women had to declare their weight at least three times and recorded breast cancer incidence. In total there were 180,885 women and 6,930 breast cancers. The researchers divided the women into different groups according to the evolution of body weight during the follow-up.

The researchers also took into account possible disturbing factors such as physical activity and the use of hormonal preparations. Compared to women who maintained a stable weight, the risk of breast cancer decreased by 13% when they lost 2 to 4.5 kg. With a weight loss of 4.5 to 9 kg that was 16% and when they lost more than 9 kg, it even decreased by 26%. The reduction in breast cancer risk was particularly evident in women who were overweight or obese at the start of the study. The researchers conclude that weight loss can be an important measure to reduce the risk of breast cancer.

Overweight or obesity is very often associated with high blood pressure, abnormal blood sugar and excess cholesterol (Lasalle 2020) Yet there are many people with a BMI over 25 (which the World Health Organization classifies as "overweight") and even over 30 ("obese") for whom these clinical indicators are absent. Despite their excess body fat, they have a fairly normal blood pressure and cholesterol, which makes them considered healthy by many doctors, especially at the level of the metabolism. Fat but healthy, if you like.This is unjustified, according to a long and comprehensive study in which thousands of people in more than ten European countries were followed for years. The British medics who coordinated the study looked for links between obesity on the one hand and heart disease on the other. They classified the study participants according to medical indicators such as blood pressure, cholesterol level, blood sugar and BMI. If people met three or more of the criteria, they were classified as "unhealthy". People with a (much too) high BMI escaped that. "In the overweight group, the risk of heart complaints was almost 30 percent higher than in the healthy participants with a healthy BMI (between 18.5 and 25)" But the analysis found that in the end, they didn't escape the effects of their excess body fat - statistically, that is. For example, the risk of ischemic heart complaints - in which the heart receives too little blood due to blocked coronary arteries and a heart attack - was almost 30 percent higher than in the healthy participants with a healthy BMI (between 18.5 and 25). In the unhealthy participants the risk of the same type of heart complaints was preferably twice as high as in the healthy group.

The positive relationship between physical movement and brain volume in middle-aged people has already been demonstrated, but this now appears to be the case for children as well (Esteban-Cornejo 2017; Ortega at al. 2014; Ronan at al. 2016). Moreover, more active children show an increase in gray matter volume, which in turn is associated with better school performance. The findings of this large-scale study (as part of the “ActiveBrains” project) were reported by Spanish researchers in the specialist journal NeuroImage. Previous studies have already shown the positive effect of sports on cognition, brain function and academic performance. People who exercise less during their lifetime run a higher risk of developing neurodegenerative disorders and cognitive problems. In addition, body weight also plays a determining factor in this: overweight people show accelerated aging of the brain, which means that their gray matter corresponds to people who are 10 years older than themselves. In addition, the higher the body mass index (BMI), the less gray matter volume. What's more, overweight children perform worse at school than normal weight children. All this demonstrates the importance of a scientific study of the potential benefits of physical exercise on the brain in overweight children and its impact on school performance. More specifically, 110 overweight children aged between 8 and 11 years were included in the study. Their physical fitness was tested using an extensive battery test, looking at a number of cardiorespiratory

factors, as well as "speed-agility" (including movement speed, dexterity and coordination) and muscle strength. All children also underwent a brain scan and their academic profile was mapped. By looking at those factors together, the researchers were able to see which aspects were associated with greater brain volume. The study therefore showed that cardiorespiratory factors and "speed-agility" are related to higher brain volume, as shown in the figure. The green brain regions are positively associated with physical movement (panel A for cardiorespiratory factors, panel B for "speed-agility"). Moreover, a positive relationship with better academic performance has also been shown for some of these brain regions. However, no association between brain volume and muscle strength was found.

These results thus demonstrate the positive effect of physical movement on the brain and can thus counteract the negative influence of obesity. Increasing physical activity in children (with or without overweight) is therefore very important. Moreover, this can have direct implications for education, among other things.

The purpose of the study of Oja et al. (2011) was to update the evidence on the health benefits of cycling. Cross-sectional and longitudinal studies showed a clear positive relationship between cycling and cardiorespiratory fitness in youths. Prospective observational studies demonstrated a strong inverse relationship between commuter cycling and all-cause mortality, cancer mortality, and cancer morbidity among middle-aged to elderly subjects. Intervention studies among working-age adults indicated consistent improvements in cardiovascular fitness and some improvements in cardiovascular risk factors due to commuting cycling. Six studies showed a consistent positive dose-response gradient between the amount of cycling and the health benefits. The existing evidence reinforces the current efforts to promote cycling as an important contributor to better population health.

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Food as a Medicine – Selected Findings from Literature Review in Slovakia

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Abstract

The section entitled "Food as a medicine" was created to bring the latest knowledge on the impact of food on human health. Researchers have long been studying the synergistic effect of foods that cause chronic health problems, as well as their therapeutic and defensive properties, which play a key role in promoting health. At present, much research points to an increasing trend of obesity in children and adolescents, which is mainly caused by a sedentary lifestyle combined with poor eating habits, excessive consumption of sweetened beverages, or low nutritional foods. Expert findings suggest that obesity has broad effects on human health, increases the risk of cardiovascular disease, and also contributes to the increased incidence of diabetes mellitus in children and adolescents.

Key words: Food as a medicine, physical activity

Tláskal (2019) summarizes the data to different nutritional factors that affect the formation of adipose tissue. Not only excessive energy intake, but also differences of essential nutrients have their importance. The individual components of the nutrients is variously involved in metabolic processes. The formation of adipose tissue activates more diet with a higher content of sugars than other carbohydrates, diet with a higher content of saturated and monoenoic unsaturated fatty acids than polyunsaturated omega 3 fatty acids. In the context of the age is changing not only the way of nutrition, but also habits of the individual. In the diet is so the five time periods that are individually specific to activate the development of excessive accumulation of fat tissue. To prevent childhood obesity is necessary to pay attention to the child´s diet systematically and differentially.

Zlatohlávková (2016) presents concept of Developmental Origins of Health and Disease presumes that early human development programmes health and the risk of adult diseases through the processes of developmental plasticity which can create different fenotypes stemming from a single genotype in response to environmental signals. Early nutrition is a significant programming factor. Individual long-term health can be affected by inadequate intrauterine and postnatal nutrition. In order to reduce susceptibility to noncommunicable diseases preventive measures are most effective in the time of the highest plasticity – during the human reproductive cycle which includes both pregnancy and breastfeeding. Exclusive breastfeeding for up to 6 months of age followed by the introduction of complementary foods with adequate protein intake and energy together with continued breastfeeding is a basic preventive measure. Breastfeeding lowers the risk of being overweight or obese in infancy, childhood, adolescence, and adulthood. It also reduces the probability that a future mother will become overweight or obese before conception and during pregnancy and thereby lowers the risk of fetal overnutrition with all the consequences for the child's health.

Kazda and Broulík (2017) in his article constate that the significance of protein income for bone health and the significantly positive influence of proteins on decreased frequency of frailty fractures. The influence of diets on acid-base status with respect to metabolism of the bone was assessed. The types of obesity in relation to bone mass. Chronic inflammation of low degree, accompanying the obesity and more of other chronic diseases in advanced age and its relation to osteoporosis and to frailty fractures. The elevation of proinflammatory cytokines like the metabolic dysregulation influenced the loss of bone. Clinical studies aimed to the amelioration of chronic inflammation by proper diet. To this theme belongs knowledge about the positive influence of dairy proteins on proinflammatory markers as well as studies of the influence of polyunsaturated fatty acids omega-3 on these markers. The text is dedicated to keeping bone health among vegetarians. The relations between the bone metabolism and the consumption of fruits, legumes, drinking of alcoholic and non-alcoholic beverages are mentioned. Finally, the detrimental influence of hyponatremia on metabolism of bone is presented.

Psoriasis vulgaris is one of the most common skin, chronic, immune-related diseases. It affects about 0.5–11% of the adult population. The treatment integrates local and systemic therapy, in cases of moderate to severe psoriasis, biologic therapy is used. The modification of eating habits or using nutritional supplements in patients with psoriasis or psoriatic arthritis has been an

observed area for several decades. Patients with this skin disease, especially after their initial diagnosis, want to know whether changing diets can contribute to improving their health problems. The article of Mrosková and Konečná (2018) briefly summarizes the most recent findings on the impact of selected nutrition areas – gluten-free diet, hypocaloric diet, nutritional supplements, alcohol – on the incidence of psoriasis, the severity of skin changes or the quality of life. Changing diet in certain groups of patients with psoriasis has beneficial effects, but nutritional interventions should always be seen as an additional form of treatment along with the standardized treatment of psoriasis.

Both in Europe and in Slovakia, cardiovascular morbidity and mortal-ity dominates, with cardiovascular mortality in our country represent ing 53% of al l- cause mortality. Murín (2016) described the pathophysiology of the process of atherosclerosis and atherothrombosis, which is in the background of most cardiovascular diseases. He focused on the place of platelets in atherothrombotic processes. In the second part he presents data concern in antithrombotic (anti aggregational) effects of natural substances in food, mostly in tomato extract. This extract also inhibits the ACE (angiotensin converting enzyme) which further enhances its cardiovascular benefit. This extract has shown an antithrombotic influence in clinical studies and it was safe for use.

Kajaba at al. (2020 presented a review of knowledge about the development of the microbiome from birth with regard to its genetic predisposition to 2 basic factors - the way of birth and nutrition of the newborn. The close relationship of microbial development to the intestinal immune system is shown. Attention is drawn to the importance of eumicrobiosis and its preventive function in the course of metabolic processes and the prevalence of non-contagiouse diseases. A particularly serious risk of dysmicrobiosis, which is currently considered to be one of the major elements in the etiopathogenesis of many so-called civilizations linked diseases, is underlined. The importance of modulation is therefore justified, mainly by probiotics according to the classical works of Mechnikov's lactic acid milk products containing lactic - acid milk bacteria. Recently, it is also the application of "faecal microbial therapy", so far mainly in non-specific intestinal inflammations and with the prospect of its application in several metabolic, cardiovascular, neurodegenerative, autoimmune diseases, even in some mental disorders.

Article of Minárik and Mlkvý (2016) is focused on the role of Calcium in the prevention of colorectal cancer. Calcium is an important nutrient for bone and dental health, and milk together with dairy products are in the European region the main source of calcium. Colorectal cancer (CRC) is the world's third most common cancer. In recent years sufficient evidence has been accumulated that calcium together with vitamin D has in colon cancer antineoplastic effects. Consistent evidence from existing studies suggests that both calcium and milk probably protect against the CRC. Calcium supplementation probably protects against CRC as well. On the other hand, limited evidence currently suggests that cheese on the contrary increases the risk of CRC. Existing evidence also suggests that diet rich in calcium is likely to increase the risk of prostate cancer. Therefore, currently there is no general recommendation to take calcium supplements as a means to reduce the risk of CRC. Dietary supplements containing calcium are indicated as an

alternative source of calcium for people who for any reason are unable to receive enough calcium from normal diet (for example, lactose intolerant persons, or strict vegan individuals). Milk and low-fat dairy products if consumed in reasonable quantities and within a varied diet are considered part of a healthy diet in those populations and regions of the world where dairy products are traditional part of the diet. Most medical professional societies recommend on average to consume 3 servings of milk or dairy products daily. Oncology and cardiology societies recommend preferring low-fat milk and low-fat dairy products. Vitamin D has a major role to ensure homeostasis of calcium and phosphate and, like calcium. It is an important nutrient for bone and dental health. In recent years there have been published a number of observational and epidemiological studies that have confirmed that vitamin D plays an active protective role in the development of colorectal cancer, as well as cancers of prostate, breast, ovary, and skin. Most of the evidence on the preventive effect of vitamin D is at CRC. The best expression of the vitamin D status in the body is the serum 25(OH)D vitamin level. Despite the strength of the evidence that oral intake and the synthesis of vitamin D reduce the risk of CRC incidence and mortality, particularly when associated with adequate calcium intake, the health professionals at present do not recommend supplementation with vitamin D as a general measure for the prevention of malignancies, including CRC. For more detailed information on causation, the mutual interaction of vitamin D with other protective nutrients, as well as other aspects of the preventive effects of vitamin D at CRC, and also other tumors, there is need for further prospective studies.

Currently, there is a pandemic of common obesity (Marinov and Střítecká 2017). In the last 25 years, there has been a tremendous increase in overweight, and common obesity has become the most serious health problem of mankind today. In the surgeries of general paediatricians for children and adolescents, common paediatric obesity is the second largest group of chronic diseases with long-term metabolic changes, second only to allergic conditions. In the Czech Republic, approximately 10 % of children aged up to 16 years old have obesity, including 2/3 children with complex metabolic changes and 1/4 with extreme obesity. Cardiometabolic sequelae are triggered and preserved by maladaptation processes based on malnutrition behaviour: on the one hand, developed at an early age following the stage of imprinting during the period of neophobia and negation and, on the other hand, based on national nutritional habits. The pressure of obesogenic environment affects the nature of hyperalimentation and results in the development of specific nutritional deficiencies that are discussed in the present article.

Pochop (2020) describes nutrition as an integral part of comprehensive patient care. Diet intake is associated with vitality and the possibility of continuing cancer therapy. It should be noted that with advanced cancer, the body's ability to use energy changes. Weight loss and anorexia can have various causes. In many cases, these causes can be influenced by appropriate medication adjustment as well as by dietary measures. Adequate education of caregivers leads to less urge for "healthy nutrition" and the associated effort to find a miracle pill. The goal is proper nutrition at the right time, thus providing appropriate comfort to palliative patients.

Aim of the study of Vitáriušová et al. (2010): In 2006–2008 a survey analyzing food patterns, intake of main food items and leisure time activities of 5,410 schoolchildren was carried out. Methods:

The study was performed in 13 randomly selected regions of Slovakia. 5,410 elementary school children (2,848 girls and 2,562 boys) aged from 6.3 to 15.9 years, mean age was 11±2.6 years, were included. The data collected by questionnaire concerned nutrition and leisure time activities. Results: Noteworthy results are that only 63% of participants eat breakfast regularly. Almost all of the children eat lunch during workdays regularly and 60.9% prefer a cooked (hot) dish for supper. Although dairy products are a substantial part of child nutrition, in general their consumption in our sample was low. Only 50.1% of children consume these daily and 62% of children drink milk daily, more often boys than girls. A striking observation is that only 65.5% of interviewed pupils eat fruit every day and 30.9% of them eat vegetables daily. The frequency of consumption of poultry and pork in our sample was almost the same, however, the analysis showed that only 14% of children consume fish once per week. Moreover, only 12.6% of subjects prefer wholegrain bread. In our sample 56.8% of children eat sweets daily, 32% prefer a salty snack almost 2 times per week. Within the group of pupils 35.8% do not attend physical trainings even once a week. Almost every child is used to watch TV and 64% of them play PC games daily. While both girls and boys watched TV on average over 2 hours, boys spend more time on PC per day than girls (girls 0.72 hours per day vs. boys 1.13 hours per day, $p<0.001$). The food patterns and leisure time activities of children older than 11 years and rural pupils were less favourable. Conclusions: According to results of our analysis we recommend to increase the consumption of dairy products, fresh fruits and vegetables in Slovak schoolchildren and spare no effort in making children to take breakfast regularly. It is necessary to promote daily moderate physical activity. Nutritional and lifestyle education should begin already in childhood.

The study of Bašková, Baška and Holubčíková (2016) analysed the consumption of sweetened soft drinks and energy drinks as well as attitudes towards their consumption. Design: Health Behaviour in School-aged Children (HBSC) is a cross-sectional school-based study focused on the target group of 11-, 13- and 15-year-old adolescents. It employs a universal, internationally standardized questionnaire. Methods: The study analyses results of the HBSC survey carried out in Slovakia in 2014. A total of 10,179 schoolchildren from grades 5 through 9 participated (a response rate of 78.8%). Gender and age differences were analysed in 11-, 13- and 15- year-old respondents. Results: The consumption of soft drinks varied from 16.9% (11-year-old girls) to 29.0% (15-year-old boys). More than 8 in 10 respondents accepted the consumption of soft drinks. As much as 34.4% of boys and 18.8% of girls aged 15 years reported the use of energy drinks at least weekly, with boys showing higher rates than girls in all age groups and the rates increasing with age. Conclusion: In Slovakia, consumption of sweetened soft drinks and energy drinks is widely popular and socially accepted among adolescents. There is a need for more effective interventions including adoption of appropriate legislative norms. Paediatric nursing plays an important role through outpatient primary as well as hospital care.

Lifestyle of our population with the advent of science and new technologies adversely changes, reduces physical activity and develops negative eating habits. Shift from malnutrition and infectious diseases to chronic diseases (cardio metabolic diseases, cancer, diabetes mellitus) is typical for current epidemiological situation. Obesity leads to a worse quality of life and shorter life expectancy. Mortality of cardio metabolic diseases is 2.5 times higher than the average in European

countries. This current epidemiological situation in overweight and obesity is alarming. Compulsory school physical education is the only place for physical activity for a lot of children. And the number of these children is increasing. The research of Bernátová et al. (2016) is based on project "Respect for Health". They analysed the relationship between participation in compulsory PE and cardio metabolic risk factors (blood pressure, weight and body mass index). The project "Respect for Health" is monitoring the situation in the cardiovascular health of secondary school students. Assessment of cardiovascular risk factors and physical activity (compulsory physical education (PE) and extra-curriculum sport activities) in secondary school children is followed by education in effective lifestyle measures.

The purpose of the paper of Šedík, Pocol and Horská (2019) is to investigate different profiles of honey consumers in Slovakia and Romania by using a segmentation approach, thus supporting honey producers from both countries and promoting the consumption of honey for both food and health benefits. Based on the data, the authors identified similar segments in Slovakia and Romania, in terms of frequency and annual consumption ("maniacs" or "loyal consumers", "regular consumers", "occasional consumers" or "sporadic consumers" and "irregular consumers"), but, at the same time, those segments are different in terms of the way in which honey is consumed (multipurpose or direct consumption, spreads, beverages and ingredients for cooking).

The purpose of study of Lopašovský et al (2016) was to evaluate the microbiological quality of Ready-To-Eat (RTE) foods produced in Slovakia. A total amount of 144 samples of RTE food were tested during one-year period from January to December, 2014 and the microbiological quality of kebabs (n=30), gyros (n=10), hamburgers (n=54), cheeseburgers (n=5), hot-dogs (n=31), roasts (n=14) was analyzed. The samples were examined for the presence of: coliform bacteria, sulfite-reducing clostridia, yeast, microscopic filamentous fungi and coagulase positive staphylococci according to the ISO standards requirements. In kebab samples the counts of coliforms were from < 10 to $1.6x10^3$ cfu.g-1 and incompliance was found in 12/ 30 (40%) of samples. Maximum counts of coliforms and yeasts were exceeded in two and one sample of gyros and isolation range was from 10 to $1.5x10^3$ cfu.g-1 $3.2x10^2$ cfu.g-1 and from 10 to $1.4x10^2$ cfu.g-1 . Also 2/5 (40%) of samples of cheeseburger yielded unsatisfactory coliform counts and the isolation rates were from less than 10 to $1.5x10^3$ cfu.g1 . In hot-dogs, counts of coliforms, yeasts and coagulase positive staphylococci ranged from less than 10 to 1.4x103 , < 10 to $2.1x10^3$ cfu.g-1 and number of unsatisfactory samples were 3/31(10), 1/31(3) and 1/31 (3), respectively. In roast, the counts of coliforms, yeasts and microscopic filamentous fungi were from less than 10 to $2.1x10^2$ cfu.g-1 , less than 10 to $1.4x10^2$ cfu.g-1 and less than 10 to $3.2x10^2$ cfu.g-1 , respectively and the safety criteria were not met for 1/14 (7) samples for each of the bacteria group mentioned. Overall, the microbiological criteria set for RTE foods in Slovak Republic were violated in 36/ 144 (25) of samples tested. Results of the present study show that RTE foods might pose public health concerns in Slovakia and more attention on the hygienic practices should no paid.

In the study of Krajčovičová-Kudláčková (2000) values of homocysteine and lipid parameters were measured in groups of adults consuming alternative nutrition (vegetarians/lactoovo/, vegans) and compared with a group consuming traditional diet (omnivores, general population). Frequency of

hyperhomocysteinemia was 53% in the vegans' group, 28% in vegetarians vs. 5% in omnivores. In conditions of lower methionine intake (reduced content in plant proteins), the remethylation pathway of homocysteine metabolism prevails and it is vitamin B12 and folate-dependent. The intake of vitamin B12 is equal to zero in vegans; vegetarians consume 124% of the RDA vs. 383% in omnivores. Serum vitamin levels are significantly lower in subjects consuming alternative nutrition with deficiency observed in 24% of vegetarians, 78% of vegans vs. 0% in omnivores. Serum folate levels are within the reference range in all groups. Mild hyperhomocysteinemia in the groups consuming alternative diet is a consequence of vitamin B12 deficiency. Vegetarians and vegans meet the RDA for energy and fat, and have a favourable proportion of saturated, mono- and polyunsaturated fatty acids on total energy intake; the ratio of linoleic/alpha-linolenic acid in their diet corresponds with the recommendations. They have low cholesterol consumption and higher vitamin E and C intake. Optimal fat intake of correct composition is reflected in lower values of atherosclerosis risk factors (cholesterol, LDL-cholesterol, atherogenic index, saturated fatty acids, triacylglycerols), and significantly higher levels of protective substances (linoleic acid, alpha-linolenic acid, HDL-cholesterol, vitamin E, vitamin E/cholesterol, vitamin C). Low lipid risk factors but higher findings of mild hyperhomocysteinemia in vegetarians mean a diminished protective effect of alternative nutrition in cardiovascular disease prevention.

Damage of molecules as a consequence of oxidative stress has been implicated in the pathogenesis of chronic diseases related to aging. Diet is a key environmental factor affecting the incidence of many chronic diseases. Antioxidant substances in diet enhance the DNA, lipid and protein protection by increasing the scavenging of free radicals. In the study of Krajčovičová-Kudláčková (2008) products of oxidative damage of DNA (DNA strand breaks with oxidized purines or oxidized pyrimidines), lipids (conjugated dienes of fatty acids) and proteins (carbonyls) in relation to nutrition (vegetarian diet vs. non-vegetarian, traditional mixed diet) were measured in young women aged 20-30 years (46 vegetarians, 48 non-vegetarians) vs. older women aged 60-70 years (33 vegetarians, 34 non-vegetarians). In young subjects, no differences in values of oxidative damage as well as plasma values of antioxidative vitamins (C,beta-carotene) were observed between vegetarian and non-vegetarian groups. In older vegetarian group significantly reduced values of DNA breaks with oxidized purines, DNA breaks with oxidized pyrimidines and lipid peroxidation and on the other hand, significantly increased plasma values of vitamin C and beta-carotene were found compared to the respective non-vegetarian group. Significant age dependences of measured parameters (increase in all oxidative damage products and decrease in plasma vitamin concentrations in older women) were noted only in non-vegetarians. Vegetarian values of older women vs. young women were similar or non-significantly changed. The results suggest that increase of oxidative damage in aging may be prevented by vegetarian nutrition.

The aim of the paper of Siváková et al. (2007) is to evaluate dietary habits and behavioural factors related to atherosclerosis in Slovak Romany, the large minority, characterized by high cardiovascular morbidity. The study involved 150 Romany volunteers (68 males, mean age 42.1 +/- 13.9 y and 82 females, mean age 40.9 +/- 13.7 y). Dietary data were obtained by a validated food-requency questionnaire and a single 24-hour dietary recall. The nutrient intake and health behaviour of the Romany population is not consistent with current guidelines for atherosclerosis

prevention. The mean intake of fat is higher than the recommended dietary allowance (RDA), especially in males (155.3 % of RDA). In females the intake of alpha-linolenic acid is low, in males the cholesterol content of the food exceeds the acceptable value. The mean intake of protein is higher than the recommendation (males 153% of RDA, females 122.2%), with a high proportion of animal protein. In both sexes the mean intake of vitamins is below the RDA. In comparison to the general population the diet of the Romany males contains significantly more animal protein ($p < 0.05$), less plant protein ($p < 0.05$) and folate ($p < 0.01$). In the diet of the Romany females a significantly lower intake of plant protein ($p < 0.05$) and vitamin E ($p < 0.05$) was observed, as well as a lower intake of linoleic acid and iron in both sexes. The cumulation of ten selected cardiovascular risk factors showed that particularly the Romany males could be considered as having more atherogenic profile.

In the study of Krajčovičová-Kudláčková (1993) Lipid parameters (cholesterol CH, HDL-, LDL-cholesterol, triacylglycerols TG, atherogenic index AI) were estimated in four age groups of vegetarians, 82 males and 80 females, aged 15 to 60 years. The period of consumption of vegetarian food was 1.4 to 1.9 years for adolescents (15-18 years old) or 2.4 to 5.4 years for adults (age groups 19-29 years, 30-39 years and 40-60 years). Lacto-vegetarians constituted one half of females and one third of males. Vitamin C content, lipid peroxidation levels (conjugated dienes, CD) and the activities of catalase (CAT) and glutathione peroxidase (GSH-Px) were estimated in the oldest age group of males and females. Low levels of TG and glutathione peroxidase (GSH-Px) were estimated in the oldest age group of males and females. Low levels of TG and CH (in the lower half of the reference range), low calculated values of LDL-CH and AI, as well as values of HDL-CH in the upper region of the standard risk zone or over 1.4 mmol/l (reduced risk level) in males and females of all age groups are the positive factors of vegetarian nutrition in prevention of atherosclerosis. High levels of vitamin C in blood, absence of obesity and low blood pressure should be mentioned here as additional positive factors as well. When considered as a single isolated factor, the nearly significantly elevated values of CD (linked to increased intake of unsaturated fatty acids) could be a negative factor of vegetarian nutrition.

In the research of Béderová et al. (1993) 410 children aged 11-14 years and 311 adolescents aged 15-18 years were examined in the region Orava. This region was selected for the survey because of high unemployment rates. The survey was focused on changes in nutritional indices in children and adolescents, as a consequence of changed food consumption patterns, caused by increased food prices and global socio-economic regression. Biochemical markers showed negative trends in serum lipid levels, especially a high prevalence of hypercholesterolaemia as well as that of vitamin C hyposaturation. This finding is related to impaired structure of consumed food, intake of food items of lower nutritional value, low intakes of fruit and vegetables, as shown by the analysis of dietary data.

Krajčovičová-Kudláčková, Šimončič and Béderová (1997) summarize the health risks and advantages of alternative nutrition-lactovegetarian, lactoovovegetarian and vegan. These dietary patterns involve risk in particular during pregnancy, lactation and for the growing organism. Veganism excluding all foods of animal origin involves the greatest risk. General nutritional

principles for the prevention of cardiovascular diseases, oncological diseases and diabetes are fully met by the vegetarian diet. Vegetarians and vegans have low risk factors of atherosclerosis and conversely higher levels of antisclerotic substances. Overthreshold values of essential antioxidants in vegetarians imply a protective action against reactive metabolic oxygen products and toxic products of lipid peroxidation and may reduce the incidence of free radical diseases. The authors also draw attention to some still open problems of vegetarianism (higher n-3 fatty acids, taurine, carnitine). In the conclusion semivegetarianism is evaluated.

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Food as a Medicine – Selected Findings from Worldwide Literature Review

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Abstract

Expert studies have confirmed that nutritious food is a suitable preventive form of oncological diseases (especially breast, prostate, colon and rectal cancers), as well as a suitable adjunctive treatment for immune-mediated skin disease - Psoriasis Vulgaris. Clinical studies that have alleviated chronic inflammation with a proper diet have even shown a positive effect of milk proteins on anti-inflammatory markers, as well as a positive effect of omega-3 polyunsaturated fatty acids on these markers. According to experts, the alternative diet nutrition-lactovegetarian, lactoovovegetarian and vegan reduces the risk of atherosclerosis. Excessive levels of essential antioxidants in vegetarians provide protective action against reactive metabolic oxygen products and toxic lipid peroxidation products and can reduce the incidence of free radical disease.

Key words: Food as medicine, Physical activity

The aim of narrative review of Poti et al. (2017) was to summarize and critique recent evidence evaluating the association between ultra-processed food intake and obesity. Overall, evidence suggests that consumption of ultra-processed foods may be associated with increased risk of obesity as well as metabolic syndrome prevalence, increases in total and LDL cholesterol, and risk of hypertension. However, the limited number of prospective studies and the limited number of studies investigating each outcome preclude any strong conclusions about the impact of ultra-processed food consumption on obesity and related cardiometabolic outcomes. There is a clear need for further studies, particularly those using longitudinal designs and with sufficient control for confounding by lifestyle factors, to examine the association between ultra-processed food consumption and obesity. If confirmed using stronger study designs and in diverse populations and settings, these associations between ultra-processed food consumption and adverse health outcomes can provide critical insight into the etiology of obesity and can help inform development of targeted public health programs and policies to control and treat obesity among children and adults worldwide.

The global challenges of diet-related obesity, diabetes mellitus, and CVD present enormous health and economic burdens and emphasize the imperative of prioritizing nutrition in clinical care, advocacy, research, and policy (Mozaffarian 2016). Scientific advances provide a wealth of new evidence to identify several key dietary priorities for cardiometabolic health. These include food-based priorities for more fruits, nonstarchy vegetables, nuts, legumes, fish, vegetable oils, yogurt, and whole grains; and fewer processed (sodium-preserved) meats and foods higher in refined carbohydrates and salt. Red meats shouldbe minimized to prevent diabetes mellitus; butter used occasionally but not emphasized; and other foods (eg, unprocessed poultry, eggs) consumed in moderation according to personal preference. Coffee and tea can be enjoyed, with possible (but notyet confirmed) benefits; and alcohol, if consumed, should be moderate (up to 1 drink/d for women and 2 drinks/d for men). Harmful additives, in particular sodium, transfat, and added sugar, will generally be lower in such diets and must be further minimized through strong policy actions. There is growing evidence and consensus for such food-based dietary patterns as the best means to reduce CVD, obesity and weight gain, and diabetes mellitus,replacing outdated emphases on total fat, other isolated nutrients, and calorie counting. Clinical behavior-change efforts, health system changes, novel technologies, and robust policy strategies must complement and facilitate these individual food choices, which together will reduce cardiometabolic disease and economic burdens across the population.

That sarcopenic obesity is a highly multi-factorial condition, which requires a multi-targeted approach. Review of Trouwborst et al. (2018) provides the latest overview of both exercise and nutrition interventions targeting both the body composition and physical functioning in sarcopenic obese individuals. In line with this aim, this review shows that a combination of a moderate weight loss diet, with concurrent exercise and a high protein intake (≥1.2 g/kg/day), which is relatively high in animal protein and spread throughout the day, has the highest potential in improving different parameters of sarcopenic obesity. However, further research is needed to better understand the optimal rate of weight loss, the type, intensity, and frequency of the exercise, the combined effects of the different individual strategies (exercise and nutritional) on body

composition and physical functioning parameters in sarcopenic obese older adults. Finally, as new interventional technics and bariatric surgery are spreading out for the treatment of obesity in adults, we may have to consider the longterm impact of bariatric surgery on muscle preservation after surgery, and the optimal strategy to maintain mobility in these aging patients in the future.

Review of Toro-Martin et al. (2017) was an attempt to stress the most important challenges and issues that nutritional science has to overcome in order to successfully translate basic and clinical knowledge into an effective precision nutrition care. Up to date, the PREDIMED study and the Food4Me project could be considered as state-of-the-art trials in the field of precision nutrition, and two of the most stimulating wide-scale approaches in this field, that will hopefully provide guidance about how precision nutrition could be used to successfully prevent and manage cardiometabolic disorders. As already mentioned, such integrated approaches have the potential to improve dietary behaviors in an individualized or in a group-based manner, and to generate new and innovative tools, methods and procedures.

In conclusion, Kim et al. (2019) found that fast food consumption was not directly associated with obesity, whereas the "Meat and alcohol" pattern had independent associations with overweight/obesity and central obesity independent of fast food. Even if fast food is high in calories, the unhealthy dietary pattern has a stronger correlation with overweight/obesity and central obesity than fast food consumption on its own. Our results indicate that more attention should be paid to dietary patterns to prevent and manage overweight/obesity and central obesity among adults in South Korea.

The obesity epidemic is an image of complexity, displaying a risk profile with biological and social susceptibilities across population groups, environments, and life courses that could be present even in early life . The concept of early metabolic programming gave us the possibility to look at the literature, in order to see what causes could influence the first 1000 days of life, which is the most important and critical period for development. The ten good practices developed have been shown to influence growth and function of different tissues in the human body. We found that excessive adipose tissue expansion may promote infant adipogenesis and infant rapid growth, both early markers of risk associated with childhood obesity (Pietrobelli 2017).

Casas et al. (2018) have shown the intimate relationship between nutrition and CVD. Thus, the challenge is in promoting healthy dietary habits as well as an active lifestyle as early as possible in children and young adults. The evidence favors consumption of healthy dietary patterns, such as the Mediterranean diet or DASH diet, against other unhealthy dietary patterns, such as the Western diet, based on a high consumption of salt, added sugars, and saturated and trans-fats. Despite the fact that strong evidence shows the potential health benefits of a great number of foods, nutrients, bioactive compounds, and dietary antioxidants, such as polyphenols, may exert on CV risk factors or directly on CVD development, it is necessary to conduct more interventional studies with a higher number of cases and longer follow up. To date, a lot of results obtained have produced few conclusions and sometimes, even contradictions. Therefore, due to a lack of information about

possible mechanisms implicated in the cardioprotective effect of diet, foods, nutrients, or bioactive compounds, this needs to be more investigated.

With our population rapidly aging, nutritional strategies for preventing or reversing arterial aging and reducing CVD risk will continue to be an important area of research (Larocca et al. 2017). There is already strong clinical/translational evidence in support of several broad dietary patterns, energy restriction approaches, and nutraceutical compounds for healthy arterial aging. However, many important questions remain. It will be particularly important to further establish which specific diets and foods improve vs. impair function, and which alternative strategies (e.g., intermittent fasting paradigms, select nutracueticals) have the potential to enhance arterial health in older adults for whom healthy diet alone is not enough.

Nutrition therapies for diabetes have been described and reviewed. Evidence-based clinical practice is a dynamic process. Clinicians create an individualized treatment plan based not only on accumulated evidence but also on patient preference and original lifestyle. In this process, patient-centered communication skills are essential. I believe that such shared decision making is essential for successful clinical practice and supports patient longevity and quality of life (Yamada 2017).

The main store of glycogen in the body. Sugar is a great supplement, supplying both glucose and fructose (Peinado at al. 2013). A diet with a high amount of carbohydrates is recommended in endurance and high endurance sports. In long-term submaximal efforts, the longer the physical activity lasts, the greater the use of muscle glycogen and the less energy obtained from lipids. When the effort is high but the duration is not so long, the phosphagen system, glucose and glycogen constitute the main source of energy. Depending on the exercise load that is daily carried out, it is recommended to take one amount of carbohydrates or another. In people who perform light activities, 3-5 g / kg per day is recommended and in athletes with a high intensity exercise program (4-5 h per day) 8-12 g / kg * day is recommended. The decrease in glycogen is a limiting factor in performance. It is necessary to take into account not only the quantities but also the moment of intake.

A low fat and a carbohydrates diet, in people with overweight and metabolic syndrome, could offer weight loss. Due Gomez at al. (2013) there are studies that do not blame sugar for the increase of chronic disease. In Australia there was a substantial decrease in sugar intake and during that same period obesity had experienced a significant increase. In conclusion we can see that sugar doesn't seem to limit obesity incidence. Another relevant factor that can help questioning sugar-cardiovascular disease relation is sedentarism. There is some indicator that clearly shows that sedentarism is more common in our society. One of the main reasons that can justify the increase of cardiovascular diseases is that the main determinants for the population to modify their eating habits and increase physical activity are not educational, but environmental. In other words, there is a socio-economic and also a cultural background, which are determining factors in the different types of impact of preventive interventions. Also, the lack of areas for practicing physical exercise and the high prizes of vegetables and fruit, are considered to be some limiting factors. The current

is accompanied by a clear decrease of physical exercise, with stress as pivotal pathogenic elements and a more unbalanced diet.

Article of Bray and Popkin (2013) found out that about 75% of all foods and beverages contain added sugar in a large array of forms. Consumption of soft drinks has increased fivefold since 1950. This consumption of soft drinks is related to the risk of diabetes, the metabolic syndrome, and cardiovascular disease. In 1776- at the time of the American Revolution- Americans consumed about 4 lbs of sugar per person each year. By 1850, this had risen to 20 lbs, and by 1994, to 120 lbs. High Fructose Corn Syrup and the fructose that they both contain have dramatically increased the health risks. In another survey of 75 countries, soft drink intake increased globally from 9.5 gallons per capita per year in 1997 to 11.4 gallons in 2010. A 1% rise in soft drink consumption was associated with an additional 48 overweight adults per 100 people, 2.3 obese adults per 100, and 0.3 adults with diabetes per 100. Many health problems are linked with this increase in fructose intake but fatty liver disease is one which increase is noted in both the U.S. and Europe and certainly is linked with excessive fructose intake. Some of the recommendations for the individual are: 1) Chose water, unsweetened coffee, or tea in place of calorically sweetened beverages. 2) Chose and eat fruit rather than drink fruit juice or fruit drinks.

Apparently, ketogenic diets (<30 carbohydrates per day) are growing its popularity because of its potential benefits on weight loss, but there are some studies that can affirm this diet can have worse metabolic consequences than others which nowadays can be considered totally unhealthy (Evans 2018).

Stretching is a fundamental part of what is known as physical activity but it is not as studied and well-practiced as it ought to be. Due Mora, Pena and Machado (2005) experts think professional athletes sometimes reject stretching, but it allows the maximum path of the joint in various positions. Furthermore, it is as important to stretch in the first place, as to do it correctly. It must be maintained, in order, and progressive. If done correctly, stretching has a lot of benefits regarding life quality.

Regarding sports at the aim of an athlete to maximizing his performance, it's important to have in mind three fundamental moments: before, during and after the exercise (Pérez-Guisado 2009). In the first place, it's important to know what to eat, in what amount, and how long before the physical activity, so it helps digestion. But actually, the moment after the exercise is the most important one to facilitate muscle mass and strength development.

Diet takes part of a lot of chronic diseases in our century. That is why diet is the object of study of many experts, and also how it has affected to human's health along the years compared to our ancestors's diets have. It's been proved that primates have had a much more plant-based diet that we humans, at the present time, have. That descreases our micronutrients and fiber intake, and also taking into account the low caloric density of wild foods and our processed (both plant and animal) food, that is clearly reflected in our health (Milton 2000).

Due Pérez-López et al. (2014) caloric reduction has been one of the most popular dietary strategies for many years. Caloric reduction is a successful strategy for a short-term goal (e.g. if you are a judoka and you need to slim down for a tournament). However, for a long-term is not very effective because of the jojo effect. The key to lose weight is to reduce the nutrients intake and also to do physical activity. Harvard analysed the results of an investigation where they compare the effectivity for two strategies: on the first hand, a diet, on the second hand we have the combination of a diet and physical activity program. In the system with the diet they could see that the benefits disappear as time passed by. Only 3% of the patients could maintain the weight lost for like a year (or five years in extreme cases). With the other system we do not lose as much weight as we do with the other strategy, but we increase our muscular mass. Besides we do not recover **our lost mass.**

Mediterranean Sea, and is generally characterised by frequent consumption of fruit, vegetables, complex carbohydrates, pulses and fish; low consumption of meat and cheese; low-to-moderate amount of wine intake during meals; and use of olive oil for seasoning (Turati et al. 2015). High intake of fruit and vegetables have been related to a reduced risk of cancer at several sites. The high intake of vegetables reduced the cancer appearance. The vegetables effect on our health is stronger than the high fruit intake. In Italy 20%-60% of digestive tract cancers in Italy could be attributable to low consumption of vegetables and fruit. Micronutrients (vitamins and minerals) could also act against cancer through their antioxidant activities, fee radical-trapping capacity, modulation of detoxification. However, despite the promising results of several dietary vitamins and food component on cancer risk from epidemiological studies, trials usually failed to show a protective effect of vitamin supplementation on cancer risk.

Weight loss is a key factor in preventing the risk of various diseases, including diabetes. In this clinical trial, a group of individuals at high risk of suffering from diabetes was selected as a sample, and a Diabetes Prevention Program (DPP) was applied, which included a diet high in carbohydrates and low in fat, as well as physical activity. The objective was to evaluate the associations between diet and the prevention of diabetes. The results showed that a dietary shift toward higher carbohydrate intake, higher intake of dietary fibber, fruits, and vegetables, and lower fat intake, promotes weight loss in people at high risk of developing type 2 diabetes (Sylvetsky et al. 2017).

Many studies have observed associations between saturated fat in the diet and the risk of coronary heart disease, but few have compared saturated fats with unsaturated fats and carbohydrate sources in relation to the risk of coronary heart disease, this being the goal of This studio. To do this, a sample of 84,628 women and 42,908 men were analysed, all without previous illnesses. With the results obtained, it has been observed that unsaturated fats and high-quality carbohydrates, especially whole grains, can be used to replace saturated fats, and thus reduce the risk of coronary heart disease (Li at al. 2015).

The importance of protein is known for maintaining a balanced diet, but its beneficial effects vary depending on the type of protein it is, whether of animal or plant origin. Study of Song et al. (2016) aims to compare the associations of animal protein and plant protein intake with the risk of mortality. To do this, it has analysed the protein components of the diets of 131,342 participants,

for 32 years. In this study, it has been concluded that a high intake of animal protein was associated with higher cardiovascular mortality, and a high intake of vegetable protein was inversely associated with mortality, that is, it reduced the risk of death, especially in people at risk of health. Therefore, they conclude that it would be important to replace red meat, especially processed meat, with sources of vegetable protein.

Study of Mujcic and Oswald (2016) aims to analyse the psychological improvements produced after a high consumption of fruits and vegetables in the diet, in a group of 385 adults. In this study it has been observed that with an increase in the consumption of fruits and vegetables, there is an increase in happiness, satisfaction with life and well-being. These improvements occurred in 24 months. People's motivation to eat healthy foods is weakened by the fact that the effects can take a long time to appear. However, an increase in the consumption of fruits and vegetables allows to observe positive effects in less time. Therefore, the authors conclude that, at a political level, citizens can be shown improvements in increased happiness through a healthy diet rich in fruits and vegetables, being able to feel its effects quickly.

Jensen (2006) makes an analysis on whether nutrition supplementation is actually important for the recovery of inflammation, especially in highly proinflammatory states. Inflammation depends on the genes and the lifestyle that someone has, but in illnesses it can become quite problematic. From a nutrition point of view, it involves the destruction of muscle mass and joints and hyperglycaemia. The author maintains that nutrition supplementation alone has no value towards the recovery of inflammation, but he proves that combining good nutrition with other factors can solve inflammation. Following this line of thought, the author states that including and combining anti-inflammatory diets, glycemic control, physical activity, appetite stimulants, anabolic agents, anti-inflammatory agents, anticytokines, and probiotics can really modulate inflammation altogether, and therefore improve our health and recovery of illnesses and injuries.

Pinon et al. (2019) conducted a study, in a rural community in central Nebraska with under a thousand inhabitants, about how many sugar-sweetened beverages (SSBs) they consumed every day, with the purpose of studying if there is a high consumption of SSBs in areas with higher risk of health disparities and risk of disease. To conduct the study, they used a survey designed so everyone that has passed at least fourth grade of primary school could understand it and complete it. They found out that there is a correlation between higher SSBs consumption and higher Body Mass Index (BMI), especially in people who suffered overweight or obesity. These results are important since a lot of studies point out that especially people that do not live in urban areas and people with lower incomes, and thus, lower access to healthier food, are the ones with a greater risk of suffering obesity and heart diseases. Therefore, this study proved that the last statistics are the same for SSBs consumption, as in this community the average consumption was higher than the average in an urban area in Nebraska, than the average in the whole state of Nebraska, and the average of 23 states. In conclusion, the authors state that this field must be further studied and addressed in primary attention clinics, as well as reducing access to SSBs, by increasing their taxes, for instance, since this is a public health issue.

A review by Gómez et al. (2020) describes the effects of processing and preservation technologies on the sensory and nutritional quality of meat products. Physical methods such as dry aging, dry curing, high pressure discussion (HPP), conventional cooking, sous-vide cooking and 3D printing. Chemical and biochemical methods such as fermentation, smoking, drying, marinating and reformulation are discussed. are also re-evaluated. Their technical limitations, due to the loss of sensory quality when the nutritional values of these products are improved, are presented and discussed. There are several studies focused on either the nutritional or sensory quality of processed meat products, but more studies are needed to integrate these two aspects. The combination of different processing and preservation methods leads to better sensory quality results; thus, further research into combinations of different factors is needed to ensure that the nutritional value of the meat is not compromised.

Obesity is characterized by resistance to appetite-regulating hormones, which leads to a misalignment between physiological signals and the perceived hunger / satiety signal. Interrupting the rhythm of the synthesis may explain this situation. The aim of the study by Morante et al. (2020) were to evaluate the effect of diet-induced weight loss on the daily rhythms of leptin and ghrelin and its effect on daily doses of the variability of appetite sensations in obese patients. Weight loss reduced leptin synthesis (pauc <0.001), but not rhythmic characteristics, except mean value of variability (pmesor = 0.020). On the contrary, the average level of ghrelin increased after weight loss. Rhythmic characteristics were also adjusted until the rhythm was similar to that achieved in normal weight subjects. The degree of variability of leptin and ghrelin correlated with the effectiveness of the dietary intervention ($p < 0.020$ and $p < 0.001$, respectively). Weight loss partially restores the daily rhythms of leptin and adjusts the rhythms of ghrelin, but appetite is hardly controlled, confirming that these hormones cannot perform their physiological functions properly.

Due Martins et al. (2020) physical activity (PA) and sedentary behaviors (SB) influence health. Since most people engage in different combinations of both behaviors every day, understanding the socio-demographic characteristics of adults with distinct PA and sitting time (ST) patterns is important to contribute to evidence-based planning of public health strategies. Data from a national survey on diet and activity behaviors (IAN-AF, 2015/16) including 1724 adults (50.5% women, 18–64 years) from a representative sample of Portuguese adults was used in this study. Participants were interviewed face-to-face, and the International Physical Activity Questionnaire (IPAQ) was used. Logistic regression examined the associations between socio-demographic factors each of the four-low/high PA-ST groups. PA low/high categories were defined as in IPAQ, while ST low/high categories were defined according to ST tertiles (≤180 min/day, ≥360 min/day). A 'higher risk' behavior pattern (low PA/high ST) was present in 37.3% of the adults and was likely associated with a middle household income, and with having 12 or more years of education. The 'lower risk' (high PA/low ST) represented 26.6% of the sample and was likely associated with middle-aged adults and with having a lower educational level. Being male, young and highly educated was related to being physically active and spending large amounts of time in ST. Besides adding to the body of mixed evidence on this theme, the identification of the socio-demographic factors associated with each PA/ST pattern will permit national public health authorities to define policies and tailored actions to promote PA and reduce ST.

Study of Oliveira et al. (2018) includes, for the first time, estimates of general and abdominal obesity prevalence for all ages of the Portuguese population, using common standardized methodologies. Results are compared by sex, age groups, educational level and geographical regions. Participants were a representative sample of the Portuguese population aged between 3 months and 84 years of age (n= 6553), enrolled in the National Food, Nutrition and Physical Activity Survey, 2015–2016. Objective anthropometric measurements included length/height, weight and body circumferences, performed according to standard procedures. Abdominal obesity was defined in adults as waist-hip ratio≥0.85 in women or≥0.90 in men. Prevalence estimates and 95% confidence intervals (95%CI) were weighted according to a complex sampling design, considering stratification by seven geographical regions and cluster effect for the selected Primary Health Care Unit. The national prevalence of obesity is 22.3% (95%CI: 20.5–24.0), significantly higher in women. Obesity prevalence is much higher in the elderly (39.2%, 95%CI. 34.2–44.2), while children and adolescents have the lowest prevalence around8–9%. In a regression model, three knot points denoting an inflection of obesity prevalence across the life span were observed around 5, 15 and 75 years. The prevalence of pre-obesity at national level is 34.8% (95%CI: 32.9–36.7), higher in men, and almost 18% of children and 24% of adolescents have pre-obesity. The sex- and age-standardized prevalence of obesity ranged from 38.3% (95%CI: 34.6–42.1) to 13.1% (95%CI: 10.3–15.9)for the less and the most educated individuals, respectively. Although some geographical region disparities, obesity prevalence did not significantly differ across regions (p=0.094). The national prevalence of abdominal obesity in adults is 50.5% (95%CI: 47.9–53.1), particularly high in the elderly (80.2%). Almost 60% of the general Portuguese population is obese or pre-obese. Women, elderly and less educated individuals present the highest obesity prevalence. Abdominal obesity, in particular, seems to be a relevant public health problem among the elderly men.

The fact that nearly half (49.3%) of the adult population aged 18 years and older is overweight and 15.9% is obese, prevalence that have been observed since the first health survey in 1997 (41.3% and 10.8%, respectively). %) have only continued to increase, makes this a major public health problem (Drieskens et al. 2018). Overweight and obesity are more common in men, in the 35-74 age group and the less educated, making them important target groups in terms of prevention. In addition, the situation is worst in the Walloon Region (51.8% and 18.0% respectively, percentages significantly higher than in the Flemish and Brussels Regions). One in five (19.0%) young people aged 2 to 5 17 years of age are overweight and 5.8% are obese. The problem is greatest among toddlers aged 2-4 years (24.4% respectively, so almost one in four, and 11.7%). The situation among young people is more favorable, in the sense that this prevalence has remained constant compared to the previous survey years (except 1997). Here too, attention should be paid to young people from households with a low educational level, because two out of five (40.5%) of these young people are already overweight and 14.0% are obese. As far as young people are concerned, the situation is only in the Brussels Region (27.3% and 10.5% respectively, percentages significantly higher than the Flemish Region, but not the Walloon Region).

This Belgian food consumption survey was conducted by the Scientific Institute of Public Health (WIV). Food intake data was collected between February 2014 and May 2015 from nearly 3,200 Belgians aged between 3 and 64 years. This also provided for the first time more insight into the

nutrition of children between 3 and 15 years old. The previous food consumption survey dates from 2004 and only concerned Belgians from the age of 15 (De Ridder et al. 2016). Belgians still eat too many energy-rich and nutrient-poor foods and too few nutrient-rich foods. As a result, they consume too much fat and sugar and show deficiencies in important vitamins and minerals. In order for Belgians to better comply with the general dietary guidelines, the IPH argues for the consumption of nutrient-rich basic foods such as vegetables, fruit, potatoes, whole grain products, fish and milk products to be promoted more and to make it more available as an obvious choice. Although there are arguments for limiting meat consumption, the IPH points out that meat is an important source of essential nutrients. It is not necessary to completely remove meat from the menu.

Where are the bottlenecks?

• drinks too little water: 797 ml instead of at least 1 liter; eat too little bread and substitute products: 141 g instead of 150-360 g; eat too few potatoes and substitute products: 138 g instead of 210 to 350 g; he eats a third less potatoes than ten years ago and is replacing potatoes more often with refined and therefore less fiber-rich products such as white rice and pasta; takes too few vegetables: 145 g instead of 300 g; eat too little fruit: 1 piece instead of 2 to 3 pieces; uses too little milk products and calcium-fortified soy products: 160 ml instead of the recommended 450 to 600 ml; he eats enough cheese; because milk and dairy products are our main source of calcium, such under-consumption also has repercussions on the average calcium intake below the recommended amount; consumes too many extras such as sugary and alcohol-containing drinks, sweets and snacks that do not contribute to a healthy diet. These extras are good for more than 650 kcal or about a third of the average energy intake. That is almost three times the maximum allowable amount. Such extras are also responsible for about a third of the daily fat and saturated fat intake, they contribute to an excessive intake of mono- and disaccharides and little or no intake of vitamins and minerals

Previous studies have shown that there is a relationship between the composition of the intestinal flora and, for example, obesity or all kinds of conditions such as intestinal inflammation and diabetes. Such results naturally make you dream about the possibility of remedying ailments or alleviating their symptoms through interventions on the intestinal flora. Substances produced by microorganisms in our gut can affect the brain. In doing so, they also guide our behavior and our feelings. Microbiologist Jeroen Raes (VIB - KU Leuven) discovered this after researching more than a thousand test subjects. Until now, researchers have mainly investigated the link between stomach and brain in laboratory animals. Raes (2019) and his team aimed at people. They mapped the bacteria present in their test subjects' intestines. In that intestinal flora, they discovered specific bacterial groups that are related to mental health. Two of these, Coprococcus and Dialister, were not found in people with depression. Similar results were found in subjects in a Dutch research project and in a group of depression patients at UZ Leuven. Raes also previously discovered that certain bacterial communities are more common in Crohn's disease patients. It appears that the bacteria associated with intestinal inflammation also negatively impacts mental health. This investigation is currently ongoing.

In the study of Pot et al. (2020) researchers examined the effect of this treatment method in an initial 438 participants. Ultimately, they were able to include data from 234 participants in the analyzes. The program consists of an intensive coaching program of 6 months followed by a follow-up program of 18 months. It is intended for patients with diabetes who are already on medication. During the treatment the focus is on nutrition, exercise, sleep and relaxation. The guidance is provided by a dietician, exercise coach and nurse. The patient's GP is also closely involved in the treatment. We work with a combination of individual and group sessions, supplemented with online support. Some results**:**

• After 2 years, 67% of the participants used less sugar-lowering drugs, and 28% were even able to stop using this medication completely.

• Of the 66 participants who received insulin at baseline, 71% were no longer using insulin after 2 years.

• The participants weighed an average of 7 kg less after the study and had a smaller waist circumference (average -8.2 cm). Their triglycerides (blood fats) and HDL ("good" cholesterol) levels were also improved.

• Mean HemoglobinA1c (HbA1c) levels, on the other hand, did not change much in the participants. Hemoglobin is a protein that can bind sugar in the blood. The value of this "saccharified" hemoglobin or HbA1c gives a good picture of the average blood sugar level. The proportion of "normal" HbA1c levels increased in the participants from 45% at the start of the lifestyle program to 53% after 2 years.

Teras at al. (2019) and Drieskens at al. (2018) examined whether women who lose weight had a lower risk of developing breast cancer. Those estrogens can cause breast cells to grow, which can lead to breast cancer if that growth is out of control. To find an answer to the research question, the researchers collected data from ten large cohort studies with women over 50 years old. During the follow-up, the women had to declare their weight at least three times and recorded breast cancer incidence. In total there were 180,885 women and 6,930 breast cancers. The researchers divided the women into different groups according to the evolution of body weight during the follow-up. The researchers also took into account possible disturbing factors such as physical activity and the use of hormonal preparations. Compared to women who maintained a stable weight, the risk of breast cancer decreased by 13% when they lost 2 to 4.5 kg. With a weight loss of 4.5 to 9 kg that was 16% and when they lost more than 9 kg, it even decreased by 26%. The reduction in breast cancer risk was particularly evident in women who were overweight or obese at the start of the study. The researchers conclude that weight loss can be an important measure to reduce the risk of breast cancer.

Overweight or obesity is very often associated with high blood pressure, abnormal blood sugar and excess cholesterol (Lasalle 2018). Yet there are many people with a BMI over 25 (which the World Health Organization classifies as "overweight") and even over 30 ("obese") for whom these clinical indicators are absent. Despite their excess body fat, they have a fairly normal blood pressure and cholesterol, which makes them considered healthy by many doctors, especially at the level of the metabolism. Fat but healthy, if you like. This is unjustified, according to a long and comprehensive study in which thousands of people in more than ten European countries were followed for years.

The British medics who coordinated the study looked for links between obesity on the one hand and heart disease on the other. They classified the study participants according to medical indicators such as blood pressure, cholesterol level, blood sugar and BMI. If people met three or more of the criteria, they were classified as "unhealthy". People with a (much too) high BMI escaped that. "In the overweight group, the risk of heart complaints was almost 30 percent higher than in the healthy participants with a healthy BMI (between 18.5 and 25)". But the analysis found that in the end, they didn't escape the effects of their excess body fat - statistically, that is. For example, the risk of ischemic heart complaints - in which the heart receives too little blood due to blocked coronary arteries and a heart attack - was almost 30 percent higher than in the healthy participants with a healthy BMI (between 18.5 and 25). In the unhealthy participants the risk of the same type of heart complaints was preferably twice as high as in the healthy group.

Dietary fiber (DF) contains a wide range of naturally occurring and modified materials with significant changes in physical and chemical properties and potential physiological effects. Although nutritional studies that test the effects of DF usually provide extensive details of physiological responses, many still fail to adequately state the type and properties of DF itself. This weakens the ability to directly replicate and compare studies and create structural-functional relationships. The study by Poutanen et al (2018) outlines the factors that affect DF function and provides 4 general recommendations for the characterization and reporting of DF preparations and DF-containing foods in nutritional research. They relate to 1) the implementation of characterization methods that reflect the study hypothesis; 2) adequate reporting of the source of DF, quantity and composition; 3) measurement of rheological properties of DF; a4) estimation of the rate and extent of DF fermentation. It is important to consider the food matrix of the tested products, as this may affect the functionality of the DF and thus the apparent effectiveness of the DF for health outcomes.

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Brain as a Medicine – Selected Findings from Literature Review in Slovakia

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Abstract

"Brain as a medicine" is a section that presents the knowledge of several experts in order to improve the physical and mental health of people. Research findings suggest that mindfulness, yoga and meditation have a positive effect on physiological and immunological indicators of stress and inflammation. Its beneficial effects were monitored mainly in connection with the gray matter of the brain, in which there were also impairments of sensory perception, memory, learning and regulation of emotions. Repeated or chronic exposure to stressors is associated with changes in neuroendocrine responses that are affected by the type, intensity, number, and frequency of stress exposure. Stress tests focused on psychosocial stress revealed a more intense physiological response of the participants compared to cognitive stress.

Key words: Stress management, Self-esteem**,** Psychological training, Health, Prevention, Autogenic training, Anxiety**,** Blood pressure, Heart rate, Achievement motivation

Psychological insight

Athlete's personality and stress management

According to Kaplánová (2020), financial awards can be an important factor influencing the football players 'anxiety and coping skills. The results of the study (age study sample: 18-32 years (23.98 ± 3.01)) suggest that the financial awards increase the coping skills of football players but also increase their cognitive component of anxiety which is manifested by worries and fear of failure. Financial awards increase football players' motivation to better prepare for sports performance, as evidenced by better performance goal setting, more carefully following coaches´ instruction as well as better mental preparation compared to unawarded football players. Alarming is the increase in the cognitive component of anxiety awarded football players, which is associated with fears of poor performance and also associated with loss of mental relaxation, the disintegration of movement stereotypes, deautomatization of gaming automation, movement discoordination or general discontinuity of football players and thus a reduction in sports performance. For this reason, we encourage sports organizations to focus more on the mental preparation of football players. It is important to provide football players the opportunity to graduate from short- or long-term mental training conducted by a trained sports psychologist not only at the time of the athlete's failure but also as a preventive measure against increasing cognitive anxiety. We recommend sports organizations to train coaches in the field of mental training, preferably through annual short training sessions with a sports psychologist, to influence the development of desirable athletes' coping skills.

According to Kaplánová (2019a) sweating, increased heart rate, fidgeting, worrying thoughts and fear of failure are typical symptoms of an inability to manage stress in an important moment of the match. Thus, there is a well-founded need for psychological training that can help ice hockey players to control their emotions in stressful situations. Research (age study sample: 20-28 years (21.67 ± 1.94)) has shown that the cognitive component of hockey players' anxiety is closely linked to coping with adversity, coachability, concentration, peaking under pressure and freedom from worry, which is also manifested somatically. Research has also shown that higher self-esteem suggests better coping with adversity, concentration and freedom from worry, pointing to the need to orient psychological training towards increasing self-esteem of ice hockey players. Our research has shown that the level of stress management strategies varies depending on the level of self-esteem and anxiety. It seems that reduced anxiety and increased self-esteem can lead to better stress management and optimal competition performance.

Kaplánová (2019b) examined coping skills of gymnasts from the perspective of a five-factor model of personality (age study sample: 15-26 years (19.34 ± 3.15)). The personality of gymnasts seems to be one of the factors that influences why some gymnasts perform well in training and not in competition. The results of the research show that stress management is related to the personality structure of gymnasts, specifically to emotional lability/stability, extroversion/introversion and openness to experience. Coping with adversity and freedom from worry have been closely linked to the emotional lability of gymnasts. A higher level of introversion has proven to be beneficial for

self-confidence and achievement motivation, coachability and coping with adversity in this individual sport. Higher openness to experience indicates better concentration and better performance under pressure. A better understanding of personality traits and stress management strategies can help coaches and sports psychologists develop effective interventions and help gymnasts achieve optimal performance in competition.

Currently, there is a lack of research in the field of mental training and preparation of football players for competitive conditions. The Kaplánová study (2019c) deals with stress management strategies and the search for an association with the anxiety of football players (age study sample: 19-25years (21.30 ± 1.60)). Anxiety is a typical response to a situation where an athlete's skills are being assessed. It consists of disturbing thoughts and concerns that declare a cognitive component of anxiety and a degree of physical activation (sweating, muscle stiffness) that declares a somatic component of anxiety. Our research has shown that psychological resilience of football players and their ability to manage stress depends on their level of anxiety. The football players with a low level of anxiety are able to quickly bounce back from mistakes or setbacks, they are mentally strong enough, value their efforts and compete with enthusiasm compared to football players with a high level of anxiety. It seems that reducing anxiety can improve the psychological skills of football players and increase their sports performance in important moments of the match.

Psychological intervention for stress management

The aim of the paper Kaplánová and Gregor (2019) is to point out the possibility of using reframing as a psychological technique to improve the mental preparedness of an athlete for competition. Reframing can help athletes who find it difficult to think negatively to achieve set performance goals. In addition to brief instructions for framing negative thinking into its more positive perspectives, we also provide information on the development of negative thoughts, sources of pessimism, and the athlete's tendency to create negative scenarios in his mind. The use of reframing in the psychological training of athletes can contribute to improving their physical and mental health.

Overall health, including physical, social, and mental health, is one of the highest values of human life. Despite the continuous effort of the majority of the people who try to protect this value, there are still many external as well as internal factors such as psychical burden or frustration that can disrupt the smooth functioning of human beings and their social, private, or public life. The article Šagát and Kaplánová (2019) deals primarily with one of the most serious contemporary civilization problems, which is stress. It contains a basic definition of the stress concept as well as the other closely related terms (psychical burden and frustration) and points out both negative and positive aspects of stress concerning the human organism. The authors summarize the possibilities of reaction to stress in relation to human personality characteristics. They are also focused on the options of prevention and solution of negative aspects of stress. Further, the article identifies the three ways how to eliminate those aspects, such as proper diet, sports activities, and active rest. In the last part, the authors also describe individual approaches in detail, present the basic principles

of their operation in the fight against stress, and provide examples of the practical application of anti-stress measures.

The study of Chovanec and Gropel (2020) tested the effect of 8-week endurance and resistance training programs on cardiovascular stress responses, life stress, and coping. The participants (age study sample: M_{age} = 21.02 ±1.65) were randomized to one of the three study groups: endurance training group, a resistance training group and a waitlist control group. Both endurance and resistance training programs caused physiological adaptation in terms of increased VO_2max after the intervention. For stress and coping parameters, participants in the training groups improved cardiovascular recovery from stress and reported having less stress in their everyday life after the intervention than participants in the control group. We did not find any significant differences in heart rate reactivity and coping strategies between the study groups. These results partly support that exercise training has stress-reducing benefits regardless of the type of exercise. Both endurance and resistance exercise activities may be effectively used to improve stress regulation competence while having less impact on changing specific coping strategies.

Bratská (2009) examinates counterfactual thinking and changes in the personality dimensions of university students before and after participating in a socio-psychological training course that focused on constructive solutions and coping with real load situations. After the socio-psychological training statistically lower neuroticism, significantly higher extraversion, and a statistically significant difference in sub-dimension happiness in meaningfulness were shown. After completing the training, participants usually understand problems as a challenge, enjoy possibilities and their own initiative more, appreciate a creative problem solving, see a possibility to influence the course of action, and want to create mutual cooperation. SPT revealed the functionality and correctness of counterfactual thinking.

A case study of Hašto (2013), was illustrated the use of Eye Movement Desensitisation and Reprocessing and Autogenic Training in Post-traumatic stress disorder treatment. Eye Movement Desensitisation and Reprocessing was used to manage the acute symptoms, while Autogenic Training was used to enhance the resilience in persisting stress. Using the biopsychosocial model of mental illness, we discuss the socio-political and socio-psychological aspects of this case that has put a burden on the relationship of two neighbouring nations (Slovakia and Hungary) as well as on the relationship of the national majority and a minority within our country (Slovakia).

Biological insight

Stress, heart rate variability and anxious people

According to Soláriková et al. (2018) heart rate variability (HRV) represents one of the most used biomarkers of cardiovascular health that offers insight into the autonomic nervous system activation. The results of the study (age study sample: M_{age} = 22.3 ±3.10) suggest the stress tasks which featured a social component (Psychosocial stress a Psychosocial stress group test) triggered a more intensive physiological response in comparison to cognitive stress or with natural conditions

measurements. Allergic subjects showed a tendency towards decreased heart rate frequency (HR) and increased overall HRV in all tests. Besides, the functioning of the ANS showed also gender differences represented by an increased HR and a decreased HRV in women. The data support the prior findings of sympathetic withdrawal or parasympathetic hyperactivation in individuals suffering from allergy, which could be one form of the dysregulation of the autonomic nervous system.

The study of Rajčáni, Soláriková and Brezina (2018) suggests that heart rate variability (HRV) changes in allergic as well as high trait anxious people, and associations between allergic inflammation and trait anxiety. This study investigated HRV of 20 low anxious allergic, 19 healthy high traits anxious, and 18 healthy low anxious in a naturalistic setting. On arranged research days, subjects performed measurements using portable ECG device and subjective self-assessment of perceived stress. Five repeated measurements data from each subject have shown increases in overall HRV, as well as HRV on respiratory frequencies in both allergy and high trait anxiety. Subject's sex was an important factor because HRV increases in allergy were only apparent in women. Data from self-assessment show no differences in experienced stress attributable to allergy, only to trait anxiety.

The results of the study Ježová et al. (2016) suggest that repeated or chronic exposure to stressors is associated with changes in neuroendocrine responses depending on the type, intensity, number and frequency of stress exposure as well as previous stress experience. Evidence of this is the results of a study that compared salivary cortisol and cardiovascular responses to real-life psychosocial stressors related to public performance can cross-adapt with responses to psychosocial stress induced by public speech under laboratory setting. The sample consisted of 22 healthy male volunteers, who were actors. The stress task consisted of 15 min anticipatory preparation phase and 15 min of public speech on an emotionally charged topic. The actors, who were accustomed to public speaking, responded with a rise in salivary cortisol as well as blood pressure to laboratory public speech. The values of salivary cortisol, systolic blood pressure and state anxiety were lower in actors compared to non-actors. Unlike non-actors, subjects with experience in public speaking did not show a stress-induced rise in the heart rate. Evaluation of personality traits revealed that actors scored significantly higher in extraversion than the subjects in the non-actor group.

The aim of the study Sabo, Rajčáni and Ritomský (2018) was to establish a methodology for creating a database of speech under real stress, which may be used in future experiments investigating speech under stress (age study sample: 25 – 56 years). To induce stress-related speech changes, speakers took part in a virtual reality simulation of a roller coaster ride. Heart rate and skin resistance were monitored as bodily reference indicators, while subjective experience was monitored via stress and arousal checklist. In the recorded data, was founded slight increases in pitch and intensity of speech during the simulation. However, these effects were not statistically significant. In bodily indicators, we found a significant increase in HR and a decrease in skin resistance during the simulation which shows increased arousal.

The study of Regecová et al. (2019) investigated the effect of an administration of dark or milk chocolate on blood pressure, heart rate, and double product in young healthy women at rest and during acute mental stress. All subjects underwent two tests of mental arithmetic one before chocolate administration and the second one 2 hours after chocolate (1 mg/g of body weight) ingestion. Two hours after ingestion at rest, dark chocolate administration resulted in a significant increase in relative values of systolic blood pressure and double product by 5.1% ± 1.4% and 13.7% ± 3.2%, respectively, compared to the responses in the milk chocolate group (−2.4% ± 1.6% and 0.6% ± 3.4%, respectively, $p < 0.04$ for both comparisons) without changes in diastolic blood pressure, heart rate, and mean arterial blood pressure. During mental arithmetic-induced acute stress, the relative magnitude of the reactivity of diastolic blood pressure, heart rate, mean arterial blood pressure, and double product decreased by about 10, 16, 8, and 23 percentage points, respectively, 2 hours after ingestion of dark chocolate compared to the relative reactivity determined before dark chocolate ingestion. Milk chocolate failed to affect any of the above-mentioned parameters at rest or during stress. Thus, dark chocolate might have a beneficial effect during acute stress due to its ability to buffer cardiovascular reactivity in young healthy women.

The aim of the study Janšáková et al. (2020) was to assess whether stimulation of salivation affects the physiological flow of cortisol during a stressing day as compared to an ordinary day and show how the normalizing factor affects the outcome of the study. Stimulated saliva was taken from 42 children at 8:00 a.m. and 12:00 a.m. on two separate days one month apart. During the first day, the children were exposed to the stress situation, while the second day was considered a control day. The concentration of cortisol was analysed using ELISA. The highest level of cortisol was observed in the morning of the stress day (p 0.99). Based on our results, the examination of the cortisol diurnal rhythm is not reliable in stimulated saliva. Moreover, the effect of saliva stimulation has to be taken into account for every marker individually.

The aim of the study Ježová et al. (2013) was to evaluate the contribution of an acute increase in state anxiety to neuroendocrine activation under stress conditions. We have decided to take advantage of the effects of listening to music on anxiety and to apply a new methodological approach. A group of fourteen healthy volunteers participated in a counterbalanced crossover design study. Stress procedure consisted of mental (Stroop test, mental arithmetic) and physical (handgrip exercise) tasks were combined with listening to music played forward (pleasant) or backward (unpleasant). The results showed that the condition with listening to unpleasant music was anxiogenic, while the other was not. In the case of increased state anxiety, the rise in ACTH concentrations in response to mental challenge and the increase in systolic blood pressure induced by handgrip exercise was reduced compared to the situation with unchanged anxiety. Concentrations of testosterone, oxytocin, vasopressin and aldosterone were slightly increased in response to the stress paradigm accompanied by increased anxiety. The present data demonstrate that an acute increase in state anxiety contributes to neuroendocrine activation under stress conditions. Listening to music may both positively and negatively influence the perception of stress and the level of anxiety which might have functional consequences.

Ježová et al. (2015) performed a series of studies in healthy humans and patients to clarify the relationship between anxiety and cardiovascular activation under stress conditions. In a group of healthy volunteers with high trait anxiety, they have observed an exaggerated heart rate response during psychosocial stress compared to non-anxious individuals. However, in contrast to general expectations, plasma epinephrine and norepinephrine responses were lower in anxious subjects. Treatment of anxious subjects with a mixture of aminoacids lysine and arginine (10 days) was able to normalize stress-induced catecholamine responses. Anxious women in the follicular phase of the menstrual cycle exhibited a greater stress-induced rise in systolic blood pressure compared to anxious women in the luteal phase and to non-anxious women in both phases. Accordingly, we have brought evidence for a reduced neuroendocrine response to stressors in patients with an anxiety disorder or with immune dysfunction accompanied by anxiety.

Physical activity, mental health and achievement motivation

Stress is an integral part of our lives, and each of us has strategies in place to manage them. Interest in this issue was also supported by the fact that for effective human functioning in all spheres of life, it is desirable that stress management strategies be as effective as possible. Uncontrolled stress can negatively affect human behaviour and experience. One of the ways to fight stress can be a sports activity. It has several benefits (not only for physical but also mental health), contributes to a healthier lifestyle, helps reduce stress, offers a form of self-realization and helps to develop self-discipline and discipline. The paper of Pačesová (2018) offers a theoretical overview of the issue as well as some research studies in this area.

Pačesová (2019a) dealt with the level of achievement motivation and the level of anxiety trait of male and female (n = 225, 21,59 ± 1,97 year). To obtain data, standardized DMV questionnaire and standardized STAI questionnaire were used in this research. The analysis of the results revealed the finding that athletes, regardless of gender differences, show a higher level of some aspects of achievement motivation compared to non-athletes. These are, in particular, the level of achievement motive and the level of achievement -promoting anxiety. On the contrary, within the anxiety inhibiting achievement, a higher rate was found in non-athletic men and women. There was no statistically significant difference in the anxiety of men who exercise regularly and men who do not exercise at all. There was a statistically significant difference between women in terms of regular sports activity in terms of lower levels of anxiety in women sports.

Šmela et al. (2019) dealt with the differences in achievement motivation of the physical education teachers, divided by gender. The research sample was comprised of 52 physical education teachers (male: n=22; 41.59±9.95 years old, female: n=30; 39.33±10.67 years old) from Slovakia. A standardized LMI questionnaire consisting of 170 items was used as the research tool. Male physical education teachers have significantly higher (p=0.043) achievement motivation compared to female physical education teachers. A comparison of dimensions of achievement motivation of male physical education teachers showed that they achieved significantly higher scores in the dimensions of persistence, fearlessness, and competitiveness. Comparing them with national standards, the achievement motivation of male teachers of physical education corresponds with

the 58th percentile (stanine value 5) and of female teachers of physical education with 46th percentile (stanine value 5). The outcomes of this study characterize PE teachers as an elementary component in the teaching process from the aspect of achievement motivation and its dimensions and also indicate the status of PE teachers in society. This study is designated for PE teachers as well as for the general public striving to improve the quality of the teaching process in sports.

The level of achievement motivation is focused generally, so the results can be generalized to the demands of everyday life, it does not apply just to the motives for doing sports. The position of achievement motivation in the work area is quite important and irreplaceable today. The demands of the society on human performance are constantly increasing and they are "forcing" individuals to pushing their goals and performance higher constantly. Human resources are currently highly valued, and not only for young people is the emphasis primarily on ambition and strategies for success, and not on strategies to avoid failure. Research of Pačesová (2019b) suggests that young people engaged in sport activity have a higher level of achievement motivation. However, the area of achievement motivation and the sphere of sport are so unique, that they deserve a thorough examination of aspects that may play a role in them.

Pačesová et al. (2018) dealt with the level of women's wellbeing regarding their sport activity, and also designation the relationship between the individual dimensions of wellbeing and the level of state anxiety and trait anxiety. The research group consists of 107 women (20.03±1.47 years), divided into groups based on their sport activity (active 62, inactive 45). The standardized BDP questionnaire the standardized STAI questionnaire were used. The higher level of personal well-being in the sample of women actively participating in sport activities was found. In both the samples, an indirect relation between positive dimensions of personal well-being and state anxiety (in the case of the sample of women not participating in any sport activity even with trait anxiety) was found. A direct relation between the negative dimensions of wellbeing and the level of state as well as trait anxiety was recorded only in the sample of women not participating in any sport activity. These findings indicate that sport activity can be a suitable instrument to increase women´s personal well-being.

Pačesová and Šmela (2020) dealt with the level of the dimension of aggression and anxiety trait between nonathletes and contact and noncontact sport athletes and assessing the relationship between dimensions of aggression and the level of anxiety trait across the groups. The research group consisted of 153 males aged 22.07 ± 2.49 years: 47 contact sport athletes, 51 noncontact sport athletes and 55 nonathletes. Dimensions of aggression were evaluated by the Buss-Perry Aggression Questionnaire, anxiety trait was evaluated by the State-Trait Anxiety Inventory Authors found that nonathletes were more physically aggressive than contact sport athletes and they also displayed a higher level of anger and hostility. Moreover, nonathletes were more hostile, physical and verbally aggressive than noncontact sport athletes. Nonathletes also had a higher level of anxiety trait than athletes. There was no difference between athletes in any dimension of aggression and anxiety trait level. Besides that, a significant relationship between anxiety trait level and physical aggression across the groups was found. These findings suggest that sports activity can be beneficial for personality in both contact and noncontact athletes. Sport activity may be one of the factors

which increase the possibility of releasing of aggression, while "contactless" of the sport does not play any major role in the aggression of athletes.

Pačesová et al. (2018) dealt with the level of cognitive functions in context of sport. The aim of this study was to assess differences in cognitive functions between tennis players and non-athletic adolescents. The research sample consisted of 98 subjects: 44 tennis players (age 18.11 ± 1.35 years) and 54 nonathletic adolescents (age 18.04 ± 1.33 years). The level of cognitive functions was investigated using the standardized neuropsychological cognitive Stroop test. The tennis players had higher cognitive function scores compared to the non-athletes in two of the three segments of the Stroop test. There was no significant difference between the groups in the simplest segment of the Stroop test (segment T). However, a significant difference ($p = .028$; $d= 0.45$) was found between the tennis players and non-athletes in segment S of the Stroop test and in segment B, the most difficult segment of the test, the difference between research groups was also significant ($p = .002$; $d = 0.63$). There a difference between athletes and non-athletes in cognitive functions such as cognition inhibitory control, concentration of attention, conscious and selective attention. However, the differences have only been demonstrated in moderate difficulty and most difficulty segment, in the simplest segment we have not found difference between athletes and non-athletes.

Šmela at al. (2018) dealt with differences in achievement motivation among college students in terms of sports activities. The research sample was comprised of 248 college students (men: n=141, 22.40±1.62 years of age; women: n=107, 21.78±1.49 years of age) from Bratislava. The respondents were divided into 3 groups according to frequency of sports activities: college students who didn't engage in any sports activities (non-active respondents), college students who engaged in sports activities 1 to 2 times a week (moderately active respondents), and those who engaged in sports activities 3 or more times a week (highly active respondents). A standardized DMV questionnaire consisting of 52 items was used as the research tool. The results revealed significant ($p\leq0.001$) differences in all three performance motivation dimensions. The performance motivation of the highly active respondents was significantly higher compared to that of the moderately active respondents. Also, when compared with the non-active respondents, the level of performance motivation was significantly higher among the highly active respondents. Performance motivation and performance-supporting anxiety increases with the frequency of sports activities; on the contrary, performance-hindering anxiety decreases with the frequency of sports activities. Hence, these results testify to the fact that sport activity is one of the determinants for increased performance motivation.

Pačesová, Šmela and Nemček (2020) dealt with the cognitive functions usable in the sports performance (e. g. an ability to anticipate, perception and speed of movement reactions, decision-making ability or attention). These abilities or functions apply differently to different sports. It means that open skill sports such as team sports, require the coordination of complex bodily movements and adaptation to continually changing task demands. The aim of this study is to identify differences in the level of female's cognitive functions regarding the chosen open skill sports and closed skill sport disciplines. The research group consisted of 84 women aged 22.70±1.71 years. Women were divided into three groups in terms of sport discipline into: female

engaged in closed skill sport disciplines (n=26), in open skill sport disciplines (n=19) and not engaged in any sport activity (n=39). Standardized S-test to determine the level of cognitive functions was used. It is a test of spatial orientation and concentration of attention with accentuated demands on the pace of activity. The results showed that female engaged in open skill sport disciplines showed higher level of cognitive functions than female engaged in closed skill sport disciplines (p=0.04) and also as nonathletes (p=0.02). There was no difference in cognitive function between female engaged in closed skill sport disciplines and nonathletes. These results confirm the theory of different involvement of cognitive functions from the point of view of different types of sport disciplines.

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Brain as a Medicine – Selected Findings from Worldwide Literature Review

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Abstract

The human brain is composed of several billion neurons secured by thousands of connections, making it one of the most important and complicated human organs. Significant positive results were also achieved by patients who regularly performed techniques focused on deep breathing, mindfulness and meditation. In the treatment of post-traumatic stress disorder, patients have again seen improvements after autogenous training, eye movement desensitization and reprocessing. From the above, it is clear that there are many effective ways to enhance a person's subjective well-being and quality of life.

Key words: Brain as a medicine, physical activity

The health effects of resistance exercise training are proven, but less is known about the mental health benefits. Specifically, this study aims to perform a quantitative synthesis of the effects of resistance exercises on anxiety. For this, a resistance exercise program was applied to a sample of 31 individuals, and other similar clinical trials were analyzed. In this study of Gordon et al. (2017), it is concluded that the development of a resistance exercise program significantly improves anxiety symptoms both in healthy participants and in participants suffering from a physical or mental illness.

Separating ourselves from an unpleasant memory doesn't seem easy. This asymmetric in mind control in common reason for discomfort and motivation that leads many people to psychological consultations (Barraca 2011). A recent study by Killingsworth and Gilbert (2010), with a large sample of 2250 participants, has found that most people spend 46,9% of waking hours on thoughts that have nothing to do with what they are doing. There is a possibility that these intrusive thoughts make normal functioning impossible. To achieve this emotions control, the patient must be helped to establish relations between their cognition, their emotions and their behaviours, to identify the most irrational thoughts, or their or their most maladaptive cognitive processes, modify these cognitions through different methods, either through a cognitive or a behavioral path. Many professionals seem to find in acceptance and mindfulness those techniques they couldn't count with to help patient control certain negative thoughts. Although people still struggling to separate their selves from a particular thought, sensation or emotion has been the goal of a behavior therapy, it has not always worked in all cases, and the usefulness of acceptance different thoughts and staying active has been understood.

Due Barraca and Barrios (2012) people act from this structure (reptilian brain) in response to their vital needs. This part of the brain is made up of the basal ganglia, the brain stem, and the reticular system. This part of the brain is responsible for automatic or programmed behaviors (preservation of the species or physiological changes necessary for survival). IT is denominated reptilian because it is usual in reptiles and has an important role in controlling instinctive. This includes animal behaviors like nesting or mating. The behavior of the animal is largely controlled by this area of the brain. It is a programmed behavior and resistant to change. It is survival impulse (eat, drink, mating…). It processes the functions that have to do with doing and acting (routines, habits, territoriality, living space ...). According to Chirinos (2007), the reptilian brain controls respiration, heart rate, blood pressure and even collaborates in the continuous expansion-contraction of muscles. It allows human being to adapts to an environment through elemental answers little complicated emotional and intellectually. To sum up, this part of the brain is a kind of programmed and powerful instinctual behaviour and is therefore highly resistant to change.

Oxytocin and vasopressin are neuropeptides that have a relevant role in most of our social interactions. Meyer-Lindenberg et al. (2011) studied how can these neuropeptides be involved in mental health, as an effective treatment for the mental disorder, or even as its cause. They used recent studies on Autism Spectrum Disorder, anxiety in patients with depression and schizophrenia to develop a new study on how can they be used in order to reverse or reduce the impact of these

disorders on the patients, by administrating them intranasal oxytocin, proving that this treatment reduces behavioural and endocrine responses to social stress, mediates stress-protective effects of social support ('social buffering'), attenuates amygdala reactivity to social stimuli, and improves social cognition, emotion recognition, secure attachment and empathy in humans.

Recent studies show that self-control in humans (as the ability to adapt our behaviour to live in a society and accomplish our goals) depends on a limited power source, as the effort humans make to self-control is greater in following attempts to do it, affecting human behaviour and how humans respond to different stimuli (controlling emotions, attention and impulses). Gailliot and Baumeister (2007) link this source of willpower to the glucose levels in blood, as glucose is the main fuel for brain functions. They studied how more glucose is used in effortful and self-controlled interactions. Also, they linked the lack of self-control in humans under the effects of alcohol to the fact that alcohol reduces the metabolism of glucose in brain and body. In conclusion, the authors stated that humans are more capable of achieving hard goals that require willpower when acquiring the right amount of glucose for the proper functioning of their brains.

Metcalfe and Mischel (1999) analyse how our brain functions in order to obtain gratification, and therefore how it works to commit to a long-term objective. They start presenting the delay of gratification paradigm, being the object of lots of studies. This paradigm studies when is a human controlled by their emotions to obtain the gratification, or when are they driven by reason (for example, when a greater gratification could be obtained). All of this leads to the real development of willpower. The authors theorized a two-system framework, where the cool system responds to reason and the hot system responds to emotions. These two systems normally work as a whole, but sometimes they differ, becoming of interest which of them prevails. If the hot system prevails, we could say that the subject is "yielding" to temptation, having no willpower. To avoid this, humans use some strategies to diminish the influence of the hot system and accomplish their long-term goals, being better at them as they grow and become adults, when they have automated this self-control. There is a problem when adults are under stress or other chronic difficulties, under which the willpower will be diminished constantly.

Seifert et al. (2012) study the relationship intrinsic and extrinsic motivation, and they apply it to health promotion and wellness. On the first hand, extrinsic motivation, or the motivation that functions by obtaining "rewards", has been proven to not work in all cases as recent studies show, as it can lead to better performances in mechanical skills, but quite the opposite in cognitive skills. This means that for cognitive skills (where health and wellness are included), the extrinsic motivation must be followed by a meaningful result, that creates an intrinsic motivation. This happens when the subject has sufficient knowledge to want to change their behaviour, which can be given by extrinsic motivation. The authors state eight strategies to help create intrinsic motivation for health promotion and wellness, including identifying one's intentions, provide "how-to" knowledge, through belonging and recognition and making the change "fun", among others. The authors conclude that extrinsic motivation is just the first step, being necessary to create intrinsic motivation through different strategies to accomplish the wanted health promotion.

This research of Brinol et al. (2004) shows that the confidence produced by the affirmation of oneself can increase or decrease persuasion depending on the quality of the arguments presented. When a message is made up of weak arguments, asserting yourself increases persuasion. In the other hand, when the message is made up of strong arguments, persuasion decreases. The fact that self-affirmation decreases persuasion increases resistance to strongly convincing messages and supports an interpretation based on motivation to process information. The confidence, that is possibly reduced as a result of the self-affirmation, can affect the number of thoughts when it is induced before the message is elaborated, but it could also affect how you think about your own thoughts if it is induced after the message has already been processed. Therefore, it is important to accept yourself with your flaws and your virtues. Even so, affirming a person's identity can take on at least two different roles in the context of persuasion, thus influencing the number of thoughts or the confidence associated with them.

The study by Monteos-Aparicio and Rodriguez-Moreno (2019) dealt with synaptic plasticity and how it is modified in specific time windows of development. A better understanding of how synaptic adjustments take place during learning and memory and / or development can help shape and improve the effectiveness of current protocols in the early stages of academic learning. The ability to manipulate specific neural pathways and synapses has really important implications for therapeutic and clinical interventions that will improve our health. Promising therapies have proven to be deep brain stimulation, non-invasive brain stimulation, neuropharmacology, exercise, cognitive training, or real-time functional magnetic resonance feedback, based on our current understanding of brain plasticity and the subject of intensive research in various pathologies. A better understanding of the mechanisms governing neuroplasticity following brain injury or nerve lesions would help improve the patient's quality of life and save costs for national health systems around the world.

The aim of study of Wemelinger et al. (2018) is to evaluate the relationship between resilience and mental health in older adults and how physical activity influences that relationship. A cross-sectional study was carried out with 312 older adults (179 active and 133 sedentary classifieds by IPAQ). Considering the whole sample, an inverse relationship was found for resilience (Wagnild–Young's Resilience Scale) with depression and stress (DASS-21). Among the sedentary, in spite of there not being an association between total resilience and mental health, there was an inverse relationship for the "meaning of life" component of the resilience and depression scale. For the active group, there was a relationship between total resilience and its components with depression and stress, but not for the "meaning of life" component of the resilience scale. Physical activity played an important role in the relationship between resilience and depression, showing that active and sedentary people use different components of resilience

Ageing is associated with a progressive decline in cognitive function, which occurs according to heterogeneoustrajectories, dependent on multiple physiological and environmental components (Periera et al. (2019). To tackle this major chal-lenge, we designed a project to test the effect of a tailored physical exercise intervention program in the cog-nitive function of a Portuguese elderly

cohort, included in the AGA@4life project. The exercise program includedaerobic and strength components, prescribed in a personalized approach according to the AGA@4life model, andimplemented under direct control of two experienced professionals. The 33 included elderly participants weredivided into two groups (intervention group–IG–and control group–CG) according to their willingness toparticipate in the physical training program. Cognitive function was evaluated with the CambridgeNeuropsychological Test Automated Battery (CANTAB) platform at baseline ant three-months after the inter-vention period in all the participants. The groups had similar clinical and demographic characteristics atbaseline. After the intervention program, significant improvements in cognitive function were observed in theIG, but not in the CG. Particularly, a significant improvement in motor control, spatial working memory andvisuospatial associate learning were depicted in the IG, which revealed an overall better cognitive performanceas compared with the CG after the follow-up period. The results clearly identify physical exercise as an effectivenon-pharmacological tool to positively modulate age-related decline in cognitive function in older adults, par-ticularly when prescribed in a personalized approach with a multicomponent structure as foreseen in the in-novative AGA@4life model

Physical activity and self-rated wellbeing have important benefits to health. However, scientific knowledge regarding their relationship among older adults is scarce. Thus, the aim of study of Peralta et al. (2018) was to examine the associations between physical activity frequency and several dimensions of self-rated wellbeing, in a representative sample of European older adults from 28 countries. Methods: This study is based on the European Social Survey round 6, 2012. It had a total sample size of 12,341 older adults (5100 men, 7241 women) with mean age 73.8 ± 6.6 years. Information was collected through a questionnaire, filled-in during an hour-long face-to-face interview. Physical activity was accessed using the question "On how many of the last 7 days you were physically active continuously for 20 minutes or longer?" and six dimensions of self-rated wellbeing were used. Results: Physical activity in the last 7 days was linearly related with all dimension of the self-rated wellbeing and with wellbeing total score for both sexes (men, $\beta = 0.09$, 95% CI: 0.07 to 0.10, $p < .001$; women, $\beta = 0.10$, 95% CI: 0.09 to 0.11, $p < .001$). Conclusions: Physical activity promotion should be stressed as a meaningful strategy to improve people's wellbeing overall. This strategy has special importance when considering the older adult population. Keywords: Physical exercise, epidemiology, active life styles, public health

Due Raes (2019) previous studies have shown that there is a relationship between the composition of the intestinal flora and, for example, obesity or all kinds of conditions such as intestinal inflammation and diabetes. Such results naturally make you dream about the possibility of remedying ailments or alleviating their symptoms through interventions on the intestinal flora. With this Gut Flora project we hope to take steps to unravel the relationship between an individual and his or her intestinal flora. Substances produced by microorganisms in our gut can affect the brain. In doing so, they also guide our behavior and our feelings. Microbiologist Jeroen Raes (VIB - KU Leuven) discovered this after researching more than a thousand test subjects. Until now, researchers have mainly investigated the link between stomach and brain in laboratory animals. Raes and his team aimed at people. They mapped the bacteria present in their test subjects'

intestines. In that intestinal flora, they discovered specific bacterial groups that are related to mental health. Two of these, Coprococcus and Dialister, were not found in people with depression. Similar results were found in subjects in a Dutch research project and in a group of depression patients at UZ Leuven. Raes also previously discovered that certain bacterial communities are more common in Crohn's disease patients. It appears that the bacteria associated with intestinal inflammation also negatively impacts mental health. This investigation is currently ongoing.

It is not clear how intensive sweeteners that do not supply energy can have a negative effect on our body weight. Several hypotheses are circulating, but need further investigation. For example, some think that sweeteners would increase the urge for sweetness, which ultimately leads to more eating. Others think that sweeteners change the composition of our intestinal flora and thus have a negative effect on our body weight. Other research has shown that the use of light products leads to a higher consumption because of the psychological effect (brain as a medicine): people feel less guilty when using light products and therefore tend to eat more of them. This completely cancels out any positive effect. Finally, it is also quite possible that diet sodas are a marker of unhealthy eating habits. It is not diet sodas, but unhealthy dietary habits that are the cause of obesity and lifestyle diseases (Azad et al. 2017; Rogers 2015; Miller and Perez 2014).

Cahn et al. (2017) in an article published in the journal Frontiers in Human Neuroscience investigated the effects of yoga and meditation on humans by looking at physiological and immunological markers of stress and inflammation. Researchers studied people who participated in an intensive three-month retreat. They found that exercise had a positive effect on physiological and immunological markers of stress and inflammation. They also improved subjective well-being.

Practitioners view "meditation" or mental training as a process of becoming familiar with one's mental life that leads to long-term changes in cognition and emotion. Little is known about this process and its effect on the brain. Here, experts Lutz et al. (2004) investigate how long-term Buddhist practitioners themselves induce sustained high-amplitude gamma-band electroencephalographic oscillations and phase synchronization during meditation. These electroencephalogram patterns differ from those of controls, particularly at lateral frontoparietal electrodes. Furthermore, the ratio of gamma band activity (25-42 Hz) to slow oscillatory activity (4-13 Hz) is initially higher at resting baseline for meditating practitioners than controls at medial frontoparietal electrodes. This difference increases significantly during meditation at most scalp electrodes and remains higher than the initial baseline in the post-meditation baseline. These data suggest that mental training involves temporal integration mechanisms and can produce short- and long-term neural changes.

The effect of mindfulness meditation training on biological acute stress responses to anxiety disorder, by Georgetown University, USA. One of the main things sciences says about meditation is that it helps to reduce and prevent stress. A study by Hoge et al. (2017), published in January 2017, found that meditation reduced hormonal inflammatory responses to stress, specifically after

practicing mindfulness. This rigorously designed clinical study found objective physiological evidence that conscious meditation fights anxiety.

Mindfulness exercises lead to an increase in the density of gray matter in the brain. A 2011 study conducted by researchers at Massachusetts General Hospital in the US, published in the journal Psychiatry Research: Neuroimaging, revealed that meditation, specifical mindfulness, can cause measurable changes in the brain areas associated with memory, consciousness, empathy, and stress. This study by Hölzel et al. (2011) first showed what changes meditation can cause over time in the gray matter in the brain. Analysis of the MRI images showed a greater density of gray matter in the hippocampus. This is important for learning ability and memory. This density has also been found in structures associated with self-awareness and introspection. The reduction in stress is also correlated with the decrease in the density of gray matter in the amygdala. The amygdala is known to play an important role in anxiety and stress.

Ravesteijn et al. (2014) a recently randomized controlled trial provided preliminary evidence for the effectiveness of mindfulness-based cognitive therapy (MBCT) for the top 10% frequent primary care visitors with persistent medically unexplained symptoms (MUS). The aim of this qualitative study is to investigate the mechanisms of action and potential barriers of MBCT in this population. A total of 35 qualitative interviews were conducted. MBCT has initiated a process of change, starting with the awareness of the present moment, the associated sensory experiences, thoughts and emotions, and accepting them instead of resisting them. Participants began to recognize and change their own behavioral patterns, improving self-care. Self-compassion seemed to result from and facilitate this process. The main barriers were simultaneous social problems and the inability or unwillingness to accept symptoms. MBCT can initiate a change process in patients with persistent MUS. Awareness and acceptance of painful symptoms and emotions are key factors in this process. Changes in unhelpful behavioral patterns and increased self-care and self-compassion may result from this process.

Yackle (2017) et al. states that slow, controlled breathing has been used for centuries to promote mental relaxation and is used clinically to suppress excessive arousal such as panic attacks. However, the physiological and neural basis of the relationship between breathing and higher brain activity is unknown. We found a neuronal subpopulation in the mouse preBötzinger complex (preBötC), the primary generator of the respiratory rhythm that regulates the balance between calm and excited behavior. Conditional bilateral genetic ablation of ~175 Cdh9/Dbx1 double-positive preBötC neurons in adult mice left breathing intact but increased quiet behavior and reduced time in excited states. These neurons project to, synchronize, and regulate positive noradrenergic neurons in the locus coeruleus, a brain center involved in attention, arousal, and panic that projects through the brain.

Breathing is one of the eternal rhythms that are often taken for granted, the apparent simplicity belies the complex neural machinery involved. According to Sheikhbahaei and Smith (2017) this behavior is more complicated than just generating inspiration because breathing is integrated with

many other motor functions such as vocalization, orofacial motor behavior, emotional expression (laughing and crying), and motor skills. In addition, cognition can strongly influence breathing. Mindful breathing during yoga, meditation, or psychotherapy can modulate emotion, arousal, or stress. Therefore, it is of great importance to understand the connections between respiratory behavior, the arousal state of the brain, and higher-order brain activity.

There are many reasons why normal breathing can be negatively affected, including biochemical, biomechanical, or psychological disorders. According to Ristiniemi et al. (2013) conscious or unconscious changes in breathing can affect both our feelings and thoughts and emotions and feelings of anger, fear and anxiety can strengthen our breathing. Biomechanical aspects of respiration affect its functionality and patients with unexplained respiratory symptoms, such as dyspnoea, often exhibit abnormalities in the respiratory pattern. Changes in the performance of the respiratory muscles can decrease the effectiveness of ventilation. People with hyperventilation syndrome often display a predominant chest breathing pattern at rest. It has been proposed that the abdominal afferent proprioceptive input associated with such respiration can directly lead to the perception of respiratory symptoms. Unpleasant sensations may appear in the intercostals and other respiratory muscles as a result of prolonged chest breathing, and the sensations may worsen when the patient is stressed. So it is not surprising that patients with exhaustion syndrome and elevated anxiety levels show higher levels of hyperventilation compared to healthy controls.

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Summary from Literature Reviews Focused on Exercise as a Medicine, Food as a Medicine, and Brain as a Medicine

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Abstract

The "Exercise as a medicine" section deals with the positive effects of exercise on the health of people of different ages or people who have been diagnosed with different types of the disease. The section entitled "Food as a medicine" was created to bring the latest knowledge on the impact of food on human health. "Brain as a medicine" is a section that presents the knowledge of several experts and research in order to improve the physical and mental health and to raise the awareness that breathing, mindfulness and meditation have a positive effect on physiological and immunological indicators of stress and inflammation.

Key words: Exercise as a Medicine, Food as a Medicine, and Brain as a Medicine

Exercise as a Medicine

The "Exercise as a medicine" section deals with the positive effects of exercise on the health of people of different ages or people who have been diagnosed with different types of the disease. Properly selected types of exercise programs of moderate intensity of continuous physical activity or high-intensity interval physical exercise with a longer duration of the training unit seem to demonstrably improve somatic indicators, contribute to better physical and functional performance of people and eliminate harmful effects of long-term sedentary work or unhealthy lifestyle. Long-term inactivity can result in several health complications and cause cardiovascular as well as respiratory problems. It can also reduce the elasticity of muscles and their atrophies, inflammatory processes in the body or osteoporosis.

Research by many experts suggests that the promotion of physical activity, for example, reduces the risk of sarcopenia, which is characterized by loss of muscle mass, strength, and function. Resistance exercises with load control performed under the supervision of experienced trainers or physiotherapists have demonstrably eliminated problems caused by the physiological process of aging or several chronic diseases. In addition, research into the susceptibility of bones to external mechanical stress provides much stimulating information for the development of exercise programs aimed at injury prevention through special strength training. In addition, physical activity has been shown to be beneficial for patients with diabetes mellitus. Not only was there a reduction in the use of drugs or their discontinuation in some patients, but positive findings were also recorded in somatic parameters and their levels of triglycerides and HDL, "good cholesterol". Controlled weight reduction in overweight women has also been shown to be very significant, as rapid weight loss has been positively correlated with the risk of ring cancer due to estrogen overproduction.

The researchers concluded that physical activity can be considered as one of the effective ways to prevent the health problems of the elderly or chronically ill. Experts point to the importance of developing health literacy related to healthy exercise, as ignorance limits people's motivation to start training, walk or cycle more often. A 10-minute walk or a 1-minute plank can significantly improve the health of children, adults or the elderly. Raising awareness of exercise as a medicine supports the inner motivation to live more actively and healthily. Awareness and understanding of the importance of exercise is therefore an important condition for a sustainable active lifestyle.

Food as a Medicine

The section entitled "Food as a medicine" was created to bring the latest knowledge on the impact of food on human health. Researchers have long been studying the synergistic effect of foods that cause chronic health problems, as well as their therapeutic and defensive properties, which play a key role in promoting health. At present, much research points to an increasing trend of obesity in children and adolescents, which is mainly caused by a sedentary lifestyle combined with

poor eating habits, excessive consumption of sweetened beverages, or low nutritional foods. Expert findings suggest that obesity has broad effects on human health, increases the risk of cardiovascular disease, and also contributes to the increased incidence of diabetes mellitus in children and adolescents. Many diseases can be prevented by proper eating habits.

Expert studies have confirmed that nutritious food is a suitable preventive form of oncological diseases (especially breast, prostate, colon and rectal cancers), as well as a suitable adjunctive treatment for immune-mediated skin disease - Psoriasis Vulgaris. Clinical studies that have alleviated chronic inflammation with a proper diet have even shown a positive effect of milk proteins on anti-inflammatory markers, as well as a positive effect of omega-3 polyunsaturated fatty acids on these markers. According to experts, the alternative diet nutrition-lactovegetarian, lactoovovegetarian and vegan reduces the risk of atherosclerosis. Excessive levels of essential antioxidants in vegetarians provide protective action against reactive metabolic oxygen products and toxic lipid peroxidation products and can reduce the incidence of free radical disease.

However, in addition to the benefits, these types of diets bring certain health risks, so it is necessary to know all the context of the chosen diets. Increasing knowledge about the importance of plant-based and fiber-rich foods has been shown to increase people's motivation to adapt their eating habits to good health. Sufficient information about the disadvantages of excessive sugar consumption or about the risks that the development of canned foods and preservatives has brought with it has a positive effect on the development of healthy eating habits. Low-calorie diets reduce metabolism, leptin synthesis and contribute to the yo-yo effect, ie the re-increase in human body weight. From the above, by creating the right eating habit rich in vitamins and minerals, it is possible to prevent many types of diseases or even improve human health, so the right choice of food is also considered a medicine.

Brain as a Medicine

"Brain as a medicine" is a section that presents the knowledge of several experts in order to improve the physical and mental health of people. Research findings suggest that mindfulness, yoga and meditation have a positive effect on physiological and immunological indicators of stress and inflammation. Its beneficial effects were monitored mainly in connection with the gray matter of the brain, in which there were also impairments of sensory perception, memory, learning and regulation of emotions. Repeated or chronic exposure to stressors is associated with changes in neuroendocrine responses that are affected by the type, intensity, number, and frequency of stress exposure. Stress tests focused on psychosocial stress revealed a more intense physiological response of the participants compared to cognitive stress. Financial evaluation for sports performance also proved to be a significant stressor increasing the cognitive component of football players' anxiety, which was accompanied by a loss of mental relaxation, the breakdown of movement stereotypes, discoordination of movements and a reduction in sports performance.

During acute stress induced by mental arithmetic, the magnitude of the reactivity of diastolic blood pressure, heart rhythm, as well as average arterial blood pressure changes.

In the treatment of post-traumatic stress disorder, patients have again seen improvements after autogenous training, eye movement desensitization and reprocessing. Positive results were also achieved by patients who regularly performed techniques focused on deep breathing. The human brain is composed of several billion neurons secured by thousands of connections, making it one of the most important and complicated human organs. From the above, it is clear that there are many effective ways to enhance a person's subjective well-being and quality of life.

In addition, knowledge of a strong and growth-based way of thinking and how the brain works provide greater flexibility in changing behavior and strengthens the inner motivation to live healthier. Our will can help control our thoughts and give our lives further direction.

Researches

Physical Activity and Exercise Enjoyment in a Sample of Metropolitan College Students

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Abstract

This research examines physical activity (PA) participation and exercise enjoyment of students at a metropolitan private university college. Participants were 358 bachelor program students (Male=265, Female=93; Age = 20.4±1.5) from four faculties. They were surveyed using a convenient sampling method. The most popular physical activities were exercise activities (70 percent participation), individual sport and team sport. Males participated more than females in all the three activities. However, significant differences were found for individual and team sport participation with males ranking the two exercises higher than females. PA level was determined using PA Index (PAI). Male students were more active in PA as compared to that of females. Enjoyment of exercise was evaluated with 18-item PA Enjoyment Scale (PACES). Only about 24% of the sample showed a high enjoyment level while 61% had a low enjoyment score. Male had higher enjoyment in physical activity participation. The 20-21 years old group (14%) had higher enjoyment in physical activity participation as compared to other groups (18-19 years old, and 22 and above). No significance was found for the influence of gender and age for enjoyment of PA. However, PA enjoyment differed according to PAI category. Implications are drawn concerning the role of educational institutions to provide appropriate types of physical activity and conducive environments that are supportive of promoting commitment to health-supporting physical activity behaviour among college students.

Key words: Physical Activity Index, Enjoyment, Health supporting behaviour

Introduction

Even though physical activity improves overall well-being, one in four adults in the world failed to comply with the proposed global PA levels (World Health Organization [WHO], 2020). WHO (2020) also revealed that despite the fact that up to 5 million deaths a year could be averted if the world population could be active, more than 80% of adolescents are not sufficiently active engaging in physical activities.

Physical inactivity (PI) is recognized as the fourth leading mortality and mortality risk factor globally (Rajappan, Selvaganapathy & Liew, 2015), and it has been accepted as a major health issue of undergraduates in Southeast Asian institutions of higher education. Peltzer and Pengpid (2018) examined PI in Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam, and reported that university students in the region do not get enough PA (39.0% men; 53.0% women). Specifically, Indonesia reported between 49% (Sumardiyanto et al., 2019) and 64% (Sudikno et al., 2019) university students were inactive. Similarly, numerous studies on PI have been reported in Malaysia. Rajappan, Selvaganapathy and Liew (2015) revealed 43.7% Malaysian college students were physically inactive, and for those who were active, only 43.5% (22 - 25 years old) reported participating at high physical activity level. Other Malaysian studies reported between 55% (Bakar et al., 2019) and 66% (Yusoff et al., 2018) university students were sedentary with only 5% physically active (Yusoff et al., 2018). However, the Malaysian National Institute of Health [MNIH] (2020) revealed that a quarter of adult population was physically inactive.

Various reasons may explain physical inactivity among adults and they are varied and specific to individuals. Barriers to physical activity participation have been reported by many researchers. Wee (2012) examined 511 college students and reported three main physical inactivity barriers as injury phobia, unskillfulness and inter-personal effects. Other researchers concur that barriers to physical activity are time constraints (Cerin et al., 2010; Gomez-Lopez et al., 2010) and financial constraints, physical travelling constraints, facility scarcity (Jackson, 1993), influence of significant others, and peers (Coakley & White, 1999), unknowledgeable, insufficient amenity, reachability, indifference, without companions, cultural beliefs, financial constraints, physical limitations and unsafe neighbourhood (Alexandris & Caroll, 1997; Crawford, Jackson & Godbey 1991; Goodale & Witt, 1989; Jackson & Rucks, 1993; Raymore et al., 1993; Shawn, Bonen, & McCabe, 1991; Wuest & Fisette, 2012). While other researchers reported that individual barriers to physical activity may include prioritising study over physical activity (Gomez-Lopez et al., 2010), and making choices and decisions based on previous and present PA experiences. (Laker, 2002).

On the contrary, individuals participate in physical activity due to numerous motives. Enjoyment motivates individuals to involve in PA. Previous research had revealed many grounds such as bonding, pleasure, health, capability, and contest for involvement in physical activity (Weiss & Petlichkoff, 1989). While others cited happiness and satisfaction as the reason why people continue in physical activity and found experience enjoyable (Kimiecik, 2002; Titze, Stronegger, & Owen, 2005). However, Williams et al. (2006) revealed that individualized PA program provided greater

enjoyment in individuals. Other researchers reported that enjoyment, intention and adherence are interrelated in sport participation (Nielsen et al., 2014; Granero-Gallegos et al., 2017; Teixeira et al., 2019), exercise (Chen et al., 2020; Klos et al., 2020; Rodrigues et al., 2020), and recreation (Gardner, Magee, & Vella, 2017). Research has also shown that greater enjoyment affected individual's intention to exercise and these could explain why individuals were more committed and persistent in pursuing exercise. (Rodrigues et al., 2020).

Enjoyment indicates feelings of happiness, passion, and contentment in physical activity participation, and is associated with intrinsic motivation in PA involvement. (Moore et al., 2009; Nielsen et al., 2014). According to Craike, Hibbins, and Cuskelly (2010) enjoyment of LTPA is a multidimensional construct which is conceptualised to include three dimensions: activity enjoyment (good feeling due to leisure physical activity pursuit); physical and environmental enjoyment (enjoy the location and environment where LTPA occur); and inter-personal interactions. Previous research conducted to examine the relationships between enjoyment and sport related physical activities reported feeling of pleasure or fun during sport participation. Moreover, it was reported that enjoyment has encouraged youths to participate in PA and sport (Fenton, Duda, Appleton, & Barrett, 2017; Karatrantou et al., 2020; Lagestad & Sørensen, 2018), in organized sport (DiFiori et al., 2018; Fenton et al., 2017; Karatrantou et al., 2019), specifically in basketball (DiFiori et al., 2018). Other researchers examined the meaning of enjoyment among youths (Cheon, Reeve, Lee, & Lee, 2015; Duda & Appleton, 2016; Harwood, Barker, & Anderson, 2015) reported that avoidance of social comparison, promotion of personal improvement, reduction of sport-related anxiety, creation of empowering climate, and feeling of autonomy in physical activity participation have played positive roles in promoting enjoyment among youths. Furthermore, other researchers cited that performing novelty physical activities (Dalle Grave et al., 2011) could improve physical participation, and enjoyment and interest could be increased when individuals perform new and challenging exercises and when new skills are acquired (González-Cutre et al., 2019; Lakicevic et al., 2020). On the contrary, lesser enjoyment increased dropout rate in sport (Crane & Temple, 2015).

Similarly, numerous other factors such as self-efficacy (SE) was cited as a predictor of PA enjoyment. According to Bandura (1999), individuals with high SE would be more interested and committed in their PA involvement. Earlier Fairclough (2003) reported that optimistic physical competency promotes enjoyment in exercise.

Similarly, if exercise participants have required physical competency and self-confident, fun would prevail (Eime & Harvey, 2018). When individuals enjoy their PA, they would establish inclination for it and enhance their participation (Craike et al., 2010). Furthermore, if physical activities match an individual's skill levels, it will heighten enjoyment in physical activity involvement and could promote greater exercise adherence (Westerbeek & Eime, 2021).

Previous research has shown that enjoyment is essence to participation in LTPA, and maintenance of an active involvement in physical exercise (Henderson, Glancy, & Little, 1999; Salmon, Owen, Crawford, Bauman, & Sallis, 2003). According to Dacey, Baltzell, and Zaichkowsky (2008),

enjoyment is an important forecaster of exercise involvement and is a variable in health promotion theories and models. However, there are scarcity of research that investigates enjoyment in the context of types of physical activity involvement and physical activity index. Thus, our comprehension of the role of enjoyment in LTPA participation is limited.

Methods

Participants

In the present study 358 participants (male = 265 [74%], female = 93 [26%]; M*age* = 20.4 years; SD = 1.5) enrolled in four bachelor programs at a private educational institution located in Kuala Lumpur, Malaysia. More than half of the students were in the 20-21 years old group (59%) and thus could be viewed as still experiencing initial transition into adulthood.

Instrumentation

Physical Activity Index [PAI] (Griffin, 2006)

The PAI provides a single measure of the level of physical experience by an individual in their college's life, by incorporating estimates of the intensity, frequency and duration of their self-reported physical activity. These individual factors are reported on a 5-point scale (1 = lowest score, 5 = highest score). These scores are then multiplied to produce a PAI rating with a range of scores between 1 and 125.

Exercise Enjoyment Scale

Exercise enjoyment was appraised with PACES (Kendzierski & DeCarlo, 1991) that evaluated the proportion of enjoyment of physical activity participant at a particular occasion. Kendzierski and DeCarlo (1991), and Motl et al. (2002) have confirmed the construct validity of PACES as a measure of enjoyment in PA participation. Participants expressed their PA enjoyment on a 7-point scale for 18 items. Higher scores reflect greater enjoyment. This instrument was verified in Malaysia with a reliability score of .895 using Cronbach's Alpha method. (Victor Kung, 2017).

Procedure

The Ethical Committee of the Educational Institution has approved this research prior to data collection. Questionnaires were distributed through emails and WhatsApp to the potential participants in four faculties at a metropolitan private university college, Kuala Lumpur Main Campus. Participants provided their response to the questionnaire from Section A (Demographic data), Section B (Type of physical activity involvement), Section C (Physical Activity Index), and Section D (Enjoyment inventory) in sequence. The participants were contacted via the course or class representatives of every course or class.

Data collection and analysis

Researcher explained the objectives and desired outcomes of the study to the participants prior to obtaining a written consent. An information sheet was furnished together with the consent form, emphasising voluntary participation, data confidentiality, and they could withdraw from participating in the survey at any moment without providing any reasons. The information of the main researcher was published to allow participants wishing to seek further explanations.

Frequency and percentages were used to describe the demographic data (gender, age category, BMI category, PA type, and PAI category. For enjoyment inventory, total score for the 18-item were reported and categorized into 'low enjoyment' (score <72), 'neutral' (score of 72), and 'high enjoyment' (score >72). PAI total score was calculated via multiplication of intensity-duration-frequency variables. PAI was rated as 'Excellent' (PAI score = 100 or more), 'Good; (PAI score = 60-99), 'Average' (PAI score = 40-59), 'Fair' (PAI score =20-39), and 'Need improvement (PAI score = < 20).

T-test, and analysis of variance (ANOVA) were used to compare the mean scores of exercise enjoyment according to gender, age category, BMI category, and PAI category. Where F-test in ANOVA was significant, a post-hoc Tukey multiple comparison test was applied. All research data were analysed with SPSS ver. 23.

Assessment of Exercise Enjoyment

PACES was used to determined exercise enjoyment. Subjects' perceived enjoyment was rated on a 7-point Likert scale for 18 items. The total score from the sum of 18 items demonstrated the perceived enjoyment of the physical activity. A minimum score of 18 denotes lowest level of enjoyment level, and a maximum score of 126 reflects highest level of enjoyment. Score below 72 points is considered to have a low level of exercise enjoyment, a score of above 72 shows high enjoyment level, and a score of 72 is neutral.

Results

Results in Table 1 showed 74% of the respondents were male (74%), and majority of them (58.7%) were in the 20-21 years age group. In terms of BMI, a majority of the respondents was in the normal weight group (66%) with 12.9% overweight. As for the Physical Activity Index (PAI), about one third of the respondents were in the good category with 15.4% of respondents needing improvement in their physical fitness levels.

The analysis of physical activity in Figure 1 was based on participants' activities in the last three months. Majority of the respondents (70.3%) participated in exercise activity, about 54% in individual sport, and 51% in team sport. Further analysis of the three activities according to gender revealed that males were more involved in all the three activities; 'exercise activities' (male: 74.6%,

female: 25.4%), 'individual sports' (male: 82.4%, female: 17.6%), and 'team sports' (male: 84.9%, female:15.1%).

Table 1 Profiles of the Respondents (N = 358)

Socio-demographic characteristics		Frequency (n)	Percent (%)
Gender			
Male		265	74.0
Female		93	26.0
Total		358	100
Age Category (years)			
18-19		94	26.3
20-21		210	58.7
22 & above		54	15.1
Total		358	100
BMI			
< 18.5	Underweight	75	21.1
18.5 – 24.9	Normal weight	235	66.0
25.0 – 29.9	Overweight	46	12.9
Total		356	100
PAI Score & Rating			
<20	Need improvement	55	15.4
20-39	Fair	93	26.0
40-59	Average	85	23.7
60-99	Good	111	31.0
100 or >	Excellent	14	3.9
Total		358	100

Overall, only about 24% of the participants showed a high enjoyment level while 61% had a low enjoyment score. For the high enjoyment category, males (73%) enjoyed their physical activity participation more than female participants (27%). The participants aged between 20 and 21 years old (58%) enjoyed their physical activities more than the younger (18-19 years) group and older group (22 years and above). In terms of PAI category, the 'good' category group participants (33%) enjoyed physical activities the most as compared to other group participants. The normal weight participants (61%) appeared to enjoy their activities as compared to other groups.

In Table 3, the percentage of enjoyment is calculated based on enjoyment frequencu as compared to the sum total of participants in each activity. Almost 26% of the participants had high enjoyment when they were involved in outdoor leisure, followed by 22.2% in team sport, 21.4% in exercise activity, 19.7% in individual sport, and 13.6% in outdoor challenge.

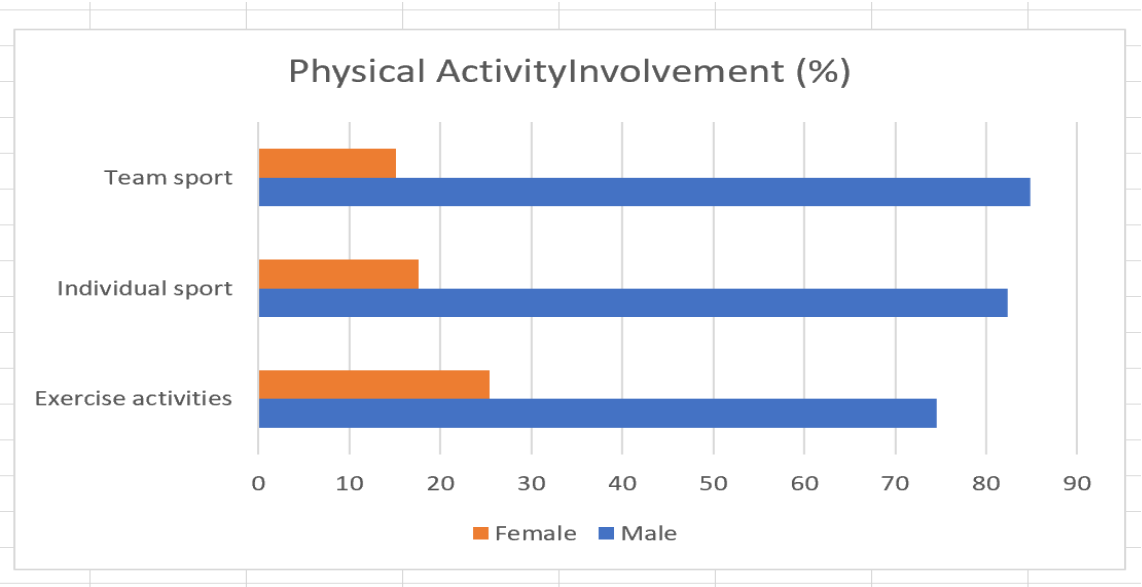

Figure 1 Physical activity participation according to gender (percentage)

Table 2 Enjoyment level according to gender, age, PAI category, and BMI category

Characteristics	Enjoyment Frequency			Total (Percentage)
	Low Enjoyment <72	Neutral 72	High Enjoyment >72	
Gender				
Male	167	36	62	265 (74.0)
Female	50	20	23	93 (26.0)
Total	217	56	85	358 (100.0)
Age				
18 – 19 years	62	11	21	94 (26.3)
20 – 21 years	125	36	49	210 (58.6)
22 years & above	30	9	15	54 (15.1)
Total	217	56	85	358 (100.0)
PAI Category				
<20 needs improvements	24	10	21	55 (15.4)
20-39 fair	56	22	15	93 (30.0
40-59 average	52	12	21	85 (23.7)
60-99 good	72	11	28	111 (31.0)
100 or more excellent	13	1	0	14 (3.9)
Total	217	56	85	358 (100.0)
BMI Category				
<18.5 Underweight	39	17	19	75 (21.1)
18.5 - 24.99 Normal weight	153	30	52	235 (66.0)
25 - 29.99 Overweight	25	7	14	46 (12.9)
	217	54	85	356 (100.0)

Table 3 Enjoyment level according to type of physical activities

Characteristics	Enjoyment Frequency			Total (Percentage)
	Low Enjoyment <72	Neutral 72	High Enjoyment >72	
Exercise activities				
No	61	14	31	106 (29.6)
Yes	156	42	54	252 (70.4)
Total	217	56	85	358 (100.0)
Individual sport				
No	92	26	47	165 (46.1)
Yes	125	30	38	193 (53.9)
Total	217	56	85	358 (100.0)
Team sport				
No	99	30	44	173 (48.3)
Yes	118	26	41	185 (51.7)
Total	217	56	85	358 (100.0)
Outdoor leisure				
No	197	50	76	323 (90.2)
Yes	20	6	9	35 (9.8)
Total	217	56	85	358 (100.0)
Outdoor challenge				
No	200	54	82	336 (93.9)
Yes	17	2	3	22 (6.1)
Total	217	56	85	358 (100.0)

Enjoyment of physical activity participation according to gender, age, BMI, and PAI.

An analysis of enjoyment by gender for the students showed no significant difference in enjoyment ($t= -1.270$, $p>0.05$). Similarly, insignificant differences in enjoyment were observed according to age group ($F (2, 355)=1.191$, $p>0.05$), and BMI group ($F(2, 353)=0.591$, $p>0.05$). However, PAI group analysis showed significant results for enjoyment ($F(4, 353)=4.041$, $p<0.05$). A multiple comparison test showed the mean enjoyment score of 'excellent' group (mean=60.93) differed from that of other four groups. There were no differences among the 'fair' group (mean = 68.32), 'good' group (mean = 68.65), 'average' group (mean = 69.29), and 'need improvement' group (mean = 71.18).

Discussion

Physical activity index of participants

This study reported about 4% of the participants were in the 'excellent' category, 31% in the 'good' category with 15.4% of respondents in the 'need improvement' category. Our findings revealed

lower physical fitness level among participants as compared to that reported by Wee et al. (2013). Wee and colleagues (2013) examined physical activities of undergraduates and revealed that 11.3%, 37%, 11% of them are in the excellent, good, and need improvement category respectively. Similarly, current findings (35% in excellent and good category) differed from another research findings of Wee and other researchers (2012) where it was reported that about 40% of undergraduates had good and excellent physical fitness levels. However, current findings showed the participants' physical fitness levels are better than that of a study on sport science undergraduates; 8% very good, 28% good, and 20% in the poor level (Elijah & Eric, 2012).

The mean PAI score for the sample was 44.9 which may be considered as entering into the 'average' PAI classification. According to Le Rossignol, Boertien, and Wee (2016), when the PAI classifications is compared to the WHO physical activity guidelines, it suggests that a PAI score of 40 to 60 (average) could be considered as meeting the international recommendations for moderate PA (150 minutes/week) or vigorous PA (75 minutes/week).

In this sample the male students had a significantly higher PAI ($t= 4.217$, $p=0.001$) than their female counterparts. The male mean score placed them in the average category (Mean=47.95, SD±23.79) whereas the mean for the female students was in the fair band (Mean=36.10, SD±21,92), indicating that a significant proportion of the female students were failing to fulfil the international recommendation of minimal PA involvement. On the contrary, Elijah and Eric (2012) examined physical activity of undergraduates and found insignificant difference in the perceived physical health status according to gender.

As for age category, there was a significant difference ($F[1,731]=0.558$, $p=.455$) observed between younger students 18-19 years group (Mean=50.27, SD±24.82) and older students (20-21 years old, Mean=42.30, SD±23.56). Younger students were physically active in this sample and this situation could be explained by Wee et al. (2013) that older students in Kuala Lumpur college indicated that they lacked skill to participate. However, Wee et al. (2013) also reported that college students in Melbourne, younger students perceived inadequate time as their greater obstacle to being physically active. These findings concur with the previous finding that age affected physical activity participation significantly (Torkildsen, 2000). Torkildsen also observed that older students have considerably more time at their disposal than the younger student group.

Physical activity of the participants

The study revealed that participants were engaged in three main physical activities (exercise activity, 70.3%; individual sport, 54%, team sport, 51%) with male participants 3-6 times more active in those activities than female participants. Exercise activity of this sample is indistinguishable from that reported in a comparative-research between Kuala Lumpur and Melbourne undergraduates (Wee, Aumand, Ler and Chan, 2013). However, individual sport (29.3%), and team sport (27.2%) were much lower in Wee et al. (2013) study as compared to the findings of this research. In addition, another research (Michael et al., 2016) reported that males boys engaged in more activities, and enjoyed PA more, as compared to females.

Enjoyment and type of physical activity

This research sample experienced a high enjoyment level when they participated in outdoor leisure (26%), followed by team sport (22.2%), and exercise activity (21.4%). Increasing PA among adolescents has been linked to opportunities to be involved in and enjoy a variety of PA (Michael, Coffield, Lee, & Fulton, 2016). Leisure activity such as walking and team sport are associated with increased PA (Agans & Geldhof, 2012; Taverno Ross, Dowda, Beets, & Pat, 2013). In fact, adolescent enjoyed their PA more if they engaged in activities that they preferred (Liu, Sun, Beets, & Probst, 2013), and regular participation in sport could increase their PA levels (Hebert, Møller, Andersen, & Wedderkopp, 2015; Kokko et al., 2019). Enjoyment has encouraged almost 72% of young basketball players (71.5%) to participate in MVPA between 6 and 7 days per week (Krommidas, 2016).

In examining the relationship between PA type and enjoyment, Michael et al. (2016) reported enjoyment was positively correlated to PA involvement in boys. PA enjoyment played a mediating role in PA and team sports participation. In girls, team sports and weightlifting have positive relationships with PA participation and individual sport was predictor of PA enjoyment. In addition, PA participation and individual sports are mediated by the sense of enjoyment.

Outdoor leisure structure could affect participants' enjoyment as well. In identifying the youth involvement in outdoor activities in city neighbourhood recreational area (soccer field, futsal court and jogging track), Omara, Omara, Othman, and Yusoff (2016) reported that youth were pleased with the facilities with males dominating in the usage of soccer field (M: 64.4%, F:46.6%), futsal court (72.4% versus 56.8) and jogging track (57.1% versus 53.7%). Similarly, Bowers, Larson, and Sandoval (2019) interviewed youths who participated in outdoor adventure camp and revealed that they enjoyed spending time outdoors and meeting new people in a natural setting. The outdoor experience has connected youths to the natural world, promoting a sense of oneness with the natural setting and enhanced enjoyment (Cheng & Monroe, 2012). The novel settings for recreation experiences among youths and allowing them a sustained time in nature (Garst et al., 2011) has generated enjoyment in them.

Enjoyment of physical activity participation according to gender, age, and BMI

Bai et al. (2018) revealed significant interaction effects of gender and enjoyment; Boys and girls who had high-level enjoyment in PA had statistically significant higher PA. However, insignificant result was reported according to gender. In another study of elementary school students, Burford, Zhang and Bartholomew (2021) found girls had enjoyed lower intensity activities more while boys reported more joyful with high intensity activities and activities that require strength. According to other research (Kann et al., 2014; Ortega et al., 2013) PA among girls decrease sharply as compared to boys. The decline might be due to decrease in enjoyment among adolescent girls as compared to boys (Cairney et al., 2012).

Bai et al. (2018) found younger students had higher enjoyment scores and higher PA as compared to older students; elementary school students had the highest level of enjoyment and PA as compared to middle school students and high school students respectively. Accordingly, previous research (Cooper et al., 2015; Ortega et al., 2013) is in agreement that PA declines with age and consequently there is an increase in sedentary behaviour.

With regard to the effects of body weight, and enjoyment of PA, Bevan et al. (2021) surveyed 579 undergraduate's behaviour in physical activities and reported that weight stigma (teasing, and negative comments), appearance evaluation (beliefs about one's appearance), and weight bias internalisation (self-blame) were related to lower enjoyment of PA and sport. In addition, Baven also revealed that due to the above, undergraduates with body weight issues tend to avoid physical activity. According to Pearl and Puhl (2016) self-blame was highly associated with lower PA enjoyment and incline to turn away from PA and sport.

Conclusion

This research reported that enjoyment in physical activity is associated with many variables such as demographic (gender, age, PAI, body weight, type of PA). Taken collectively, the findings of this research indicate that it might be imperative to observe the effects of enjoyment on PA and not the activity itself. These research findings also support the belief that enjoyment is linked to PA behaviours. Since enjoyment is changeable, College co-curriculum program provider should aim at increasing enjoyment in students PA. However, as the results of this study are based on student self-respond, the results may be prejudiced. Thus, the findings should be viewed within the limitation.

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The Effects of Innovative Tools Implemented in Singapore during Physical Education and Physical Activities of Children, Youth and Adults

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Abstract

Purpose: This chapter investigated 2 studies that implemented innovative tools for children, youth and adults to utilize during physical education (PE) and physical activities (PA). 1) The use of Brain Breaks® videos and its effects on Singaporean students' attitudes towards PA. 2) The use of the adult OMNI Rate of Perceived Exertion (RPE) scale on soccer players during laboratory and field testing. **Methods:** 1) A total of 113 clinically healthy students (boys: 47, girls: 66) (age: 9.68 ± 0.95 years, height: 1.38 ± 8.27 m, weight: 35.21 ± 10.21 kg, body mass index (BMI): 18.19 ± 2.86 $kg \bullet m^{-2}$) participated in this study and were randomly assigned to experimental Brain Breaks® group (BB, 48 students) and control group (CG, 65 students). BB underwent Brain Breaks® video intervention consisting of 3-5 minutes of Brain Breaks® video exercises for 10 weeks, 5 days per week during academic lessons. CG continued academic lessons without video intervention. A self-reported Attitudes toward Physical Activity Scale (APAS) questionnaire was administered pre- and post-intervention for all students. 2) Ten healthy female participants volunteered for this study (age: 23.20 ± 1.49 years, height: 161.10 ± 7.50 cm, weight: 49.01 ± 3.90 kg, body fat percent: 22.20 ± 3.89 %). Participants underwent 3 sessions trials that consisted of laboratory session 1 (S1), field sessions 2 and 3 (S2 & S3). In S1, participants completed a discontinuous submaximal exercise treadmill run protocol with 4 minutes run, 4 minutes rest. OMNI RPE, oxygen consumption (VO_2) and HR were recorded during the last minute of each exercise stage. During S2 and S3, participants completed warm-up, 5v5 possession soccer game, followed by cool down. After each exercise segment, participants recorded their RPE and HR on a data recording sheet. **Results:** 1) There were significant main effects between groups for importance ($p = 0.012$), learning ($p = 0.000$), self-efficacy ($p = 0.000$), fun ($p = 0.034$) and fitness ($p = 0.022$). 2) Results indicated significant positive correlation between HR during field (field HR) and HR during treadmill (treadmill HR) at V_{pt} (field HR: 161.94 ± 12.80 $beats \bullet min^{-1}$ vs. treadmill HR: 156.0.6 ± 12.25 $beats \bullet min^{-1}$, $r = 0.79$, $p = 0.032$); field HR and OMNI RPE during treadmill (treadmill OMNI RPE) (field HR: 161.94 ± 12.80 $beats \bullet min^{-1}$ vs. treadmill OMNI RPE: 4.89 ± 0.93, $r = 0.726$, $p = 0.027$). **Conclusion:** 1) 3-5 minutes daily of Brain Breaks® video is sufficient to improve students' perception toward PA and this will subsequently lead students to increase the duration of PA. 2) Recreational and elite athletes from soccer and other similar team sports can use OMNI RPE 4-6 to self-regulate their exercise intensity to allow them to train optimally and achieve significant improvement in performance.

Key words: Innovative tools, Singapore, Physical education

Introduction

Research on physical activity (PA) has shown to contribute to various health benefits (e.g., prevention of weight gain, regulation of blood pressure, management of good mental health etc.). The American College of Sports Medicine (ACSM, 2014) recommends 150 minutes of moderate-to-vigorous intensity of exercise weekly for healthy adults and 60 minutes of PA for children daily. In Singapore, physical educators, coaches, and sports trainers are constantly finding different methods to actively engage students and athletes in PA, exercise, and training in the most fun, effective, and safe way to meet the PA requirements. Singapore educators are also incorporating technology into lessons or co-curricular activities (CCA), especially during the recent pandemic when the country was under lockdown. The current generation of students are better known to be "tech-savvy" and are interested in technology (Balasekaran et al., 2021). Therefore, it is suggested that technology and digital platforms can encourage students to increase their PA levels (Boone et al., 2015; Lewallen et al., 2015). Hence, this chapter investigated two studies (1) and (2) that implemented innovative tools for children, youth and adults during physical education (PE) and PA in Singapore.

Exercise videos found on YouTube, HOPSports, JumpJam etc. are becoming increasingly popular with students and adults. This study utilized the exercise videos from HOPSports Brain Breaks® as this platform is aligned to the Whole School, Whole Community, and Whole Child (WSCC) Guidelines (Centers for Disease Control and Prevention, 2020, Shields & Behrman, 2000) and the United Nations 17 Sustainable Development Goals (UNSDG) (Balasekaran et al., 2021). Furthermore, Singapore is committed to the 2030 Agenda for Sustainable Development (Ministry of Education, 2020) and these values are also aligned to Singapore's Ministry of Education (MOE) Desired Outcomes of Education and 21st Century Competencies (Ministry of Foreign Affairs, 2018). The HOPSports Brain Breaks® videos are between 3-5 minutes in duration with easy-to-follow video instructions in completing aerobic/movement exercises. 1) The first study investigated the use of Brain Breaks® videos and its effects on Singaporean students' attitudes towards PA and the possibility of increasing PA participation during its intervention conducted amid school curricula.

While PA and exercise are imperative, exercising at an optimal intensity is also essential to prevent or reduce the risk of sustaining injuries. Children, youths, and adults should enjoy exercise and simultaneously reap cardiovascular benefits. Hence, they would participate in PA regularly. One way to measure optimal exercise intensity is by utilizing Ratings of Perceived Exertion (RPE), which is commonly used during exercise to perceptually estimate effort. There have been studies done locally using OMNI RPE scale for children and youths as a self-regulatory tool for weight loss and Physical Education (PE) lessons (Balasekaran, Loh, Govindaswamy & Robertson, 2012; Balasekaran, Loh, Govindaswamy & Cai, 2014). Additionally, the OMNI RPE scale has been validated across various target groups to allow these individuals identify a safe training zone during their PA or exercise. 2) The second study investigated the use of the adult OMNI RPE scale on soccer players during laboratory and field testing. It aimed to examine whether adult

soccer players in Singapore could self-regulate exercise intensity using the OMNI RPE scale during their soccer training sessions.

Methods

1) A total of 113 clinically healthy students (boys: 47, girls: 66) (age: 9.68 ± 0.95 years, height: 1.38 ± 8.27 m, weight: 35.21 ± 10.21 kg, body mass index (BMI): 18.19 ± 2.86 kg•m^{-2}) participated in this study (Table 1). The students in their respective classes were randomly assigned according to experimental Brain Breaks® group (BB: 6 classes of 48 students) and control group (CG: 6 classes of 65 students). BB underwent Brain Breaks® video intervention consisting of 3-5 minutes of Brain Breaks® video exercises for 10 weeks, 5 days per week during academic lessons. The students in BB followed the Brain Breaks® videos that featured physical movement activities alongside song, dance, and exercise movements. Students could also select their choice of Brain Breaks® videos and a variety of videos were streamed online during the intervention via the official website https://brain-breaks.com (Rizal et al., 2019; Kuan et al., 2019). CG continued their academic lessons as usual without video intervention. A self-reported Attitudes toward Physical Activity Scale (APAS) questionnaire was administered pre- and post-intervention for both groups of students. This study obtained approval from the Institutional Review Board from Nanyang Technological University (NTU-IRB Reference Number: 2019-01-025), together with a school initiative. Parents and students also gave consent by submitting informed consent forms.

The APAS designed by Mok et al. (2015) is a self-reported questionnaire used to measure beliefs, attitudes and self-efficacy towards PA, which is comprised of 7 sections using Likert-type scales: F1 'promoting holistic health', F2 'importance of exercise habit', F3 'self-efficacy in learning with video exercises', F4 'self-efficacy in selecting video exercises for themselves', F5 'exercise motivation and enjoyment', F6 'self-confidence on physical fitness' and F7 'trying to do my personal best'. This questionnaire also required participants to complete basic demographics (e.g., age, gender, school grade level, height, and weight). It also included a four-point Likert-type response category, 'strongly disagree', 'disagree', 'agree' and 'strongly agree'. In addition, the Cronbach's Alpha reliability coefficients for this study ranged from 0.81 to 0.92 (Table 2).

Table 1. Participants' Descriptive Statistics (n = 113)

Variables	**Total (*n* = 113) Mean ± SD**	**BB (*n* = 48) Mean ± SD**	**CG (*n* = 65) Mean ± SD**
Age (years)	9.68 ± 0.95	9.71 ± 0.99	9.66 ± 0.94
Height (m)	1.38 ± 8.27	1.37 ± 0.09	1.39 ± 0.09
Weight (kg)	35.21 ± 10.21	34.91 ± 10.97	35.43 ± 10.55
Body Mass Index (kg•m^{-2})	18.19 ± 2.86	18.24 ± 4.18	18.16 ± 3.67

Note: Values are in mean ± SD. BB (Brain Breaks® Group); CG (Control Group); age (years); height (meters, m); weight (kilograms, kg); body mass index (kilograms per square meter, kg•m^{-2}).

Table 2 Cronbach's Alpha Reliability Coefficients for Attitudes toward Physical Activity Scale (APAS)

Scale	Number of Items	Cronbach's alpha
Promoting Holistic Health (F1)	10	0.84
Importance of Exercise Habit (F2)	5	0.81
Self-efficacy in Learning with Video Exercises (F3)	11	0.93
Self-efficacy in Selecting Video Exercises (F4)	4	0.90
Exercise Motivation and Enjoyment (F5)	14	0.87
Self-confidence on Physical Fitness (F6)	8	0.92
Trying to do Personal Best (F7)	5	0.82

Note: Cronbach's Alpha: $0.9 > \alpha \geq 0.8$*: Good;* $\alpha \geq 0.9$*: Excellent*

2) A total of 10 healthy female participants volunteered for this study (age: 23.20 ± 1.49 years, height: 161.10 ± 7.50 cm, weight: 49.01 ± 3.90 kg, body fat percent: 22.20 ± 3.89 %) (Table 3). Anthropometric measurements were taken for participants, which also included body composition assessment using Body Impedance Analysis (BIA). Participants were also required to complete a PAR-Q+ medical questionnaire to declare their current health status. Participants underwent 3 sessions trials that consisted of laboratory session 1 (S1), field sessions 2 and 3 (S2 & S3). In S1, participants completed a discontinuous submaximal exercise treadmill run protocol which is a series of treadmill runs with each stage lasting 4 minutes, followed by 4 minutes recovery rest (Balasekaran, Govindaswamy, Lim, Boey & Ng, 2021). Treadmill speed will increase with each stage by 0.5 $km \bullet h^{-1}$, ranging between 6 $km \bullet h^{-1}$ to 14 $km \bullet h^{-1}$ depending on the participant's fitness level. At each stage, participant will rate their OMNI RPE with the 10-point OMNI RPE scale (Figure 1). RPE, oxygen consumption (VO_2) and HR were measured during the last minute of each exercise stage. The test ceased when participant had achieved 85% of their maximal heart rate (HR), which is within the range where ventilatory breakpoint (V_{pt}) occurs.

During S2 and S3, participants completed warm-up, 5v5 possession soccer game, followed by cool down. After each exercise segment, participants rated their RPE and recorded their HR on a data recording sheet. Participants were told to keep their OMNI RPE between 1 and 3 during warm-up and cool down, OMNI RPE between 4 and 6 during 5v5 possession soccer game. In the final week, participants repeated the same exercises. This study obtained approval from the Institutional Review Board from Nanyang Technological University (NTU-IRB Reference Number: 2019-01-008). Participants gave consent by submitting informed consent forms prior to commencement of study.

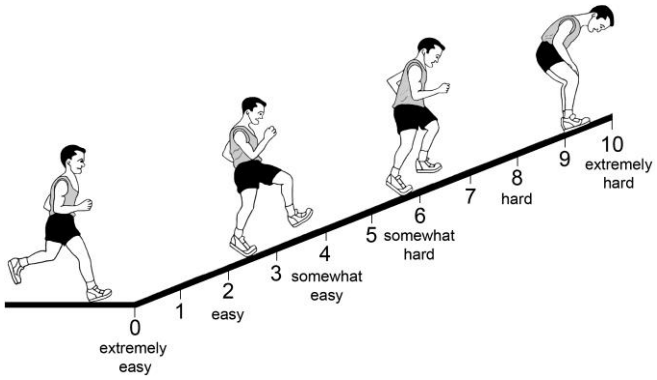

Figure 1 Adult OMNI-Walk/Run Scale of Perceived Exertion (Robertson 2004)

Table 3 Participants' Descriptive Statistics (n = 10)

Variables	**Results (Females, n=10) Mean ± SD**
Age (Years)	23.30 ± 1.49
Height (cm)	161.10 ± 7.50
Weight (kg)	49.01 ± 3.90
Body Fat (%)	22.20 ± 3.89
Variables at Final stage of Treadmill protocol	
VO_2 ($L \cdot min^{-1}$)	30.37 ± 4.60
VO_2 ($mL \cdot kg^{-1} \cdot min^{-1}$)	1.48 ± 0.22
HR ($beats \cdot min^{-1}$)	167.90 ± 1.79

Note: Values are in mean ± SD. Age (years); height (centimeters, cm); weight (kilograms, kg); Body Fat (percentage, %); absolute oxygen consumption at final stage of treadmill protocol (VO_2; $L \cdot min^{-1}$); relative oxygen consumption at final stage of treadmill protocol (VO_2, $mL \cdot kg^{-1} \cdot min^{-1}$); heart rate (HR, $beats \cdot min^{-1}$).

Data Analysis

1) Sample size for the Brain Breaks® videos intervention was calculated using G-Power Version 3.1, repeated measures ANOVA with two research conditions (BB & CG) x 2 points (baseline, and post). Using a power of 0.80, an α of 0.05, and an effect size of 0.25, it was determined that a minimum of 98 participants were required to test both main and interaction effects (Balasekaran et al., 2021). Distribution of data for variables was assessed for normality (Skewness and Kurtosis values were close to 0 and z-values that ranged between -1.96 to 1.96.).

2) Using a power of 0.80 and α level of 0.05 with an effect size of > 1.1, the sample size of the second study determined that 10 participants were needed as adopted from Robertson et al. (2001). Therefore, active, and healthy participants were randomly recruited from the university.

Results

1) There were significant main effects between groups for importance ($p = 0.012$), learning ($p = 0.000$), self-efficacy ($p = 0.000$), fun ($p = 0.034$) and fitness ($p = 0.022$) (Table 4). Effect sizes for Group main effect were relatively small ($\eta^2 < 0.12$) for all scales except Learning ($\eta^2 = 0.23$). Time*Group interaction effects were significant for all APAS scales ($p<0.05$). Results also indicated that female students had higher self-efficacy scores than male students in learning curriculum subjects through video exercises (BB males: 3.76 ± 0.28 vs EG females: 3.54 ± 0.39, $p = 0.04$) (Figure 2).

2) Participants were able to self-regulate their exercise intensity between OMNI RPE 4 and 6 during the 5v5 possession soccer game (Table 5). Results indicated significant positive correlation between HR during field (field HR) and HR during treadmill (treadmill HR) at V_{pt} (field HR: 161.94 ± 12.80 beats•min^{-1} vs. treadmill HR: 156.0.6 ± 12.25 beats•min^{-1}, $r = 0.79$, $p = 0.032$); field HR and OMNI RPE during treadmill (treadmill OMNI RPE) (field HR: 161.94 ± 12.80 beats•min^{-1} vs. treadmill OMNI RPE: 4.89 ± 0.93, $r = 0.726$, $p = 0.027$) (Tables 6 & 7). There was also no significant difference between field HR and treadmill HR (field HR: 161.94 ± 12.80 beats•min^{-1} vs. treadmill HR: 156.0.6 ± 12.25 beats•min^{-1}, $p = 0.102$). Their average HR is at 82.49% of their maximum HR (HR_{max}) at OMNI RPE 5 (S1) and 83.10% of their HR_{max} at OMNI RPE 5 (S2), which also correlates to their V_{pt}.

Table 4. Descriptive Statistics and ANOVA Pre- and Post-test Results for Brain Breaks® Group (BB; n = 48) and Control Group (CG; n = 65).

Variables on physical activity	Group	Pre-test	Post-test	Time			Group			Time*Group		
		Mean ± SD	Mean ± SD	*F*	*p*	η^2	*F*	*p*	η^2	*F*	*p*	η^2
Benefits (F1)	CG	3.19 ± 0.55	3.13 ± 0.64	18.87	<0.001	0.15	3.86	0.052	0.03	29.29	<0.001	0.21
	BB	3.06 ± 0.51	3.61 ± 0.37									
Importance (F2)	CG	3.28 ± 0.61	3.32 ± 0.60	17.89	<0.001	0.14	6.49	0.012	0.06	12.57	0.001	0.10
	BB	3.29 ± 0.52	3.74 ± 0.31									
Learning (F3)	CG	2.77 ± 0.78	2.32 ± 0.88	9.35	0.003	0.08	32.55	<0.001	0.23	66.08	<0.001	0.37
	BB	2.65 ± 0.67	3.64 ± 0.36									
Self-efficacy (F4)	CG	3.10 ± 0.60	2.82 ± 0.74	4.38	0.039	0.04	14.89	<0.001	0.12	33.45	<0.001	0.23
	BB	3.02 ± 0.62	3.62 ± 0.51									
Fun (F5)	CG	3.18 ± 0.58	3.19 ± 0.66	13.70	<0.001	0.11	4.59	0.034	0.04	13.27	<0.001	0.11
	BB	3.17 ± 0.48	3.58 ± 0.38									
Fitness (F6)	CG	3.05 ± 0.73	3.07 ± 0.69	25.92	<0.001	0.19	5.42	0.022	0.05	22.89	<0.001	0.17
	BB	2.97 ± 0.73	3.65 ± 0.39									
Personal Best (F7)	CG	3.29 ± 0.65	3.32 ± 0.63	11.59	<0.001	0.10	2.08	0.153	0.02	9.36	0.003	0.08
	BB	3.20 ± 0.61	3.66 ± 0.43									

Note: Values are in mean ± SD. Brain Breaks® Group (BB); Control Group (CG). Significance set at p<0.05.

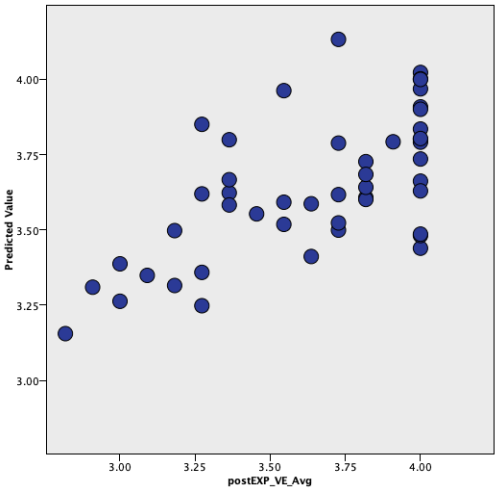

Figure 2. Post-Self-efficacy Scores in Learning Curriculum Subjects through Video Exercises of the Experimental Group for Both Genders.

Table 5 Heart Rate (HR) and OMNI Rate of Perceived Exertion (RPE) Results for Field Sessions 1 and 2

Variables	Warm-Up		Game		Cool down	
	HR	RPE	HR	RPE	HR	RPE
Field Session 1	129.40 ± 11.24	±2.30 0.68	±162.50 14.69	±4.90 0.99	±108.10 17.98	±1.40 ± 0.52
Field Session 2	125.10 ± 7.40	2.10 0.57	±163.70 ± 8.92	5.00 0.47	±108.20 11.56	±1.50 ± 0.52

Note: Values are in mean ± SD. Heart rate (HR, beats•min^{-1}); rate of perceived exertion (RPE).

Table 6 Variables at Ventilatory Breakpoint (V_{pt}) during Treadmill Protocol

Variables at Ventilatory Breakpoint (V_{pt}) during Treadmill Protocol	
VO_2 (L•min^{-1})	1.39 ± 0.10
Speed (km•hr^{-1})	8.24 ± 0.90
RPE	4.89 ± 0.93

Note: Values are in mean ± SD for oxygen uptake (L•min^{-1}); Speed (km•h^{-1}); OMNI Rate of Perceived Exertion (RPE)

Table 7 Significant Correlations between Heart Rate (HR) at Field, on Treadmill and OMNI Rate of Perceived Exertion (RPE) on Treadmill at Ventilatory Breakpoint (V_{pt})

	HR Field V_{pt}	**HR Treadmill V_{pt}**	**RPE Treadmill V_{pt}**
HR Field V_{pt}	-	r = 0.709* p = 0.032	r = 0.726* p = 0.027
HR Treadmill V_{pt}	r = 0.709* p = 0.032	-	r = 0.924* p = 0.000
RPE Treadmill V_{pt}	r = 0.726* p = 0.027	r = 0.924* p = 0.000	-

** Indicates significant difference p<0.05.*

Discussion

1) Evidence from this study supports the positive effect of Brain Breaks® videos with 3-5 minutes daily, 5 times a week for 10 consecutive weeks. Hence, students' attitude towards PA has significantly improved. These results coincide with other studies' findings that investigated the impact of Brain Breaks® videos conducted in other countries (Zhou et al., 2021; Bonnema, Coetzee, Lennox, 2020; Hajar et al., 2019; Dinc, Uzunoz, Mok & Chin, 2019; Popeska et al., 2018; Uzunoz, Chin, Mok, Edginton & Podnar, 2018; Glapa et al., 2018). These previous studies have reported that short duration of PA or exercise carried out in the classroom were correlated to improvement in students' on-task behaviour and PA, while participating in Brain Breaks® activities.

Utilising this online platform could assist students and teachers during long periods of continuous lessons, which may lead to mental fatigue that could possibly reduce attention-span and focus among students. These short PA breaks not only assist to increase students' PA duration, it also would help students and teachers to refocus for the next lesson or continue with the lesson.

2) In general, RPE is a non-invasive and easy tool to monitor and regulate as compared to measuring VO_2 and HR or taking blood lactate during exercise (Stoudemire et al., 1996). No gender differences were discovered in RPE and physiological responses (Robertson, 2000). Moreover, RPE increases as intensity increases and there is a high correlation between physiological variables (percentage of HR (%HR) vs. percentage of maximal VO_2 ($\%VO_{2max}$), RPE vs. $\%VO_{2max}$, RPE vs. $\%HR_{max}$)) (Robertson, 2000).

From study 2, results also revealed that there were no significant differences for HR between field and laboratory settings with significant positive correlation for OMNI RPE between field and laboratory settings (Table 7). Participants from study 2 were able to self-regulate their exercise intensity of an average of OMNI RPE 5 during the games (Table 5). They were also able to self-

regulate their exercise intensity at OMNI RPE 1-3 during their warm-up and cool down with lower HR (Table 5). This study also coincides with other studies using the range of OMNI RPE 4-6 for children and OMNI RPE 5-7 for adults to self-regulate their exercise intensity to exercise within a safe training zone (Balasekaran et al., 2019; Roberston et al., 2001).

Conclusion

1) This study, along with previous studies, revealed that investing with just 3-5 minutes daily is sufficient to improve students' perception toward PA and this will subsequently lead students to increase the duration of PA to meet the standard requirements. Hence, implementing this interactive technology tool during the Singapore school system curriculum is easy to implement and is readily accessible. This will benefit students in enhancing their holistic health both physically and mentally.

2) Other studies, including study 2 have shown that exercising at V_{pt} improves performance and reaps cardiovascular benefits. V_{pt} calculated from the treadmill run protocol is significantly correlated to OMNI 4-6 on field settings as well. Recreational and elite athletes from soccer and other similar team sports (e.g., hockey, netball, ultimate frisbee, basketball etc.) can use OMNI RPE 4-6 to self-regulate their exercise intensity to allow them to train optimally and achieve significant improvement in performance. Simultaneously, this will also help to reduce the risk of sustaining injuries and prolong their involvement in PA and exercise. Furthermore, maintaining exercise at such optimal intensities will lead to positive cardiovascular and peripheral adaptations and through consistency, it will eventually lead to weight loss as well.

Overall, both studies have shown that technology can be a fun and effective way to incorporate among children and youths to bring about health benefits. In addition, children, youths, and adults can self-regulate their exercise at optimal intensity to prolong their exercise or PA routine. This can help children, youths, and adults to enjoy exercise, promote exercise adherence and help them to lead an active and healthy lifestyle.

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The Relationship Between Attitudes and Participation Motivation Among Undergraduate Students Towards Extra-Curricular Activities During the Pandemic

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Abstract

Attitudes and motivation have traditionally been the most influential factors in determining physical activity (PA) involvement in physical education, sports, and extracurricular activities that contribute to health and well-being. The study analyzed the attitudes and participation motivation of 540 university students (17 to 23 years old) on extracurricular activities. Students' attitudes and motivation were measured using the Attitude towards Physical Activity Scale (M-APAS: Chin & Jeswenny, 2021) and Participation Activity and Leisure Motivation Scale-M (Kueh, Kuan, & Morris, 2019). The research utilized Pearson's product-moment and multiple regression analysis. The Pearson correlation between attitudes and participation motivation revealed a weak to strong positive connection. In contrast, the regression analysis found that learning, competition, appearance, affiliation, and physical health were the most significant predictors of BMI. The findings revealed that both extrinsic and intrinsic forms of self-determination motivation have a higher impact on the psychological elements of students' participation in extra-curricular activities.

Key words: Attitudes, Participation motivation, Undergraduate students, extra-curricular activities

Introduction

The current pandemic has created a great deal of uncertainty regarding participation in physical activities that are required for extra-curricular activities in schools and universities (Matias et al., 2020; Finnerty et al., 2021). Physical activity (PA) and other extracurricular activities help to establish self-regulation mechanisms that boost psychological and social elements of wellness, health, and mental health (Guilmette et al., 2019). Sandford (2020) indicated that an estimated 4 billion people were socially isolated, which dramatically altered the PA patterns of people. Although the World Health Organization (2019) advocated 150 minutes of moderate physical activity per week for persons aged 18 to 64 to improve their mental and physical health, nearly one-third of the population did not participate in sports to achieve these recommendations. This also covers Malaysia, where 36.3% of individuals curtailed their physical activity and 30.7% gained weight due to COVID-19 pandemic lockdowns (Chin et al., 2022). This is similar with Ali et al. (2021) study, which concluded that approximately 95% of the participants' time were spent on in-home obligatory and maintenance tasks, which negatively impacted their physical and social well-being. Prior to the pandemic, the physical activity level of students in higher education institutions were low due to a heavy workload, assignments, exams, social and family obligations (Anuar et al., 2021; Fagaras et al., 2015). Conversely, undergraduate students reported a low to moderate level of physical activity (Balle et al., 2020; Galle et al., 2020) within the two years following the pandemic.

Among the approaches that have demonstrated improvement in online learning is the incorporation of online physical activity classes into school lessons, utilising digital platforms that can increase students' physical activity. Due to the extraordinary problems posed by the COVID-19 pandemic, the Malaysian education system has established a number of digital platforms, such as the Digital Educational Learning Initiative Malaysia, in order to keep up with the worldwide industry advances. Students in Malaysian schools and Institutions of Higher Education now have access to interactive learning tools and resources that promote successful teaching and learning. Consequently, the teaching of physical activity through various digital platforms and tools has become a unique method as a feasible mechanism for achieving physical activity equity among students (Webster et al., 2021). These digital technologies were intended to empower individuals to engage in physical activity or exercise with greater initiative. During the unprecedented COVID-19 pandemic, physical exercise is one of the major variables that can increase physical and mental health (stress, anxiety, depression), reduce cardiovascular disease, and strengthen the control of the immune system against infectious diseases (Pedersen & Saltin, 2015). Despite the fact that a number of studies have demonstrated that psychological needs and attitudes are related with higher levels of PA motivation and behaviour, the aftermath of COVID-19 tends to vary among population groups with different demographic variables and characteristics. As the world has nearly recovered from COVID-19, people, such as university students, will likely be motivated to return to their typical levels of physical exercise. Comprehending the behaviour of students towards PA after COVID-19 necessitates examining the limitations of understanding the motivation and attitudes of university students towards PA after recovery from COVID-19. This

study examines to evaluate the relationship between undergraduate students' views and involvement motivation during the pandemic.

Method

Participants

The participants were comprised of 540 undergraduates from the Institution of Higher Learning in Sarawak, Malaysia. The participants consisted of 377 (69.8%) females and 163 (30.2%) males between the ages of 17 to 19 years old (296) 54.8% and 20 to 23 (244) 45.2%. Before conducting the research, permission and consent were sought from the Institute of Teacher Education Batu Lintang Campus Ethics Committee and the participants. Participation in the study was anonymous and voluntary, and participants' anonymity and confidentiality were guaranteed.

Measures

The Attitudes toward Physical Activity Scale in Malay version (M-APAS) (Chin & Jeswenny, 2021) was used to assess an individual's attitudes, beliefs, and perceptions of self-efficacy towards physical activity participation. The M-APAS was modified by Mok et al. from the Attitudes towards Physical Activity Scale (2015). The M-APAS consisted of 35 items that are comprised of the following seven factors: Benefits (6 items; e.g., Being physically active helps to relax me), importance (3 items; e.g., It is importance to spend time to be physically active), learning (4 items; e.g., I learned about language through video exercise), self-efficacy (3 items; e.g., I know which is my favourite physical activity in video exercise), fun (7 items; e.g., I feel stronger after physical activity), fitness (7 items; e.g., I am confident with my flexibility), and personal best (5 items; e.g., I just do my personal best in physical activity). The items were assessed on a 7-point scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). The subscales' internal consistency ranged from 0.71 to 0.92, and their total reliability was 0.96, supporting the findings of Chin and Jeswenny's (2021) study on Malaysian primary school pupils.

The Physical Activity and Leisure Motivation Scale in Malay version (PALMS-M: Kueh, Kuan, & Morris, 2019) was utilised to assess the student's physical activity involvement motives. The PALMS comprised of forty items, eight subscales with five items each, which are competition/ego (e.g., Because I perform better than others), appearance (e.g., To lose weight, look better), others' expectations (e.g., To manage medical condition), affiliation (e.g., Because I enjoy spending time with others), physical condition (e.g., Because it keeps me healthy), psychological condition (e.g., Because it helps me relax), mastery (e.g., To improve existing skills), and enjoyment (e.g., Because it's fun). Items are assessed on a 5-point Likert scale, with 1 (strongly disagree) to 5 (strongly agree). The internal consistency of the subscales ranged from 0.69 to 0.92, with an overall reliability of 0.95.

Results

Table 1 Socio-Demographic Characteristics of the 540 Participants

Characteristics	Frequency (N)	Percentage (%)
Gender		
Male	163	30.2
Female	377	69.8
Age group		
17 – 19	296	54.8
20 – 23	244	45.2
Ethnicity		
Malay	338	62.6
Non-Malay	202	37.4
Body Mass Index (BMI)		
Underweight (≤ 18.49)	91	16.9
Normal (18.5 – 24.9)	357	66.1
Overweight (25.0 – 29.9)	73	13.5
Obese (30.0 – 34.9)	19	3.5
Frequency of Exercise Per Week		
1 – 3 times	406	75.2
4 – 6 times	134	24.8
Minutes Exercise		
0 – 30 minutes	248	45.9
31 – 60 minutes	223	41.3
61 – 90 minutes	27	5.0
91 – 120 minutes	42	7.8

The demographic characteristics of the participants are shown in Table 1. 540 participants were involved in the study, comprising of 163 (30.2%) males and 377 (69.8%) females. The age groups categories showed that 296 (54.8%) of the participants were aged 17 – 19 years old while 244 (45.2%) were aged 20 – 23 years old. In terms of ethnicity, Malay accounted for 62.6% of the population, followed by non-Malay accounted for 37.4%. According to Body Mass Index, 357 (66.1%) of the participants were in the normal weight category, followed by underweight category with 91 (16.9%), overweight category with 73 (13.5%) and obese category with 19 (3.5%). Whereas, in terms of the frequency of exercise, the majority of participants (75.2%) exercised 1 to 3 times per week for 0 to 30 minutes on average (45.9%).

Table 2 Mean, Standard Deviation and Reliability of M-APAS and PALMS-M

Variables	*M*	*SD*	α
M-APAS			.96
Benefits	4.39	0.54	.87
Importance	4.23	0.59	.71
Personal Best	4.23	0.65	.89
Fun	4.18	0.64	.90
Fitness	3.89	0.73	.92
Self-efficacy	3.85	0.72	.74
Learning	3.48	0.87	.89
PALMS-M			.95
Physical Condition	4.54	0.57	.92
Enjoyment	4.35	0.65	.90
Psychological Condition	4.32	0.63	.89
Mastery	4.31	0.66	.90
Appearance	4.07	0.82	.86
Affiliation	4.04	0.76	.85
Competition/Ego	3.55	0.84	.80
Others' Expectations	2.78	0.79	.69

The mean, standard deviation and reliability of M-APAS and PALMS-M are shown in Table 2. For M-APAS, the most crucial construct influencing students' participation in physical activity was benefits (4.39 ± 0.54), followed by importance (4.23 ± 0.59), personal best (4.23 ± 0.65), fun (4.18 ± 0.64), fitness (3.89 ± 0.73), self-efficacy (3.85 ± 0.72) and learning (3.48 ± 0.87). The M-APAS showed high consistency of 0.96, whereas the subscales' alpha values for fitness, fun, personal best, learning, benefits, self-efficacy and importance demonstrated high reliability of 0.92, 0.90, 0.89, 0.89, 0.87, 0.74, and 0.71, respectively. Whereas, for PALMS-M, physical condition (4.54 ± 0.57) was the most crucial construct that influenced the students' engagement in physical activity, followed by enjoyment (4.35 ± 0.65), psychological condition (4.32 ± 0.63), mastery (4.31 ± 0.66), appearance (4.07 ± 0.82), affiliation (4.04 ± 0.76), competition/ego (3.55 ± 0.84) and others' expectations (2.78 ± 0.79). The internal consistency of the PALM-M was 0.95, with alpha coefficients of 0.92, 0.90, 0.90, 0.89, 0.86, 0.85, 0.80, and 0.69 for physical condition, enjoyment, mastery, psychological condition, appearance, affiliation, competition-ego, and others' expectations, respectively.

The relationship between benefits, importance, learning, self-efficacy, fun, fitness, personal best, competition-ego, appearance, others' expectations, affiliation, physical condition, psychological condition, mastery and enjoyment are shown in Table 3.

Table 3 Correlation between variables for M-APAS and PALMS-M

Variables	BNF	IMP	LRN	SE	F	FIT	PB	CE	APP	OE	AFF	PHYC	PSYC	MAS	ENJ
BNF	-	.69**	.44**	.54**	.74**	.56**	.64**	.36**	.39**	.14**	.52**	.64**	.74**	.69**	.74**
IMP		-	.45**	.57**	.77**	.59**	.68**	.44**	.39**	.20**	.45**	.64**	.66**	.65**	.70**
LRN			-	.48**	.51**	.47**	.43**	.40**	.30**	.30**	.40**	.33**	.45**	.42**	.42**
SE				-	.67**	.65**	.62**	.41**	.37**	.23**	.44**	.56**	.56**	.58**	.60**
F					-	.68**	.75**	.53**	.46**	.24**	.59	.66	.71**	.74**	.78**
FIT						-	.69**	.53**	.42**	.29**	.50**	.52**	.54**	.62**	.63**
PB							-	.46**	.49**	.20**	.53**	.72**	.70**	.76**	.76**
CE								-	.61**	.61**	.58**	.40**	.44**	.58**	.50**
APP									-	.39**	.43**	.54**	.48**	.57**	.50**
OE										-	.34**	.14**	.22**	.26**	.18**
AFF											-	.52**	.60**	.64**	.64**
PHYC												-	.80**	.82**	.81**
PSYC													-	.80**	.85**
MAS														-	.87**
ENJ															-

BNF = Benefits, IMP = Importance, LRN = Learning, SE = Self Efficacy, F = Fun, FIT = Fitness, PE = Personal Best, CE = Competition-Ego, APP = Appearance, OE = Others' Expectations, AFF = Affiliation, PHYC = Physical Condition, PSYC = Psychological Condition, MAS = Mastery, ENJ = Enjoyment

*Note***. Correlation is significant at the 0.01 level (2-tailed)

Benefits was highly correlated with enjoyment (r =.74), fun (r = .74), and psychological condition (r = .74) but moderately correlated with importance (r = .69), self-efficacy (r = .54), fitness (r = .56), personal best (r = .64), affiliation (r = .52), physical condition (r = .64) and mastery (r = .69). Benefits was weakly correlated with learning (r = .44), competition/ego (r = .36), appearance (r = .39) and others' expectations (r = .14). Importance was highly correlated with fun (r =.77) and enjoyment (r = .70), yet moderately correlated with self-efficacy (r = .57), fitness (r = .59), personal best (r = .68), mastery (r = .61), physical condition (r = .64), psychological condition (r = .66) and mastery (r = .65). Importance was weakly correlated with learning (r = .45), competition/ego (r = .44), appearance (r = .39), others' expectations (r = .20), and affiliation (r = .45). Learning was moderately correlated with fun (r = .51), whereas weakly correlated with self-efficacy (r = .48), fitness (r = .47), personal best (r = .43), competition-ego (r = .40), appearance (r = .30), others' expectations (r = .30), affiliation (r =.40), physical condition (r = .33), psychological condition (r = .45), mastery (r =.42), and enjoyment (r = .42). Self-efficacy was moderately correlated with fun (r = .67), fitness (r = .65), personal best (r = .62), physical condition (r = .56), psychological condition (r = .56), mastery (r =.58), and enjoyment (r = .60), yet weakly correlated with competition-ego (r = .41), appearance (r = .37), others' expectations (r = .23) and affiliation (r = .44). Fun was highly correlated with fitness (r = .68), personal best (r = .75), psychological condition (r = .71), mastery

(*r* = .74) and enjoyment (*r* = .78), but moderately correlated with competition –ego (*r* = .53), affiliation (*r* =.59) and physical condition (*r* = .66). Fun was also weakly correlated with appearance (*r* = .46) and others' expectations (*r* = .24). Fitness was moderately correlated with personal best (*r* = .69), competition-ego (*r* = .53), affiliation (*r* =.50), physical condition (*r* = .52), psychological condition (*r* = .54), mastery (*r* = .62) and enjoyment (*r* = .63), yet weakly correlated with appearance (*r* = .42) and others' expectations (*r* = .29). Personal best was highly correlated with affiliation (*r* = .53), physical condition (*r* = .72), psychological condition (*r* = .70), mastery (*r* =.76) and enjoyment (*r* = .76) but weakly correlated with competition-ego (*r* = .46), appearance (*r* = .49), others' expectations (*r* = .20). Competition-ego was moderately correlated with appearance (*r* = .61), others' expectations (*r* = .61), affiliation (*r* = .58), mastery (*r* = .58) and enjoyment (*r* = .50), whereas weakly correlated with physical condition (*r* = .40) and psychological condition (*r* = .44). Appearance was moderately correlated with physical condition (*r* = .54), mastery (*r* = .57) and enjoyment (*r* = .50), yet weakly correlated with others' expectations (*r* = .39), affiliation (*r* = .43) and psychological condition (*r* = .48). Others' expectations were weakly correlated with affiliation (*r* = .34), physical condition (*r* = .14) psychological condition (*r* = .22), mastery (*r* = .26) and enjoyment (*r* = .18). Affiliation was moderately correlated with physical condition (*r* = .52), psychological condition (*r* = .60), mastery (*r* = .64) and enjoyment (*r* = .64). Physical condition was highly correlated with psychological condition (*r* = .80), mastery (*r* = .82) and enjoyment (*r* = .81). Psychological condition was highly correlated with mastery (*r* = .80) and enjoyment (*r* = .85). Enjoyment was highly correlated with enjoyment (*r* = .87).

Table 4 Hierarchical Regression Analysis showed gender, age groups, benefits, importance, learning, self-efficacy, fun, fitness, personal best, competition/ego, appearance, others' expectations, affiliation, physical condition, psychological condition, mastery and enjoyment as predictors of levels of BMI

Variables		β	*t*	*p*	*R*	Adj. R^2	Δ Adj. R^2
Step 1					.07	.004	< .001
	Gender	-.03	-0.58	.57			
	Age Groups	-.04	-0.85	.39			
Step 2					.35	.12	.09
	Benefits	-.04	-0.53	.60			
	Importance	.07	1.02	.31			
	Personal Best	-.06	-0.80	.43			
	Fun	-.06	-0.63	.53			
	Fitness	-.06	-0.92	.36			
	Self-efficacy	-.003	-0.05	.96			
	Learning	.14	2.67	.008*			
	Physical Condition	-.20	-2.24	.026*			
	Enjoyment	.04	0.40	.69			
	Psychological Condition	-.08	-0.82	.41			
	Mastery	.10	1.00	.32			
	Appearance	.38	6.64	< .001*			
	Affiliation	-.12	-2.06	.04*			
	Competition/Ego	.-.18	-2.44	.015*			
	Others' Expectations	-.01	-0.19	.85			

* $p < .05$

Table 4 shows the hierarchical multiple regression which assess the ability of fifteen control measures (benefits, importance, learning, self-efficacy, fun, fitness and personal best, competition/ego, appearance, others' expectations, affiliation, physical condition, psychological condition, mastery and enjoyment) to predict levels of BMI, after controlling for the influence of gender and age groups. Preliminary analyses were evaluated to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. Gender and age groups were entered at Step 1, explaining 0.4%, $F(2, 537) = 1.13$, $p = .33$ of the variances in perceived SEGAK. After entry of the benefits, importance, personal best, fun, fitness, self-efficacy, learning, and physical condition, enjoyment, psychological condition, mastery, appearance, affiliation, competition/ego, others' expectations, and at Step 2 the total variance explained by the model as a whole was 11.9 %, $F(17, 522) = 4.15$, $p < .001$. The two control measures explained an additional 11.5% of the variance in BMI, after controlling for gender and age groups, *R* squared change = .115, *F* change (15, 522) = 4.54, $p < .001$. In the final model, only five control measures, learning ($\beta = .14$, $p = .008$, competition/ego ($\beta = -.18$, $p = .015$), appearance ($\beta = .38$, $p < .001$), affiliation ($\beta = -.12$, $p = .04$), and physical condition ($\beta = -.20$, $p = .026$) were found statistically significant predictor with BMI.

Discussion

During the pandemic period, the aim of this study was to investigate the relationship between participation motivation and attitudes of university students toward extracurricular activities. Positive factors of attitudes were found to be associated with self-determined participation motivation that allow participants to be more aware of the positive impacts of extracurricular activities in the form of PA and workouts on health and mental wellness. As fun was found to be highly correlated with fitness, psychological condition, personal best, mastery, and enjoyment, it suggests that a positive attitude toward fun will motivate students to engage in PA regardless of the extrinsic value of PA.

The gratification in terms of fun and interest from the novelty of challenging PA and exercises through digital platforms may have stimulated and increased their interest, enjoyment, and adherence toward better health and PA programmes in the universities. The usage of digital platforms for directing and aiding students to adapt their involvement and engagement in PA can indirectly reduce the impact of restrictions during a pandemic. Rogers et al. (2008)'s study supported the current findings whereby attitude factors, such as benefits, importance, personal best, and fun, and physical condition, enjoyment, psychological condition, and mastery in participation motivation were interconnected and related to motivating students to participate in extracurricular activities. According to literature, students' BMI was mostly influenced by their intrinsic learning attitude and extrinsic motivations for competition, beauty, affiliation, and physical condition. These findings further indicates that both intrinsic and extrinsic elements are required for extracurricular activity engagement by students.

Conflicts of interest

The authors acknowledge that there were no financial and commercial benefits that can contribute to any form of conflict of interest in the study.

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University Students' Lifestyle and Physical Activity during the COVID-19 Pandemic

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Abstract

The altered lifestyle and insufficient physical activity of students in the Republic of Croatian studying under circumstances of the COVID-19 pandemic can have a negative effect on their academic and health experiences. The overall low mood and health problems can be consequences of the effects of isolation during the pandemic. Therefore, it is necessary to place greater focus not only on psychological and mental consequences of the pandemic but on physical and kinesiology activities and habits of young people as well, particularly owing to reduced socialization. The aim of this research, within the framework of promoting mental health and a healthy lifestyle, is to examine the degree of students' agreement with the offered statements of their general mood and lifestyle under the circumstances of the COVID-19 pandemic with particular emphasis on their physical and kinesiology activity. For this purpose, a Questionnaire for students on coping with emergency situations and circumstances brought upon the COVID-19 pandemic was prepared. The questionnaire was distributed *online* to 153 students of the Faculty of Teacher Education in Zagreb. Through quantitative analysis of frequencies, the questionnaire statements were interpreted and grouped. The results show that students' mood during the COVID-19 pandemic was mostly negatively affected. They also indicate a presence of student awareness and expressed need for physical activity in order to avoid increased negative moods. After *online* classes, students do not have sufficient energy for physical activities in their free time. They assess conditions for kinesiology activities as much worse during the pandemic, although students who were not involved in kinesiology activities in the pre-pandemic time actually wanted to become involved in some type of kinesiology activity. The results indicate that, in time leading to the post-pandemic period, higher education institutions should provide possibilities for increased physical and kinesiology activities along with making available effective counselling and guidance in order to find adequate solutions for academic, health and career challenges caused by the COVID-19 pandemic.

Key words: COVID-19 pandemic, Mental health, Mood, Physical and kinesiology activities, Students

Introduction

The period during the COVID-19 pandemic has had a significant influence on all aspects of society, including mental and physical health among the older population but also among children and youth. Around the world, Croatia included, government pleas were manifested in form of demands that people stay safe, i.e. stay at home, As a result measures of social distancing, which limited daily activities, were introduced. For the working population, pupils, and students that meant that the majority of their time (if not all) was to be spent without their ordinary, daily activities which take place outside of their homes. Research conducted over the last two years indicate concern that the measure of social distancing and quarantine can have implications on people's behavior with respect to physical activity (Papaioannou, Schinke, Chang, Kim, & Duda, 2020; Sallis, Adlakha, Oyeyemi, & Salvo, 2020; Hall, Laddu, Phillips, Lavie, & Arena, 2021).

The World Health Organisation (WHO) (2020) defines physical activity as any physical movement which is produced by muscles in the body and which requires energy consumption. Newell (1990), and Hoffman (2005), according to Jurko, Čular, Badrić, and Sporiš, (2015), define physical activity as intentional, voluntary movement directed towards reaching an identified goal. Kinesiology activities are important for the exercise processes which aim to improve health and maintain body characteristic, abilities and motor knowledge at a high level for as long as possible. From the point of view of kinesiology, Prskalo (2007) emphasizes the importance of creating habits among children and youth of proper use of free time dedicated to exercise and movement which should become the primary task of education. In that sense, the same author points to the possibility of developing a positive relationship towards physical exercise without which leading a healthy lifestyle in present-day, or in the future, is inconceivable. Moreover, it is well known that physical activity is useful for people's mental health in general. It enhances perception, self-confidence and self-respect (Fox, 1999). Piercy et al. (2018) state that regular physical activity has health benefits for every person regardless of age, sex, race or ethnicity, and is recommended for children, adolescents, the elderly, and for persons with chronic diseases and persons with disabilities. The WHO recommends, among others, that children and youth with disabilities between the ages of 5 and 17 also need to accumulate at least 150 minutes of physical activity of moderate to strong intensity per week whenever that is possible. This can be also be recognized in the context of offering social support to persons with disabilities. Wellbeing is also manifested in the reduced feeling of anxiety, lower blood pressure, better sleep, better cognitive functions as well as in improved cardiorespiratory condition, muscle strength and fewer symptoms of depression. Therefore, knowledge of efficient, individualized ways of coping in such situations is of special significance (Folkman & Moskowitz, 2004; Folkman, 2011). What is more, studies have shown that physical condition in childhood can later affect health and that adult persons as they grow old must maintain their condition at a certain level. According to Piercy et al. (2018) it is recommended that children and youth work on muscle and bone strength and do physical activities three or more days per week as physical activity can improve not only their cardiorespiratory and muscle condition, cardio-metabolic health, bone health, weight and cognition, but also lower the risk of depression. The benefit of regular physical activity for youth, in addition to overall health and physical condition, is in lowering the risk of

developing numerous illnesses, mental difficulties and conditions. Therefore, physical activity, health and quality of life are very closely linked. In that sense, it is important to maintain, on a daily basis, physical activity as an important life habit.

In the context of altered conditions for physical activity, newest research suggest that people of all age groups have significantly lowered their level of physical activity during the COVID-19 pandemic in comparison to the pre-pandemic time (Hossain, Sultana, & Purohit, 2020; Maugeri et al., 2020; Theis, Campbell, De Leeuw, Owen, & Schenke, 2021), which, as a consequence, had a negative effect on their mental health and wellbeing (Ammar, Trabelsi, & Brach, 2020). In that context, measures of social distancing meant that young persons had fewer opportunities for being physically active, especially if their activities were limited, such as going to the gym, group get-togethers, and other. Among the population, youth in particular, this changed way of life led to changes in behavior, sleep regime and quality of life affecting mental health and reaction to stress which, in the end, leads to insufficient social recourses which are important factors for young persons' resilience towards mental and health difficulties (Sehmi, Maughan, Matthews, & Arseneault, 2019). For example, children and youth in risk groups, such as those with physical disabilities and/or intellectual difficulties, are particularly susceptible to the effects of limitations brought upon the COVID-19 pandemic. According to Fitzgerald, Stride, & Drury (2020) the effects of reduced possibilities for kinesiology activities and directives regarding possibilities for regular physical activity will, for those groups, most likely deeply affect their physical activity and mental health in general. The Republic of Croatia observes trends which are similar to those in developed countries such as decrease in activity with an increase in age and greater frequency of eating disorders, therefore, it is important to observe trends and developments among young persons (Bjelajac, Relja, & Stanić, 2010).

According to Piercy et al. (2018), Fröberg (2020) states that physical activity is of particular importance for the wellbeing and mental health of children and youth. Yet, if public gyms, fitness centers and public sports fields are closed due to forbidden public gatherings, young persons have limited access to indoor and outdoor environments in which they used to be physically active (Lim & Pranata, 2020). In line with this concern, one research showed that physical activity on a global scale was reduced for more than 25% within 30 days of declaring the COVID-19 pandemic (Tison et al., 2020 according to Fröberg, 2020). Along with the mentioned, research has shown numerous psychological, social and neuroscientific effects of the COVID-19 pandemic and relating to that direct and indirect psychological and social consequences which could affect mental health of people, particularly children and youth, now and in the future. Some of the negative psychological effects can be manifested as confusion, anger and posttraumatic stress symptoms (Brooks et al., 2020). Holmes et al. (2020) place the COVID-19 pandemic in the context of increased prevalence of mental health and the multidisciplinary approach and accordingly the need for cooperation between different disciplines. According to the results of the *SIDERAL Project – Social and International Dimension of Education and Recognition of Acquired Learning* (2021), during their academic activities, students mostly felt frustrated, anxious, and bored. It may indicate that student wellbeing with respect to the general situation during the COVID-19 pandemic could worsen. But, on the

other hand, it is positive that the results also showed that the frequency of happiness was average and the frequency of undesired emotions such as hopelessness and shame was assessed as relatively low.

Aim and research questions

The standpoints of the above-mentioned recent research along with research to date, indicate that the benefits of physical and kinesiology activity for young people prior to and during the COVID-19 pandemic were widely recognized and advocated in the promotion of healthy lifestyles such as the importance of physical activity for improvement of mental health, better spirits and reduced symptoms of depression, cognitive (mental) function and self-respect. Along that line of thought and within the framework of promoting mental health and a healthy lifestyle, **the aim** of this research is to examine the degree of students' agreement with the offered statements of their general mood and lifestyle under the circumstances of the COVID-19 pandemic with particular emphasis on their physical and kinesiology activity.
The research poses two research questions:

- To what extent do students agree with the offered statements about their mood and lifestyle during their study under circumstances of the COVID-19 pandemic?
- To what extent do students agree with the offered statements about their involvement in physical and kinesiology activities under circumstances of the COVID-19 pandemic?

Methodology

Participants

The sample comprised 153 students of teacher education from the Faculty of Teacher Education, University of Zagreb (M= 3.3%, F=96.7%) enrolled in the third (37.9%), fourth (39.2%) and fifth (22.9%) year of study. Following ethical standards for conducting research, students participated in the research by providing their informed consent. Students were informed and assured that the research questionnaire which included questions regarding their general demographic data (sex and year of study) were anonymous and that their personal data would not be sought. Furthermore, by pursuing to complete the questionnaire they confirmed being informed regarding the research and accepted participation.

Instrument and data collection procedure

For the purpose of this research the *Questionnaire for students on coping with emergency situations and circumstances brought upon the COVID-19 pandemic* (further in text Questionnaire) was devised. The research was carried out in the 2020/2021 academic year in an online environment. Upon creating the online Questionnaire through Google forms, the participants received a link via study groups. As the research was conducted in accordance with all ethical aspects of the research, the

participants were informed of the purpose and aim of the research, and they were guaranteed anonymity and secrecy of their data, as well as the possibility to opt out of participation at any time. They were asked to provide their opinions in the most spontaneous and honest manner. If they did not want to share their opinions on some statements they were not obliged to do so.

The Questionnaire comprised two parts. The first part referred to participants' socio-demographic data (sex and year of study). The second part of the questionnaire comprised 30 statements for which students express a certain degree of agreement with statements of their general mood and lifestyle while studying under extraordinary situations and circumstances caused by the COVID-19 pandemic. For the purpose of this paper, 16 statements were extracted, i.e., variables which refer to the degree of students' agreement with statements of their mood and their lifestyle under circumstances of the COVID-19 pandemic and their involvement in physical and kinesiology activity during the COVID-19 pandemic. The degree of agreement with each statement was marked on a four-degree Likert-type scale (1 – I entirely disagree, 2- I partly disagree, 3- I agree, 4- I entirely agree).

Grouped items from the questionnaire were interpreted and argued by quantitative analysis of frequencies in the following manner: The first group of items (Table 1) refers to the degree of students' agreement with statements of their mood and lifestyle while studying under circumstances of COVID-19 pandemic; The second group of items (Table 2) refers to the degree of students' agreement with statement regarding the extent to which they assess their involvement in physical and kinesiology activities under circumstances caused by the COVID-19 pandemic. Based on the grouped items from the *Questionnaire on coping in emergency situations and circumstances caused by the COVID-19 pandemic*, along with their involvement in physical and kinesiology activities, the distribution of frequencies was used. Data were calculated in percentages and presented in tables.

Results and discussion

Considering the applied quantitative methodology and the analysis of frequencies, Table 1 shows the distribution of frequencies of results according to the degree of students' agreement with the offered statement of their lifestyle mood during their studies in pandemic conditions is shown.

The distribution of the frequencies of results according to the degree of students' agreement with the offered variables on their lifestyle mood during their studies in pandemic conditions (Table 1) shows that students, considering both assessments I agree and I entirely agree, felt very tired and exhausted prior to doing work for their studies (80.4%) and that they felt exhausted and tired after online classes (62.5%). Over 50% of the participants entirely took steps and activities in line with the examples provided to resolve the situation that led to their negative mood. Furthermore, considering both opinions, I agree and I entirely agree, 53.9% of students needed more time to entirely relax and feel better after online classes.

Table 1 Distribution of frequencies of results – Mood and lifestyle during the (%) (N=153)

Variables	1	2	3	4
Some days I feel tired and exhausted before I start doing work for my studies.	4.6	15.0	30.1	50.3
After online classes I need more time than I previously needed in order to relax and feel better.	20.4	25.7	27.6	26.3
After online classes I usually feel exhausted and tired.	11.8	25.7	31.6	30.9
I feel energized while doing my assignments.	17.1	44.7	28.3	9.9
I usually quickly overcome difficult periods and stressful events.	11.8	34.2	34.9	19.1
I have a difficult time recuperating when something bad happens.	27.0	42.8	19.1	11.1
I've taken steps and activities in order to solve a situation which led to my negative mood (e.g. I've planned how to avoid such a situation in the future, tried to solve the problem through exercise).	13.7	30.7	27.5	28.1
I haven't done anything in particular, nor did I exercise in order to improve my mood.	47.8	29.4	16.3	6.5

Less than 40% of students felt energized while doing their assignments and 6.5% of students did nothing in particular, nor did they exercise in order to improve their mood. In addition, taking into account that another 16.3% of students agreed with this statement, a somewhat relatively worrying number of students who do, in fact, nothing to improve their mood is get (22,8%). Opposite, from the data mentioned, 47.8% students disagreed and partly disagreed 29,4% with the statement. It can be assumed that those students were aware of their concern for themselves and their lifestyle under such conditions and did not allow for total relaxation i.e. they try to find activities in order to overcome the difficult periods and stressful events and they did something and exercise in order to improve their mood.

Based on these findings, it can be also assumed that there is a presence of awareness among students for seeking physical activity in order to prevent falling into greater negative moods. This is supported by the statement in which students agreed that they usually quickly overcome difficult periods and stressful events (a total of 54% of students both agree and entirely agree). Generally, the mentioned may accounts for students' understanding that with the help of physical activity they can achieve health and social aims. In this way they could avoid potentially engage in risky behavior such as smoking, consumption of drugs, alcohol or irresponsible sexual behavior.

On the other hand, almost a third of the students (30.2%) agreed that they had a difficult time recuperating when something bad happened.

Table 2 shows the distribution of frequencies of results according to students' agreement with statements of physical and kinesiology activities during the pandemic.

Table 2 Distribution of frequencies of results – Physical and kinesiology activities of students during the pandemic (%) (N=153)

Variables	1	2	3	4
After online classes I have enough energy for physical activities in my free time.	18.3	37.9	28.8	15.0
I usually feel filled with energy when doing some form of physical activity after classes.	7.2	20.3	32.0	40.5
I've participated in physical activities in order to improve my moods.	10.5	27.4	32.0	30.1
During the pandemic, my kinesiology activities were reduced.	24.2	24.2	23.5	28.1
Conditions for kinesiology activities are much worse than they were before.	17.1	27.0	27.6	28.3
Kinesiology activities help me overcome this state.	11.1	28.8	30.0	30.1
I do kinesiology activities more than before as I have more time.	27.3	29.4	27.0	16.3
I don't have possibilities for joining a sports activity due to the COVID-19 pandemic.	37.3	32.6	18.3	11.8

The distribution of frequencies of results in Table 2 shows that only 37.3% of students entirely had opportunities to participate in a sports activity during the pandemic i.e. they entirely disagreed with statement I don't have possibilities for joining a sports activity due to the COVID-19 pandemic. On this occasion, no information was obtained whether they used those opportunities. The remaining 32.6% of students partly agreed that they had those possibilities, while 30.1% students did not have such possibilities.

More than 70% of students agreed that they usually feel filled with energy when engaging in physical activities after classes, however only 15% of students entirely agreed that after online classes they have sufficient energy for physical activity in their free time. Badrić and Prskalo (2011) state that young people today are generally more prone to selecting activities which do not exert any physical effort and owing to technological advancements they mostly spend their time passively and using passive content. As the results presented in Table 1 show that students sought ways for engaging in physical activity, more than 60% of students (Table 2) agreed that participated in physical activities in order to improve their mood during the pandemic and more than 60% of students agreed that kinesiology activities helped them overcome the pandemic situation.

Therefore, somewhat more than 43% of students engaged in kinesiology activities more than before as they had more time. Furthermore, 56% of students agreed that the conditions for kinesiology activities were much worse during the pandemic than they were in pre-pandemic times. According to the results of the research conducted by Bjelajac, Relja and Stanić (2010) prior to the pandemic, two thirds of the students participated in some form of sport or recreational activity during their free time. This was mostly the case for men and those studying at technical, natural science and biomedical faculties and the main reasons for engaging in recreational activity were most frequently of individual nature (improving health, becoming fit, and improving looks), while

those of social nature (socializing and gaining new friendships) were less represented. Similar results were observed in the estimation of benefits as the majority of students stated personal benefits and a significantly lower number of students reported social benefits. However, these results indicate that more than 50% of students agreed that their kinesiology activities were reduced during the pandemic period.

Conclusion

Although the COVID-19 pandemic significantly disrupted continuity in education, particularly how students study, and expanded inequalities, at the same time it pointed out new ways of teaching and learning, new ways of communicating, and new roles with the aim of improving concern for oneself and reflecting on possibilities for engaging in physical activities. With the research questions which were directed to students' opinions, the aim of this research was to examine the degree of students' agreement with the offered statements of their general mood and lifestyle under circumstances caused by the COVID-19 pandemic with emphasis on their physical and kinesiology activity. The research was devised within the framework of promoting mental health and a healthy lifestyle. The results point to a pronounced concern and awareness students have about their deteriorating mood and general wellbeing and on the altered way of life. However, although generally having a low mood, being exhausted and tired from online classes, the results show that students gained valuable experiences and a will for engaging in physical activity in order to improve the general mood and this can be valuable in process of planning kinesiology programs and activities during their course of study. What is more, the results show that students sought ways and were motivated for doing physical activity and because of that the opportunity for action should not be wasted. That calls for planning processes which continuously assess the situation, plan for solving inequalities, encourage participation in physical and kinesiology activities and assess and evaluate practice in order to be more successful and in order to maintain and pursue those practices which proved successful for the mental health of young people. Furthermore, that assumes that student organizations should also reach out to their members and contribute to strengthening social relationships between colleagues, particularly during times of crisis (Doolan et al., 2021). In that context it is necessary to develop institutional resilience in higher education and pay attention to the mental health of students, with special focus on observing the effects on students of vulnerable health or those in vulnerable groups.

Finally, it is important to emphasize that the interpretation of the results requires caution in concluding. The limitation is mainly represented in. double-barreled statements (positive and negative) which can lead to misinterpretation by the participants.

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The Application of Transtheoretical Model (TTM) of Behavioural Change Among Malaysian Undergraduate Trainee Teachers towards Physical Activity

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Abstract

The study investigated the transtheoretical model among Malaysian undergraduate trainee teachers. The questionnaires for decisional balance (Plotnikoff et al.,2001); self-efficacy scale (Rizal et al.,2019) and processes of change (Rizal et al.,2019) were completed by 450 participants including 132 males (29.3%) and 318 females (70.7%) aged between 17 – 22 years old. The results revealed a significant difference in pros and cons for decisional balance; situational and competing demands for self-efficacy; consciousness-raising, counterconditioning and stimulus control for processes of change among gender. Based on the age groups, the results revealed significant difference in reinforcement management, self-reevaluation, social liberation, consciousness-raising and in processes of change among age groups. Finally, no statistically significant difference was found between ethnicities for decisional balance, self-efficacy, and processes of change. The trainee teachers need to lead as societal leaders in PA as exemplars of a healthy lifestyle to advocate and articulate the values of PA among the school students to adhere and maintain a healthy lifestyle in the long run.

Key words: Transtheoretical model, Trainee teachers, Physical activity

Introduction

The increase in obesity prevalence among the Malaysian population is a reflection of the fall in physical inactivity which is one of the commonly known non-communicable diseases. The Malaysian National Health and Morbidity Surveys (NHMSs) showed that obesity and overweight prevalence among adults ranged from 29.4% (2011) to 30% (2015) and 15.1% (2011) to 17.7% (2015), respectively. In contrast, 15.2% and 13.35% of secondary school students aged 13 to 17 were overweight and obese respectively. Malaysia has the highest overweight and obesity rate among adults in Asia with the second-highest child obesity prevalence among children between 5 to 9 years old and 7.1% of kids under the age of 5 were overweight. This shows that the Malaysian government's efforts to tackle the obesity and overweight epidemic have not been successful. The drop-in physical activity is most pronounced between youth (15-19 years) and young adulthood (20-25 years), placing students in a high-risk group (Han et al., 2017; Jahan et al., 2017; Liu et al., 2018; Wallace et al., 2000). As a result, there is a need to educate children and adolescents in schools about good food and physical activity as these youngsters may face a variety of non-communicable diseases (diabetes, heart disease) as adults in the future.

Inculcating trainee teachers to engage in physical activities amongst themselves is a crucial aspect of the Institute of Teacher Education Campuses in Malaysia. PE in schools did not significantly contribute to health and wellness outcomes, as evidenced by Malaysia's obesity and overweight prevalence over the years. It implied the seriousness in considering alternatives to physical education because PE is not as effective at encouraging kids to engage in physical activities as part of a healthy lifestyle. The low adherence of teachers and school administrators to implement daily 20 of continuous, moderate-intensity exercise, as well as the poor quality of physical education (PE) programmes, have been a problem (Allison et al., 2016; Bremer et al., 2018; Donnelly et al., 2017; Olstad et al., 2015). According to the teachers' health and physical activity review, Rosales-Ricardo et al. (2017) discovered that the majority of university professors exhibited sedentary behaviours that led to their obesity and overweight status. Kee (2013) discovered that more than a third of trainee teachers were actively involved in PA, while more than half were mildly involved in PA. The identification of PA behaviours among trainee teachers can facilitate the design of more effective health education programmes in the Institute of Teacher Education Campuses.

The transtheoretical model (TTM) is one of the integrated theories utilised in evaluating PA and health related behaviour studies. The TTM approach examines people's preparedness to change their behaviour and develops treatments to help them change via five phases of motivational readiness, resulting in the desired behaviour change (Han et al., 2017; Prochaska & DiClemente, 1983). The stages of change (SOC), self-efficacy, decisional balance (DC), and change processes make up the TTM (POC). The main construct is the stage of change, which includes precontemplation, contemplation, preparation, action, and maintenance. Individuals begin by intending to adopt the behaviour criteria in the precontemplation, contemplation, and preparation stages before eventually adopting and maintaining the desired acquired behaviour in the action and maintenance stages (Prochaska & Velicer, 1997; Romain et al., 2018). As they progress through the stages, people might employ a variety of methods to enhance or adapt their behaviour. Processes of change (POC), decisional balance (DB), and self-efficacy are the other three

intervening constructs (SC). The ten POC are linked in promoting movement between lower stages (1-3) involving cognitive and affective processes and upper stages (4-5) focusing on behavioural processes, although DC (evaluating the benefits and drawbacks of altering) and SE have an influence on the process (Laranjo, 2016). The DC's goal was to enhance participation in PA, sports, and exercise by balancing the benefits and drawbacks of changing or adopting the targeted behaviour. Individuals in any of the stages of change may have a different DC, with the benefits of embracing change outweighing the disadvantages in the stages of action and maintenance. Self-efficacy is known as one's level of confidence, which is reflected in one's self-beliefs as one move through the phases (Marcus et al., 1992). The TTM demonstrated that lower levels of self-efficacy were linked to lower stages of change, in which the disadvantages outweigh the benefits (Dziedzic & Hammond, 2010). On the contrary, self-efficacy levels were correlated with behaviour performance levels whereby the benefits exceed the disadvantages.

Studies had shown that sedentary students lack the necessary psychological factor to motivate them to change their behaviour through physical activities, sports, and exercise in order to maintain an active lifestyle. Several studies on PA and physical activities demonstrated the applicability of the TTM Model (Cengiz, 2007; Kee et al., 2010). Higher education students would be able to increase their knowledge of PA processes of change if they had a deeper understanding of TTM studies. Kee et al. (2010) discovered that 22.8% of Malaysian secondary school students engaged in physical activity at the action or maintenance stage, whereas only 63.2% engaged in physical activity occasionally. In terms of gender, previous research (Cengiz, 2007; Spencer et al., 2006) determined that a greater proportion of male students were in the action and maintenance stage than female students, whereas a greater proportion of female students were in the pre-contemplation, contemplation, and preparation stages. This was supported by Ebem (2007), who found that a slightly greater proportion of male students than female students were in the action and maintenance stage, despite the fact that the majority of students were in the pre-contemplation, contemplation, preparation, action and maintenance stages. However, Ebem's (2007) study also revealed that a large proportion of males and females were in the pre-contemplation, contemplation, and preparation stages. In addition, the majority of college students tend to be in the pre-contemplation, contemplation, and preparation stages, possibly as a result of their demanding schedules and workloads (Cengiz, 2007; Kocak, 2005; Spencer et al., 2006). The application of the TTM among undergraduate trainee teachers is essential for institutions to identify which stages of health and mental well-being the trainee teachers may be in as they transition from secondary education to the Institute of Teacher Education due to their demanding workload, academic assignments, and schedules. These TTM mechanisms enable interventions to support their mental health and well-being through participation in physical activities and exercises during leisure time.

There are limited studies utilising the TTM on trainee teachers in PA in which TTM studies need to undertake to better understand the behavioural change of trainee teachers when modifying their health behaviour to maintain an active lifestyle as they enter the Institute of Teacher Campuses. Thus, this study examined the first-year trainee teachers' physical activity decisional balance, self-efficacy and process of change.

Method

Participants

A total of 450 first-year undergraduate trainee teachers from one Institute of Teacher Education campus in Sarawak, Malaysia involved in the study. The participants comprised 450 first-year undergraduate trainee teachers from one Institute of Teacher Education Campus in Sarawak, Malaysia. There were 132 males (29.3%) and 318 females (70.7%) among the participants, with nearly half (48.4%) of them being between the ages of 17 and 22 years (1.72 ± 0.78). In terms of ethnicity, a higher proportion of participants were Malay (63.1%) as compared to the Non-Malay (36.9%). Whereas, the BMI classifications revealed that 65.6% of the participants have a normal BMI, 16.4% underweight, 14.0% overweight, and 4.0% obese. The participants' average weekly exercise frequency was 1.72 (SD=0.78) minutes, with each session lasting between 0 and 30 minutes.

Measures

The Malay version of TTM questionnaires (Rizal, Hajar, Kueh, Muhamad & Kuan, 2019) was utilised which measures constructs of processes of change (stages of change, processes of change, decisional balance and self-efficacy). Rizal et al. (2019) suggested that the TTM questionnaires be administered to a broader population in order to generalise the validated Malay version of the questionnaires.

Decisional balance questionnaire

The decisional balance questionnaire (Plotnikoff et al., 2001) was used to assess the positive (pros) and negative (cons) elements of the perceived significance of altering physical activity. The 10-item questionnaire was scored on a 5-point Likert scale from 1 (not at all) to 5 (extremely). Participants were asked to rate the significance of each statement in relation to their decision to be physically active or inactive during their leisure time (Kee, 2013; Rizal et al., 2019). The scales of pros and cons were independently analysed to indicate the positive and negative aspects of behavioural change in individuals. The mean scores of the five pro items and the five con items were computed by adding the responses of the participants to the ten pro items and the six con items separately and dividing by the number of items.

Self-efficacy questionnaire

The self-efficacy questionnaire (Bandura, 1997; Kim, 2007; Rizal et al., 2019) was a three-factor, 13-item scale that measured participants' situational confidence in the certainty of performing their exercise routine consistently and regularly (three times per week), i.e. internal feeling (5 items), competing demand (4 items), and situational confidence (4 items). Participants responded on a 5-point Likert scale ranging from 1 (not at all confident) to 5 (completely confident) for each of 18 items corresponding to a given statement. Internal reliability for conflicting demands was 0.60, internal feeling it was 0.74, and situational was 0.80. (Liu et al., 2018).

Processes of change questionnaire

The processes of change questionnaire (Rizal et al., 2019; Nigg et al., 1999) was used to examine the cognitive (covert) and behavioural (overt) actions that individuals employ as they proceed through the many stages of change. The 30-item questionnaire, scored on a 5-point Likert scale ranging from 1 (not at all) to 5 (extremely), represented ten processes with the most empirical support, including the five main factors of cognitive processes (consciousness raising, dramatic relief, environmental re-evaluation, self-re-evaluation, social liberation, and stimulus control) and the five main factors of behavioural processes (counter-conditioning, helping relationships, reinforcement management, self-liberation and stimulus control). There were a minimum of three statements for each process, with the participant selecting the relevant column to indicate the degree of response. The ten processes of change were assessed independently, and the mean scores for each process of change were computed by adding the responses to each process of change separately and dividing by the number of questions (Kee, 2013). Cognitive processes had an internal reliability of 0.84, while behavioural processes had an internal reliability of 0.87, indicating strong internal consistency.

Ethics

The Universiti Sains Malaysia Human Research Ethics Committee (USM/JEPeM/21050369) approved the study in conformity with the International Declaration of Helsinki. All participants were informed of the study's goal, voluntariness, anonymity, and confidentiality, and their consents were acquired. The study was undertaken when schools reopened in January 2022 in accordance with the regular operating protocols of the Malaysian Ministries of Health and Education.

Data analysis

The data was analysed using version 27.0 of the Statistical Package for the Social Sciences (SPSS). The gender and age categories of the TTM variables were examined using descriptive statistics, independent sample t-tests, and one-way analysis of variance.

Results

Table 1 shows the demographic characteristics of the participants. A total of 450 participants were involved in this study, 132 (29.3%) males and 318 (70.7%) females. The age groups categories showed that 218 (48.4%) of the participants were 17 – 18 years old, 139 (30.9%) were 19 – 20 years old, and 93 (20.7%) were 21 – 22 years old. In terms of ethnicity, Malay formed the largest percentage with 63.1%, followed by Non-Malay who comprised of 36.9%. Based on the Body Mass Index (BMI), the majority of the participants were in normal weight category with a total of 295 (65.6%), followed by underweight category with 74 (16.4%), overweight category with 63 (14.0%) and obese category with 18 (4.0%). Whereas, in terms of the frequency of exercise, a high percentage of the participants exercise 1 to 2 times (48.9%) a week averaging between 0 to 30 minutes (47.8%).

Table 1 Demographic Characteristics of the 450 Participants

Characteristics	Frequency (N)	Percentage (%)	Mean (SD)
Gender			1.71 (0.46)
Male	132	29.3	
Female	318	70.7	
Age group			1.72 (0.78)
17 – 18	218	48.4	
19 – 20	139	30.9	
21 – 22	93	20.7	
Ethnicity			1.37 (0.48)
Malay	284	63.1	
Non-Malay	166	36.9	
Body Mass Index (BMI)			1.56 (0.88)
Underweight (≤ 18.49)	74	16.4	
Normal (18.5 – 24.9)	295	65.6	
Overweight (25.0 – 29.9)	63	14.0	
Obese (30.0 – 34.9)	18	4.0	
Frequency of exercise per week			1.68 (0.78)
1 – 2 times	220	48.9	
3 – 4 times	165	36.7	
5 – 6 times	54	12.0	
7 times	11	2.4	
Minutes per session			1.73 (0.89)
0 – 30 minutes	215	47.8	
31 – 60 minutes	177	39.3	
61 – 90 minutes	21	4.7	
91 – 120 minutes	37	8.2	

Table 2 shows the independent sample *t*-test of decisional balance scale, self-efficacy scale and processes of change scale based on gender. The results revealed statistically significant difference for decisional balance scale in pros scores whereby the males (3.86 ± 0.58) rated 0.13 point higher than the females (3.73 ± 0.52), $p = .019$. Besides, cons were significant difference between gender whereby the males (3.32 ± 0.81) rated 0.25 point higher than the females (3.07 ± 0.68), $p = .002$. Whereas, for self-efficacy scale, the results revealed no statistically significant difference in internal feelings scores between gender, $p = .07$. Conversely, competing demands was significant difference between gender whereby the males (3.26 ± 0.77) rated 0.23 point higher than the females (3.03 ± 0.71), $p = .002$. Moreover, situational was significant difference between gender whereby the males (3.13 ± 0.77) rated 0.16 point higher than the females (2.97 ± 0.81), $p = .049$.

Table 2 Independent T-Test of Decisional Balance Scale, Self-Efficacy Scale and Processes of Change Scale based on Gender

Variables	Male		Female		*t*-test	
	M	SD	M	SD	*t*	*p*
Decisional Balance Scale (DBS)						
Pros	3.86	0.58	3.73	0.52	2.35	.019*
Cons	3.32	0.81	3.07	0.68	3.17	.002*
Self-Efficacy Scale						
Internal feelings	3.23	0.67	3.10	0.70	1.82	.07
Competing demands	3.26	0.77	3.03	0.71	3.05	.002*
Situational	3.13	0.77	2.97	0.81	1.98	.049*
Processes of Change Scale						
Consciousness Raising	3.76	0.76	3.41	0.90	4.19	< .001*
Dramatic Relief	3.58	0.80	3.53	0.77	0.69	.49
Environmental Reevaluation	3.73	0.84	3.81	0.77	-0.97	.33
Self-Reevaluation	3.73	0.84	3.81	0.77	-0.28	.78
Social Liberation	4.09	0.73	4.11	0.72	0.32	.75
Counterconditioning	3.60	0.69	3.31	0.90	4.99	< .001*
Helping Relationships	3.82	0.86	3.86	0.94	-0.45	.65
Reinforcement Management	3.95	0.75	3.99	0.77	-0.49	.63
Self-Liberation	3.98	0.73	3.86	0.76	1.51	.13
Stimulus Control	3.44	0.89	3.03	0.99	4.04	< .001*

In addition, for processes of change Scale, an independent-samples t-test was conducted to compare the cognitive processes (consciousness raising, dramatic relief, environmental reevaluation, self-reevaluation, social liberation), and behavioral processes (counterconditioning, helping relationships, reinforcement management, self-liberation and stimulus control) scores for males and females. Results revealed statistically significant difference in consciousness raising scores between gender whereby the males (3.76 ± 0.76) rated 0.35 point higher than the females (3.41 ± 0.90), $p < .001$. However, there was no significant difference between gender for dramatic relief between gender, $p = .49$, environmental reevaluation, $p = .33$, self-reevaluation, $p = .78$., and social liberation, $p = .75$. In contrast, counterconditioning was significant difference between gender whereby the males (3.60 ± 0.69) rated 0.39 point higher than the females (3.21 ± 0.90), $p < .001$. Besides, there was no significant difference between gender for helping relationships, $p = .65$. , reinforcement management, $p = .63$, and . self-liberation, $p = .13$. Lastly, stimulus control was significant difference between gender whereby the males (3.44 ± 0.89) rated 0.40 point higher than the females (3.03 ± 0.99), $p < .001$.

Table 3 One-Way ANOVA of Decisional Balance Scale, Self-Efficacy Scale and Processes of Change Scale based on Age Groups

Variables	Age Groups			*F*	*p*
	17 – 18	19 – 20	21 – 22		
Decisional Balance Scale (DBS)					
Pros	3.74 (0.53)	3.77 (0.56)	3.84 (0.54)	1.08	.34
Cons	3.09 (0.68)	3.16 (0.72)	3.23 (0.84)	1.33	.27
Self-Efficacy Scale					
Internal feelings	3.15 (0.64)	3.17 (0.74)	3.08 (0.72)	0.47	.62
Competing demands	3.11 (0.71)	3.09 (0.77)	3.08 (0.75)	0.06	.94
Situational	3.03 (0.77)	3.03 (0.84)	2.95 (0.82)	0.36	.70
Processes of Change Scale					
Consciousness Raising	3.28 (0.90)	3.61 (0.80)	3.89 (0.77)	18.50	< .001*
Dramatic Relief	3.46 (0.73)	3.65 (0.81)	3.57 (0.84)	2.47	.09
Environmental Reevaluation	3.74 (0.78)	3.83 (0.82)	3.85 (0.78)	0.86	.42
Self-Reevaluation	4.03 (0.72)	4.12 (0.73)	4.27 (0.71)	3.61	.028*
Social Liberation	3.87 (0.73)	4.09 (0.74)	4.14 (0.76)	6.05	.003*
Counterconditioning	3.26 (0.84)	3.31 (0.85)	3.51 (0.91)	2.73	.07
Helping Relationships	3.81 (0.93)	3.88 (0.91)	3.88 (0.89)	0.33	.72
Reinforcement Management	3.87 (0.79)	4.03 (0.74)	4.14 (0.71)	4.62	.01*
Self-Liberation	3.83 (0.76)	3.89 (0.74)	4.04 (0.73)	2.46	.09
Stimulus Control	3.11 (0.93)	3.10 (1.02)	3.32 (1.02)	1.72	.18

* $p < .05$

Table 3 shows the one-way ANOVA of decisional balance scale, self-efficacy scale and processes of change scale based on age groups. For decisional balance scale, the results revealed that there was no statistically significant difference between the three age groups for pros, $p = .34$, and cons, $p = .27$. For self-efficacy scale, the results revealed no significant difference between the three age groups for internal feelings, $p = .62$, competing demands, $p = .94$, and situational, $p = .70$. Whereas, for processes of change scale, the results revealed that there was significant difference between the three age groups for consciousness raising, $p < .001$. Post-hoc Tukey HSD adjusted comparisons for consciousness raising indicated that the mean score for age group of 21 – 22 (3.89 ± 0.77) was significantly higher than age group of 17 – 18 (3.28 ± 0.90), $\mu = 0.61$, $p < .001$, 95% CI [0.36, 0.86], and age group of 19 – 20 (3.61 ± 0.80), $\mu = 0.28$, $p = .037$, 95% CI [0.01, 0.54]. Age group of 17 – 18 (3.28 ± 0.90) was significantly lower than age group of 19 – 20 (3.61 ± 0.80), $\mu = -0.33$, $p = .001$, 95% CI [-0.55, -0.12]. Besides, there was no significant difference between the three age groups for dramatic relief, $p = .09$, and environmental reevaluation, $p = .42$. However, there was significant difference between the three age groups for self-reevaluation, $p = .028$. Post-hoc Tukey HSD adjusted comparisons for self-reevaluation indicated that the mean score for age group of 21 – 22 (4.27 ± 0.71) was significantly higher than age group of 17 – 18 (4.03 ± 0.72), $\mu = 0.24$, $p = .021$, 95% CI [0.03, 0.45]. Moreover, there was significant difference between the three age

groups for social liberation, p = .003. Post-hoc Tukey HSD adjusted comparisons for social liberation indicated that the mean score for age group of 17 – 18 (3.88 ± 0.73) was significantly lower than age group of 19 – 20 (4.09 ± 0.74), μ = -0.22, p = .017, 95% CI [-0.41, -0.03], and age group of 21 – 22 (4.14 ± 0.76), μ = -0.27, p = .009, 95% CI [-0.48, -0.05]. Conversely, there were no significant difference between the three age groups for counterconditioning, p = .07, and helping relationships, p = .72. In addition, there was significant difference between the three age groups for reinforcement management, p = .01. Post-hoc Tukey HSD adjusted comparisons for reinforcement management indicated that the mean score for age group of 17 – 18 (3.87 ± 0.79) was significantly lower than age group of 21 – 22 (4.14 ± 0.71), μ = -0.27, p = .012, 95% CI [-0.49, -0.05]. In contrast, there were no significant difference between the three age groups for self-liberation, p = .09, and stimulus control, p = .18.

Table 4 Independent T-Test of Decisional Balance Scale, Self-Efficacy Scale and Processes of Change Scale based on Ethnicity

Variables	Malay		Non-Malay		*t*-test	
	M	SD	M	SD	*t*	*p*
Decisional Balance Scale (DBS)						
Pros	3.77	0.53	3.77	0.56	0.16	.87
Cons	3.14	0.72	3.13	0.74	0.13	.90
Self-Efficacy Scale						
Internal feelings	3.12	0.68	3.17	0.70	-0.70	.48
Competing demands	3.07	0.72	3.14	0.76	-1.07	.29
Situational	3.02	0.80	3.00	0.80	0.21	.83
Processes of Change Scale						
Consciousness Raising	3.47	0.89	3.59	0.86	-1.43	.15
Dramatic Relief	3.57	0.79	3.50	0.77	0.91	.37
Environmental Reevaluation	3.79	0.79	3.78	0.80	0.16	.87
Self-Reevaluation	4.10	0.68	4.13	0.79	-0.40	.68
Social Liberation	4.00	0.74	3.97	0.75	0.49	.63
Counterconditioning	3.30	0.84	3.36	0.91	-0.66	.51
Helping Relationships	3.80	0.89	3.93	0.95	-1.41	.52
Reinforcement Management	3.95	0.75	4.03	0.78	-1.04	.30
Self-Liberation	3.86	0.74	3.95	0.77	-1.25	.21
Stimulus Control	3.10	0.97	3.23	1.00	-1.38	.17

Table 4 shows the independent sample *t*-test of decisional balance scale, self-efficacy scale and processes of change scale based on ethnicity. For decisional balance scale, the results revealed no statistically significant difference between ethnicity for pros, p = .87, and cons, p = .90. For self-efficacy scale, the results revealed no statistically significant difference between ethnicity for internal feelings, p = .48., competing demands, p = .29and situational, p = .83. For Processes of Change Scale, the results revealed no statistically significant difference between ethnicity for

consciousness raising, $p = .15$. , dramatic relief , $p = .37$. environmental reevaluation, $p = .87$, self-reevaluation, $p = 69$, social liberation, $p = .63$, counterconditioning, $p = .51$, helping relationships, $p = .16$, reinforcement management, $p = .30$, self-liberation, $p = .21$, and stimulus control, $p = .17$.

Discussion

The study extended further review on the TTM among Malaysian undergraduate trainee teachers. The results revealed a significant gender difference in self-efficacy, indicating that males were more confident in their ability to engage in physical activity than females as they were more likely to be encouraged to engage in masculine activities. With such a high level of self-assurance, men are more likely to engage in and undertake more demanding and intense forms of public service. Males had higher positive perceived benefits of exercise and lower perceived costs than females, indicating that due to gender stereotypes, males have a substantial advantage in engaging in physical activity and performing physical tasks better than females. On the other hand, the non-significant difference between the age groups indicated that the trainee teachers had nearly equivalent self-efficacy for PA, revealing that they were able to schedule their time for PA. In terms of ethnicity and self-efficacy, both Malay and non-Malay participants perceived that engaging in PA could improve their health and prevent and manage non-communicable diseases. In addition, they were aware that PA facilitates socialisation and reduced stress and anxiety associated with their academic workloads and schedules as they progressed through the programme.

For decisional balance, the age groups, Malay and Non-Malay had similar positive perceptions of PA in that they deemed regular PA as a beneficial health measure that can positively contribute to a healthy lifestyle and meet the daily demands. From the process of change among gender, the male used more cognitive and behavioural processes of change than the female. Regarding age groups, there was no significant difference in decisional balance and self-efficacy, but there was a significant difference in consciousness raising, self-re-evaluation, self-liberation, and reinforcement management processes of change, with the older age group employing more cognitive and behavioural processes than the two younger age groups.

As schools are the main setting to nurture positive behaviours in the health and well-being of the students, the future trainee teachers need to lead as societal leaders in PA through lessons, intramural sports and sports programs that can cater for the interests and needs of all students (Kee et al., 2010). In order to be exemplars of a healthy lifestyle, the trainee teachers would need to be responsible and take charge of their own habitual PA and health to guide the school children to practice lifelong engagement in PA.

Conflicts of interest

The authors declare that the study was conducted in the absence of any commercial or financial relationships that could be constructed as a potential conflict of interest.

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The Role of Recreation in the System of Physical Education of Young People with a Sedentary Lifestyle

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Abstract

One of the important elements of the system of recreational activities aimed at maintaining people's health is the optimization of their physical activity. Myofascial massage is an important component of the complex of measures to stimulate the motor activity of people. This is a specific massage technique used by qualified specialists, and is aimed mainly at the fascial structures that form the connective tissue membranes of individual muscles and muscle groups in order to optimize their tone. A decrease in the level of physical activity of people against the background of the Coronavirus pandemic contributes to the development of adverse changes in the state of the fascial sheaths of their muscles. This study was conducted to determine the effect of recreational techniques with elements of myofascial massage on the well-being and functional state of the muscular apparatus of young people. The study involved 136 people (58 men and 78 women) aged 20 to 35 with a low level of physical activity. The study period lasted from September 2020 to November 2021. The study participants were divided into the main and control groups according to the principle of similarity of the main parameters (age, gender, anthropometric indicators). We took the results of carpal dynamometry as an indicator of the state of the respondent's muscular system. During the entire period of observation, the participants of the main group used complexes of recreational activities using the techniques of myofascial massage, and the participants in the control group did not use such complexes. At the end of the observation period, the dynamometry was repeated and compared with the original data. The results showed that the use of myofascial massage techniques turned out to be an effective means of optimizing the condition of people with a low level of physical activity.

Key words: Motor activity level, Myofascial massage, Health programs, Carpal dynamometry method

Introduction

Over the past decades, in many countries of the world there has been a trend towards an increase in the number of people leading a sedentary lifestyle. A sedentary lifestyle, or physical inactivity, is an insufficient amount of moderate and/or vigorous physical activity relative to the recommended level (13). One of the reasons for this trend is a high level of computerization of life processes, as well as a change in the style of people's daily activities due to a change in the nature of professional activity (2, 11). Finally, the third most important cause of this phenomenon can be considered the restrictions on motor activity associated with the Covid-19 pandemic.

Thus, a huge number of people, especially those of the first mature age, are influenced by these factors. As a result of prolonged exposure to this state, most people experience adverse changes in physical and mental health (6). Can these people be helped to avoid the adverse effects of this condition? This question is a serious scientific problem, the search for a solution of which requires the concentration of efforts of many scientists. An analysis of the scientific literature indicates that many scientists are working productively on the problem of studying the adaptive reserves of a person with a sedentary lifestyle (7). Of great interest are those scientific works that are devoted to studying the effect of cardiorespiratory load on the condition of young people (1, 8).

Valuable results have been obtained in the study of the impact on the physical and mental health of young people leading a sedentary lifestyle, activities such as aerobics and meditation (10). Particular attention should be paid to studies devoted to the problems of optimizing the use of the resources of the human body in the process of its adaptation to the use of special motor programs and technologies (5). Also important are the results of studying the role of inclusive education in the prevention of a sedentary lifestyle for different categories of the population, in particular students of higher educational institutions (4).

An important aspect of scientific research in this direction can rightfully be considered the study of the influence of socio-economic factors and the level of sensory abilities of an individual on the nature of motor activity in the process of daily activities (9). Of course, the results of research by scientists who have devoted their efforts to studying the historical aspect in search of ways to solve this problem deserve special attention (14). One of the important areas of scientific activity was the study of changes in mental health indicators of persons with a reduced level of motor activity (2).

In addition, the results of studies aimed at studying the features of recreational and social rehabilitation of people leading a sedentary lifestyle deserve special attention (12). However, despite significant progress in the study of these problems, the issue of the relevance of the use of recreational programs based on myofascial massage to restore the physical and mental health of people leading a sedentary lifestyle remains insufficiently studied in our time. The research work carried out by our team was devoted to the study of this important issue.

In the course of fulfilling the objectives of this study, we also studied the condition of persons whose movement restriction was associated exclusively with the Covid-19 pandemic.

Methods

In the course of this study, the following scientific methods were applied. The method of studying medical records was used to form equivalent groups of respondents in terms of age, gender and anthropometric data.

To obtain reliable information about the characteristic complaints of respondents during the study period, the methods of questioning, interviews and pedagogical observation were used. At the final stage of the study, modern methods of statistical processing of the results obtained were used. The age range of participants was 20 - 35 years old, they were residents of the city of Kyiv and its environs. All of them gave written consent to participate in the study. Of the total number of participants, two equivalent groups were formed (main and control). At the same time, during the entire period of observation, the indicators of well-being and the results of carpal dynamometry were monitored for all participants in the study.

The results of carpal dynamometry were regarded as an indicator of the tone of the muscular system as a whole. For all participants in the main group, special health programs were used, which were based on sessions of myofascial massage. For the participants of the control group, such programs were not used, so they were engaged in physical culture on their own.

To control the indicators of the respondents' well-being, self-observation logs were kept, in which the respondents noted typical complaints of deterioration in well-being, as well as the degree of their severity. To generalize the results of the study and determine the level of their reliability, statistical methods used in the field of biomedical research were used.

Results

In recent years, in many countries of the world there has been a trend towards an increase in the number of people leading a sedentary lifestyle. This is due to the Covid-19 pandemic and the introduction of restrictions on the movement of citizens, their contacts and certain activities.

One of the important tasks of scientists working in the field of healthcare, physical culture and sports was to find a way convenient for the general population to minimize the negative consequences of forced physical inactivity in order to preserve the physical and mental health of people. In the course of our study, the condition of people with a sedentary lifestyle living in Kyiv and its environs was studied. Of the 136 selected respondents, two groups were formed (main and control) according to the principle of matching age, gender and anthropometric indicators. Each of these groups included 68 people.

To assess the level of physical health of each of the respondents, we chose the index of hand dynamometry as the most accessible and convenient in terms of dynamic control. For the respondents of the first (main) group, throughout the entire observation period, special training programs were used using myofascial massage.

For respondents of the second (control) group, such programs were not used. They were engaged in physical training on their own at home. In the course of the study, we adopted the classical method of carpal dynamometry using hand dynamometers certified in our country.

Dynamometry is a technique for measuring the strength of an individual muscle or group of muscles using special instruments - dynamometers. Carpal dynamometry is a measurement of the strength of the flexor muscles of the fingers. This procedure looks like a one-time maximum impact on the device of the muscles of the hand. With the forearm extended, the subject squeezes the carpal dynamometer with one hand. The study is carried out for both limbs, after which the data obtained are compared.

After measuring the strength of the muscles of the right and left hands of each subject, we calculated the average value of these data and entered it into the study protocol. The results that we obtained during this study are presented in the following table.

Table1 Carpal dynamometry parameters in persons with a sedentary lifestyle (kg)

Research phase	**Main group**		**Control group**	
	Male persons	**Female persons**	**Male persons**	**Female persons**
Start of study	46,8 ± 3,1	32,4 ± 2,6	46,7 ± 3,1	32,4 ± 2,6
End of study	50,6 ± 3,8	35,5 ± 2,9	48,3 ± 3,3	32,6 ± 2,7

From this table, we see that the indicators of carpal dynamometry at the beginning of the study were almost the same in both the representatives of the main group and the participants in the control group. However, in the male representatives of the main group, the indicators of carpal dynamometry during the study period increased from 46.8±3.1 kg to 50.6±3.8 kg, while in the female representatives of the main group they increased to a lesser extent (from 32, 4 ± 2.6 kg to 35.5 ± 2.9 kg).

At the same time, in the participants of the control group (both men and women), the indicators of carpal dynamometry at the beginning of the study and at the end of it remained almost the

same (their changes were within the permissible measurement error). To assess the mental health of the respondents, we assessed the indicators of their well-being.

For this we have developed a special control system. We suggested that each of the study participants keep a personal diary of self-observation and assessment of their well-being. In the process of keeping such a diary, the respondents daily noted the state of their health and recorded complaints about its deterioration.

At the same time, they evaluated each case of deterioration in well-being in points, depending on the extent to which this deterioration affected their ability to perform daily activities. If the deterioration in well-being practically did not affect the performance of daily functions, 1 point was put in the diary of self-observation. If the impact of a case associated with a deterioration in well-being had a slight negative impact on the process of performing vital functions, such a condition was assessed as 2 points. A score of 3 points was given in the case when the deterioration in well-being skill fully limited the ability to perform the usual life functions. 4 points were given in cases where, as a result of a violation of self-esteem, the limitation of the ability to perform vital functions was significant. Finally, 5 points were awarded when the deterioration of the respondent's health was so severe that he was practically unable to perform daily life functions.

We summed up the points scored by the respondents during the observation period, and on the basis of this we judged the state of health characteristic of each participant. The most frequent complaints were increased irritability, the presence of pain syndrome of various localization and sleep disturbance in the form of insomnia. The remaining types of complaints were not numerous, so we grouped them into the category of other signs.

The analysis of the obtained data made it possible to determine the trends in the change in the indicators of the well-being of the respondents, depending on whether special health programs were applied to them. Information on the assessment of the well-being of the respondents of both groups is presented in Table. 2.

As can be seen from the data presented in Table. 2, the number of points received by the respondents of the main group at the beginning and at the end of the study remained practically unchanged. At the same time, the respondents of the control group showed a significant increase in the frequency of complaints of deterioration in well-being during the second year of observation compared with the first year. At the same time, this pattern was observed in relation to all types of complaints, regardless of their nature.

Taking into account the fact that special health programs based on the use of myofascial massage were used for the participants of the main group during the entire observation period, it can be concluded that this was the condition for maintaining the physical and mental health of the study participants at a stable level.

Table2. Indicators of well-being among the people with a sedentary lifestyle (in points)

Sequence number	The nature of the disorder	Symptoms frequency			
		Main group		Control group	
		2020	2021	2020	2021
1	**Nervous excitement**	66,4 ± 4,2	67,1 ± 4,3	66,3 ± 4,2	71,2 ± 4,5
2	**Pain syndrome**	83,5 ± 5,9	84,3 ± 6,0	82,7 ± 5,9	87,1 ± 6,5
3	**Insomnia**	42,5 ± 2,9	42,6 ± 3,0	42,4 ± 2,9	46,4 ± 3,2
4	**Other signs**	75,4 ± 3,1	76,2 ± 3,2	75,3 ± 3,1	79,4 ± 3,5

Discussion

There is no doubt that in our time for many people living in different countries of the world, the so-called sedentary lifestyle is typical. And that, unfortunately, the number of people suffering from this syndrome continues to gradually increase. The reason for such an adverse impact is the combined impact of a number of circumstances that characterize the life of a modern person. This is a high level of computerization of many life processes, and the widespread use of modern technical means that replace the physical actions of a person when performing many types of work in production and at home.

And, of course, those quarantine restrictions that many people are forced to comply with in order to protect their health and the health of others, in connection with the Covid-19 pandemic. But does the restriction of physical activity of people contain a potential danger in relation to their state of health? The opinion of many reputable scientists studying this problem agrees that, of course, an insufficient level of physical activity of a person in most cases leads to a violation of both his physical and mental health. Stagnation resulting from prolonged physical inactivity leads to disruption of the normal functioning of many organs of the human body.

But how can you help those people who, for various reasons, are forced to lead a so-called sedentary lifestyle for a long time? This important question worried many scientists and a large number of studies have been carried out on this topic.

This work was devoted to evaluating the effectiveness of one of these methods, with the help of which the effect of improving the well-being of people and supporting their physical and mental health is achieved. One of the main features of this study was that the contingent of respondents included precisely those young people who, in accordance with the international age classification, belong to the first period of adulthood, since they are the main productive force in any state and are the force that determines the development strategy of society.

With regard to the gender approach, the trends identified in our study were characteristic of both men and women, although the degree of their manifestation was not the same in all cases. Summarizing the above, we can conclude that the use of special recreational programs using the techniques of myofascial massage can help maintain both the physical and mental health of people who lead a sedentary lifestyle. It would be logical to assume that one of the important directions for further scientific research on this problem could be the development of methods for improving the physical and mental health of people with a sedentary lifestyle belonging to other age categories.

The search for ways to solve this problem is an extremely complex process and requires the combined efforts of the best specialists working in the field of health, physical culture and sports.

Conclusion

Based on the analysis of the results of this study, the following conclusions can be drawn:

1. Due to the presence of total movement restrictions associated with the quarantine measures of the Covid-19 pandemic, many categories of people, especially in the first period of adulthood, have a significant decrease in the level of motor activity, which can be called a sedentary lifestyle. As a result, indicators of their physical and mental health deteriorate.
2. One of the effective means, the use of which leads to an increase in the physical health of people who lead a sedentary lifestyle, is the systematic use of special health programs based on the principle of using myofascial massage. This, first of all, has a positive effect on muscle tone and strength indicators of the main muscle groups of a person, especially the muscles of his upper limbs, which is extremely important for human production activities.
3. Special health programs with the use of myofascial massage also contribute to the improvement of the mental health of the respondents, as evidenced by the decrease in the frequency of various types of disturbances in their well-being. Thus, the use of health programs with myofascial massage is advisable for people leading a sedentary lifestyle.

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Effects of Peer Motivation on Sport Participation among College Students

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Abstract

This study examined the effects of peer motivation on sport participation of college students. A sample of 278 team sport co-curriculum programme participants (19.7±1.5 years) from six team sports were surveyed using a purposive sampling method. Participants completed a 21-item Peer Motivational Climate in Youth Sport Questionnaire (PeerMCYSQ; Ntoumanis & Vazou, 2005). The items of the inventory were weighted on a 7-point Likert-scale from strongly disagree (1) to strongly agree (7). Descriptive and inferential statistics were used to analyse the data collected. Inferential statistics such as t-test and one-way ANOVA were used to determine whether differences existed in peer motivation mean scores according to gender, and age category. All data analysis was carried out using SPSS (IBM, ver.23). All tests of significance were at the 0.05 level. For the one-way ANOVA, where F-tests were significant, a Tukey-HSD post-hoc test was employed. Descriptive statistics showed that the whole sample had favourable peer motivation climate mean scores for all the five subscales. In addition, female participants were found to favour all the five subscales more than male participants. Independent sample t-test according to gender revealed a significant result only on 'intra-team conflict' sub-scale ($t(276) = -2.879$, $p=.004$) with female participants scored significantly higher than male participants, showing that they have less conflicts with teammates as compared to the male participants. Similarly, significant results were also obtained in the intra-team conflict according to age ($p=0.006$), with younger students (18-19 years old) scoring significantly higher than the older student group (20-21 years old). For future research, it is recommended that the examination of peer motivation should also include individual sport and mixed sport participants.

Key words: Physical activity, Peer motivation, Task-orientation, Ego-orientation, Intramural sport programme

Introduction

In the college sport context, participation in sport has provided numerous positive benefits; college students learned to balance between sports participation and academic pursuit. And this has helped them to develop good time management skills and also helped them reduce stress. Numerous researchers (Eime et al., 2015; Khan et al., 2012) have reported that the opportunity to take part in physical activity has led to a healthy lifestyle among individuals. In addition, sport participation has helped individuals develop and improve physically, mentally, and socially (Eime et al., 2013; Janssen & LeBlanc, 2010). Similarly, organised sport programmes that offer participation opportunities for college students, are contexts in which young people can acquire not only important skills and competencies but also enhance psychological well-being. These can contribute to positive youth development. In addition, organised sport such as team sport helps participants reduce social anxiety, promote social acceptance, and promote health over time in youth as compared to those who participate in an individual sport programme (Eime et al., 2013).

Previous studies on sport participation motivation have reported that peers are important contributors in creating a motivational climate in sport settings (Cervello et al., 2007; Ntoumanis & Vazou, 2005; Ullrich-French & Smith, 2006; Vazou, Ntoumanis, & Duda, 2006). Motivational climate in which the peers were supportive and emphasized personal improvement, cooperation, and effort could influence positive affective responses to sport among participants (Murcia et al., 2008). This could be mediated through variables such as the satisfaction of individual needs for autonomy, competence, and relatedness, as well as self-determined motivation. However, Murcia et al. (2008) could not confirm how autonomy, competence, and relatedness mediate the relationships between peer motivational climate and athletes' motivation and persistence behaviour in sport.

The effects of social support from peers on sport participation were inconclusive. For example, Shafer (2012) reported that there were no significant correlations between physical activity and self-efficacy, motivation and social support from friends among male college students. However, Wee et al. (2012) revealed that the majority of the college students preferred friends as their partner when doing physical activity. And female students had higher social support than male students. Even though peers are important to adult motivational climate towards sports (Joesaar, Hein, & Hagger, 2011; Ntoumanis, Taylor, & Thøgersen-Ntoumani, 2012; Ullrich-French & Smith, 2009), peers also act as source of stress and anxiety by creating conflict and negative evaluation (Fraser-Thomas & Cote, 2009).

Peers play an influential role in various levels of competitive or recreational sport and physical activity participation. Peers could lead individuals to a higher level of enjoyment in exercise even in exercise groups (Murcia, 2008). In fact, peer motivation has a greater influence on enjoyment in sport compared to coach created motivation climate (Vazou et al., 2006). Peers could create a more mastery climate which have positive impact on other athletes which are similar to that created by coaches (Keegan et al., 2014; Ntoumanis et al., 2007; Vazou et al., 2006). According to Ntoumanis et al. (2007), a mastery climate created by peers correlates with the feeling of self-esteem,

enjoyment, greater chance of sport participation in the future and lower anxiety of competitive traits. In addition, Keegan et al. (2014) found that peers promote the feeling of belonging in a group.

Even though much research has been conducted to examine peer motivation, and goal orientation, apparently there is no study examining the peer motivation among students in the compulsory co-curriculum sport programme. In light of this, the aim of this research is to investigate the effects of peer motivation on sport participation of college students.

Methods

Participants

The sample consisted of 278 students who have enrolled in a compulsory college co-curriculum programme. The participants were selected based on six team sports which were made available to students by the College Student Affairs Department. The sample consisted of 60.8% (n = 169) male and 39.2% (n = 109) female. In terms of age, 41.4% of the respondents were under 20 years old, 48.2% was in the 20-21 years old category and the 10.4% was in the 22 and above years old category. As for the sport involvement, 19.1% of the participants were involved each in basketball, and volleyball, while 18.7% of them were involved each in futsal, and netball. Almost 15% of the participants were in the softball team while about 10% in the soccer team.

Instrumentation

Peer motivation on sport participation was measured using the "Peer Motivational Climate in Youth Sport Questionnaire" (PeerMCYSQ) (Ntoumanis & Vazou, 2005). The 21-item PeerMCYSQ inventory comprised of 5 subscales which are improvement (4 items, α = .88), relatedness support (3 items, α = .52), effort (5 items, α = .92), intra-team competition and ability (5 items, α = .54) and intra-team conflict (4 items, α =.87). Participants were asked to respond to what extent they agreed or disagreed to the items using a 7-point Likert Scale anchored on 1 (strongly disagree) to 7 (strongly agree). The reliability for the 'intra-team competition and ability' (α =. 54), and 'relatedness support (α = .52), were less than satisfactory and any data related to these factors would be treated with caution as suggested by Joesaar, Hein, and Hagger (2011). These two scales were excluded in the inferential statistical analyses. However, overall reliability was 0.84 which is considered adequate for it to be used.

PeerMCYSQ was developed by Ntoumanis and Vazou (2005). The '*improvement*' dimension is defined as "encouraging and providing feedback to help teammates progress and develop". *'Effort'* dimension refers to "the degree to which peers emphasize to their teammates that they should perform to their best ability" while *'relatedness support'* is defined as "fostering a strong sense of belonging and created a friendly team atmosphere". Intra-team Competition is "the promotion of competition within peer group members". Lastly, Intra-team Conflict means "negative and unsupportive behaviours toward other team members".

Procedure

This survey was available only to the undergraduates who enrolled in the compulsory team sport co-curriculum programme. All the team sport co-curriculum programme registered participants were invited to participate in this study through their programme instructors. Data was collected once at each co-curriculum programme, thus the participants had only one opportunity to complete the inventory. All participants gave informed consent before completing their survey. Research ethics clearance was granted by the Research Ethics Committee of the institution where this study was conducted.

Data Collection and Analysis

The raw scores from the above-mentioned questionnaire were used for analysis. For PeerMCYSQ, items were weighed on a priori weight method from Strongly Agree (7) to Strongly Disagree (1). The 'intra-team conflict' subscale was reversed scored to demonstrate non-existence of conflict among team members. The data collected was analysed using the Statistical Package for the Social Sciences (SPSS) for Windows ver.23. Two types of statistical techniques were used to analyse the data, namely, descriptive and inferential statistics. Descriptive statistics such as means, standard deviations, unweighted mean, and rank were used to report the demographic data and data from PeerMCYSQ inventory.

In the descriptive statistics, the unweighted means was used because PeerMCYSQ sub-scales contain a different number of items. The unweighted means were calculated by dividing the means by the number of items in the sub-scales. A mean of 3.50 is considered neutral; a mean above 3.50 is considered a favourable peer motivation climate and a mean below 3.50 is considered as having unfavourable peer motivation climate.

Inferential statistics such as independent sample t-test was used to compare differences in PeerMCYSQ according to gender. One-way analysis of variance (ANOVA) was used to compare differences in PeerMCYSQ according to age category, and years of study. All tests of significance were set at the 0.05 level. For the one-way ANOVA, where F-tests were significant, a post-hoc test using the Tukey-HSD test was employed.

Results

Descriptive statistics

In order to examine the peer motivation climate, the scores of the items were compounded as a single mean score according to five PeerMCYSQ sub-scales as shown in the table below. Overall, there was a favourable peer motivation climate as indicated by *Peer Motivation* score. The unweighted mean showed that the *'intra-team conflict'* was ranked first indicating that there was no conflict among team members. The *'effort'* sub-scale was ranked second showing that teammates encourage each other to perform well in their sport activity while *'relatedness support'* was ranked third which demonstrated that students enjoyed their strong sense of belonging and the friendly team atmosphere.

Table 1 Descriptive statistics of PeerMCYSQ sub-scales

PeerMCYSQ sub-scales	Mean	Standard Deviation	Number of items	Unweighted means	Rank
Improvement	20.57	3.85	4	5.14	4
Relatedness Support	15.87	2.84	3	5.29	3
Effort	26.48	5.11	5	5.30	2
Intra-team Competition and ability	24.06	4.39	5	4.81	5
Intra-team Conflict	21.86	5.15	4	5.47	1
Peer Motivation	108.83	16.07	21	5.18	

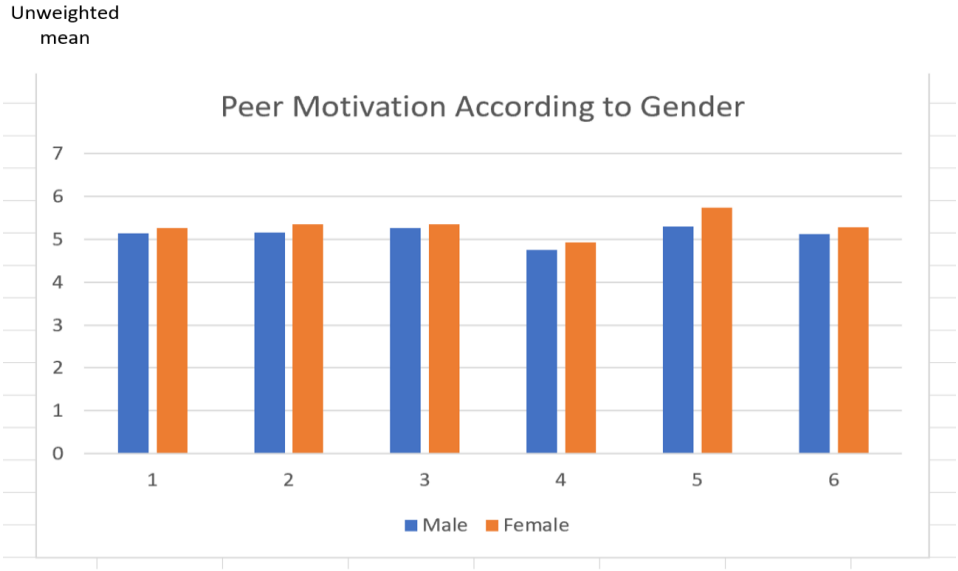

Figure 1 Peer Motivation Climate according to gender

Figure 1 showed that both male and female participants ranked *'intra-team conflict'* first. Male participants ranked *'effort'*, and *'relatedness/ability'* as second and third. While female participants ranked *'effort'*, and *'relatedness/ability'* as second. Female scored higher than the male participants. Overall, females demonstrated higher scores in all the five subscales of peer motivation.

Gender and age group difference analyses

Independent sample t-test with gender as the independent variable and PeerMCYSQ sub-scales serving as dependent variables yielded a significant result only on 'intra-team conflict' sub-scale ($t(276) = -2.879$, $p=.004$). Female participants (mean = 22.92) score significantly higher than male participants (mean = 21.17) 'intra-team conflict' variable, showing that they have no conflicts with teammates.

Follow-up ANOVA reveals that there was a significant effect of age group on PeerMCYSQ sub-scales at the p<.05 level for the 'intra-team conflict' sub-scale [F(2, 275) = 5.23, p = .006]. The result showed the 18-19 years old group (mean = 22.97) participants scored significantly higher than the 20-21 years old group (mean = 20.88) on the 'intra-team conflict' peer climate variable. Similarly, there was a significant effect of years of study on PeerMCYSQ sub-scales at the p<.05 level for the 'intra-team conflict' sub-scale [F(2, 275) = 3.585, p = .029]. The result revealed the year one group (mean = 22.43) participants scored significantly higher than the year three group (mean = 19.27) on the 'intra-team conflict' peer climate variable. There were no conflicts among co-curriculum participants in younger participants as indicated by the analyses of age group and years of study.

Discussion

Descriptive statistics in Table 1 revealed that all the unweighted mean scores exceeded 3.50 which is considered favourable peer motivation climate in all the five subscales. The subscales were discussed according to task-involving motivation climate *('improvement', 'effort', and 'relatedness support'*), and ego-involving motivation climate *('intra-team competition and ability', 'intra-team conflict'*). In both orientations, female participants scored higher than males in peer motivation.

Lawler, Heary, Shorter & Nixon (2021) in a study of the influence of peer and parental processes on physical activity participation among adolescents reported that friend support helped girls to participate in organised sport and unorganized physical activity. On the contrary, males who engaged in team sport or mixed PA patterns experienced higher levels of peer acceptance. This suggests that team sport participation might be more important in gaining social status among males but not females. Similarly, Lawler et al. (2021) also reported low scores in ego orientation and high scores in task orientation which is contrary to the findings of this research. Our research findings also on the contrary to other research; Ruiz-Juan, Gómez, Pappous, Alacid and Allende (2010) with young elite paddlers and Abraldes, Granero-Gallegos, Baena-Extremera, Gómez-López, and Rodríguez-Suárez (2016) with swimmers.

Gut, Schmid, and Conzelmann (2020) revealed that peers influence adolescent participation in organised sports, and the participation level is higher than that of other types of sport especially for females. In addition, Gut et al. (2020) reported that friend support was associated with team sport rather than leisure active individual sport. The findings indicated that friend support is positively related to physical activity of adolescents demonstrating differences according to gender; friends support playing a more important role in females rather than males.

Our research revealed that male and female participants ranked '*intra-team conflict'*(ego-involving) first, and *'effort'* (task-involving) second. These results are contrary to that of Duda (1989) which examined gender difference in goal perspectives between male and female high school athletes and found that females were significantly higher in task orientation than males, and males were significantly higher in ego orientation than females. Similarly, our findings are contrary to

Chowdhury's (2012) which found similar differences in motive for male and female. Males have indicated higher motivation for affiliation and challenge than females.

Peer support in physical activity comprises of instrumental support (e.g., sharing resources, participation in physical activity together as a group), and emotional and motivational support (e.g., providing encouragement or praise) (Fitzgerald et al., 2012; Lawler et al., 2021; Martins et al., 2020; Mendonça et al., 2014). In addition, other previous research has emphasized that peers play important role in physical activity participation in females (Weiss et al., 2013; Zook et al., 2014). However, other research (Garn, 2016; Ullrich-French & Smith, 2009) reported higher perceptions of peer acceptance are associated with team sport participation for both adolescent males and females (Garn, 2016; Ullrich-French & Smith, 2009).

Inferential statistical analyses showed significant results for 'intra-team conflict' (ego orientation) according to gender and age groups, and insignificant results for the 'improvement', and 'effort' sub-scales (task orientation) for both the above-mentioned independent variables. In addition, for the 'intra-team conflict' variable, female participants scored significantly higher than male participants, and younger students (18-19 years old) scored significantly higher than the older student group (20-21 years old).

The findings of this research are supported by Ntoumanis, Vazou, and Duda (2007) where they found females exhibited perceptions of a more ego-involving peer climate.

On the contrary to the findings of this research, in a study examining conflict in sport focused on female intercollegiate athletes' perceptions of the sources of teammate conflicts, Holt, Knight and Zukiwski (2012) through a semi-structured interviews reported the presence of conflict relating to performance (i.e. task) and relationships (i.e. social). Similarly, the above-mentioned research results on gender differences (intra-team conflict - ego involving) differed from that of Vazou et al. (2006). Vazou et al. (2006) found males scoring higher on perceptions of an ego-involving peer climate which might be due to males being exposed to more ego-involving motivational practices (Lewko & Greendorfer, 1988). The insignificant task-involving motivation climate ('improvement' and 'effort') also differed from findings by Vazou et al. (2006). However, Belli (2015) compared goal orientation between males and females and found significant differences were observed in favour of females in the sub-dimension of ego orientation. Other researchers (Zarauz-Sancho, & Ruiz-Juan, 2016; Zarauz-Sancho, Ruiz-Juan, Flores-Allende, & García-Montes, 2017) investigated gender and goal orientation but have not found significant differences according to gender.

Our research findings found younger students (18-19 years old) scored significantly higher than the older student group (20-21 years old) in the *intra-team conflict* (ego-involving). Our findings were supported by some previous research (Ogles, & Masters, 2000; Steinberg & Grieve, 2011; Zarauz-Sancho, & Ruiz-Juan, 2011) which examined the relationship between goal orientation and age; the results revealed that the older the participant, the greater his or her task goal orientation, and the younger the participant, the greater his or her ego orientation.

However, Ntoumanis, Vazou, and Duda (2007) revealed that athletes in the younger age group, both males and females, reported similar levels of ego-involving peer climate. In examining the link between goal orientation and the sources of enjoyment in Korean youth sport, Yoo and Kim (2002) reported that athletes high on ego orientation more frequently identified social recognition and rewards as their enjoyment sources. Thus, this might explain why there is less conflict for athletes high on ego orientation.

Our research findings which indicated higher peer motivation scores in *intra-team conflict* (less conflict) in younger participants is supported by the previous research (Vazou et al., 2006). Vazou et al. (2006) found older athletes perceived more intra-team conflict than younger athletes. Younger athletes perceived their peers to be more supportive, and perceived them to use more normative referenced criteria for competence evaluation and to encourage intra-team competition. In a study of junior tennis players, Weiss and Smith (2002) who had similar beliefs and interests, companionship/pleasant play and conflict resolution with their best tennis friends found their experiences more fun and pleasurable, thus less conflict among them. Similarly, our research findings also concur with the findings of Belli (2015) where it was reported that younger age group students had more ego orientation than students aged between 26 and 30 years old. This finding may be due to the fact that the students' with more or longer experience in sport have more individually ego-orientation compared to inexperienced younger students. Further, young individuals who join a new social group are more likely to move with a group (Belli, 2015), thus creating less conflict with their teammates.

Conclusion

The present study extends prior research by demonstrating that peer processes are associated with college students' participation in organized sport. Our results showed a positive peer motivational climate in male and female college students in compulsory team sport participation with female students having higher peer motivation scores. Female students demonstrated higher mean peer motivational climate scores as compared to male students in all the five PeerMCYSQ sub-scales. In addition, younger college students are different as compared to older students in the 'intra-team conflict'. However, this research has its limitations as we did not examine peer motivation climate among students who participated in individual sport, mixed sport and unstructured sport and physical activity.

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Functional Disorders of the Musculoskeletal System in Younger School-age Pupils

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Abstract

Body posture is a movement habit that is formed and changed throughout the lifespan of a person and carries all the characteristics of the movement activity and mental state of the individual. Posture is a basic prerequisite for good health, normal growth, and development of humans, which is why it is very important that care for proper posture begins in preschools and continuing at school. The aim of the research was to expand the knowledge, to find out and point out the level of the musculoskeletal system with an emphasis on selected functions of the muscular system and body posture in younger school-age pupils. The group consisted of **Σ** 288 younger school-age pupils in the number of n = 150 girls (body height (x) 136.21 ± 4.8 cm, body weight (x) 34.5 ± 8.6 kg and n = 138 boys (body height (x) 137.65 ± 5.1 cm, body weight (x) 35.12 ± 8.1 kg from the Central Slovakian region. In terms of data acquisition methods, we used standardized methods for evaluating the functional state of the locomotor system for physical education practice. The results significantly demonstrated the fact that in the period of younger school age, the kyphotic posture predominates in pupils to the detriment of girls ($\chi^2 p < 0.01$), accompanied already in this developmental period by upper and lower cross syndrome. We also found significant differences ($\chi^2 p < 0.05$) in the overall posture, where the III. quality level dominated, to the detriment of the girls. From the areas of individual posture segments, the forward head posture and the prominent abdominal area had the highest proportion. The above partial findings show the need to increase the attention of primary prevention by physical activity in the school and out of school environment. The listed study is the part of research project VEGA "1/0427/22 Prevention of pupils' postural health by physical activity".

Key words: Body posture, Functional disorders, Health, Locomotor system, Younger school-age

Introduction

The issues of health, healthy and harmonious development of children and youth are currently the focus of our entire society. In Slovakia, there has been an upward trend in diseases of civilization and health disorders in the school population, in the last two decades (Bendíková, 2017; Olekšák & Nemček, 2021).

One of the areas of health is also postural health, which is linked to the musculoskeletal system, where posture has become a negative syndrome, or a disease of civilization today. Posture disorders in children and adolescents are one of the most serious but underestimated health problems. Decreased cardiorespiratory activity, decreased vital capacity of the lungs, pain in the musculoskeletal system, as well as displacement of internal organs are just some of the consequences of untreated body posture (Yu et al., 2002).

Posture defects may include incorrect posture of the head, shoulders, shoulder blades, pelvis, spine, chest, or upper and lower limbs. Disorders in the position of specific parts of the body cause instability and imbalance (Claus et al., 2007). All negative changes in body posture intensify during periods defined as critical during the posturogenesis process. It is the beginning of younger school age and the first phase of puberty (Lafond et al., 2007). The younger school age is the most vulnerable to changes in body posture. No large or sudden weight gain or height is observed until the age of 5 years. The pace of developmental phenomena is declining at that time compared to childhood.

An upright body posture is the result of an individual postural function that ensures body posture with respect to external conditions. Proper body posture is one of the basic prerequisites for optimal involvement of individual muscle groups (Vařeka, 2002).

The functional musculoskeletal disorders are about the muscular coordination disorders due to central control disorders. However, the question of the boundary of the norm is problematic because movement stereotypes are to some extent individual and characteristic of each individual. Ideally, movement stereotypes should allow the most economical movement as possible, which would require a minimum of energy at a certain power (Lewit, 1996).

The movement stereotype is characterized as a complex human movement manifestation, which is formed by a system of conditioned and unconditional reflexes. These reflexes result in a certain movement, and by repeating these reflexes are fixed and changed during life in response to changes in the external and internal environment. From a functional point of view, it is important how the muscle is involved in the locomotor chain.

According to Vařeka (2002), postural stability is related to the issue of ensuring correct upright posture. This means that in the analysis of postural function, Kolář et al. (2009) distinguish between postural stability, postural stabilization, and postural reactibility. Postural stability is the body as a

whole in a static position and does not change its position in space. However, each static position (upright position, seat) contains implicitly dynamic actions. When taking a fixed position, it is not a static state, but rather a certain process or process that faces the natural lability of the locomotor system, which is a prerequisite for movement.

Postural stabilization is the active holding of body segments against the action of external forces, controlled by the central nervous system. It is a muscular activity that strengthens segments of the body against the action of external forces (mainly gravity). Without coordinated muscle activity, our skeleton would collapse.

With every movement that is demanding on the force, a contractile muscle force is always generated, which is needed to overcome the resistance. They call this reaction stabilization function postural reactibility. It follows that the external stimulus stereotype leads to the formation of an internal stereotype of neural actions. Not only targeted movement (phase movement) is automated, but above all its postural securing (movement stabilization). It can be assumed that the movement stereotype (movement and its posture) facilitates the operation of the central system in more complex and more recurring situations. Our normal movements are performed automatically and unconsciously, which very often causes us to use certain muscles insufficiently and to overload others all day long without realizing it (Vařeka & Dvořák 2001; Kolář, 2009).

The unfavourable situation in musculoskeletal system in the school population is pointed out by research by several domestic and foreign authors with an intent on the occurrence of incorrect body posture, muscle imbalance, or disorders in the field of movement stereotypes (Malátová & Matějková, 2011; Lemos et al., 2012).

Hypokinesia, lifestyle change, weight gain, and low muscle fitness are among the primary causes of musculoskeletal disorders today (Gray et al., 2015; Bendíková, 2016; Bendíková et al., 2020; Nemček & Ladecká, 2020). The current lifestyle of the school population in Slovakia has acquired a hypokinetic character over the last two decades (Bendíková, 2018), which was also reflected in the upward trend in chronic diseases of civilization (Booth et al., 2012), which includes disorders of the musculoskeletal system (Acasandrei & Macovei, 2014). Insufficient primary prevention in the musculoskeletal system from childhood leads to the emergence of vertebrogenic diseases in adulthood, the prevalence of which is up to 60-80 %. Vertebrogenic disorders are associated with the occurrence of poor body posture and muscle imbalance.

Postural activity is a complex of factors that lead to optimal posture maintenance during each movement. Postural activity is part of every movement and is controlled by the central nervous system. Postural stability ensures an upright body posture and responds to changes in external and internal forces to prevent an uncontrollable fall (Vařeka, 2002).

The deep stabilizing system is the punctum fixum, a form of support for performing normal movement. This knowledge can be used to improve the implementation of individual movements

in various correct postural patterns. Muscles in the body core called "core - deep stabilizing system" are aimed at improving lumbopelvic stability. The core area consists of the diaphragm at the top, the abdominal and oblique abdominal muscles at the front and the side, the paraspinal and gluteal muscles at the back and the pelvic floor muscles at the bottom. These muscles are needed to ensure the dynamic stability of the spine and other body segments (Vařeka, 2002).

It is important to start and focus on prevention from childhood, even before the onset of the initial symptoms. Within physical and sport education, intervention in the form of postural educational programs with an emphasis on the correct movement habits of everyday life is important (Bendíková, 2020).

The aim of the research was to expand the knowledge, to find out and point out the level of the musculoskeletal system with an emphasis on selected functions of the muscular system and body posture in younger school-age pupils.

Method

Participants

The group consisted of **Σ** 288 younger school-age pupils in the number of (n) 150 girls and (n) 138 boys from the Central Slovakian region. The average body height in girls was (x) = 136.21 ± 4.8 cm and in boys (x) = 137.65 ± 5.1 cm. The average body weight in girls was (x) = 34.5 ± 8.6 kg and in boys (x) = 35.12 ± 8.1 kg. The mentioned pupils attended the second, third and fourth years of the I. grade of primary school. At the same time, they were willing to cooperate in the research with the cooperation of physical education and sport teachers as well as parents and legal guardians. The primary characteristics of the group are presented in Table 1.

Table 1 The primary characteristics of groups (n = 288)

(n = 288)	Girls (n = 150)		Boys (n = 138)	
	Body height / cm	Body weight / kg	Body height / cm	Body weight / kg
Factors	136.21 ± 4.8	34.5 ± 8.6	137.65 ± 5.1	35.12 ± 8.1
Age/ years	8.6 ± 1.4		8.8 ± 1.3	
BMI	24.6 ± 1.5		24.9 ± 1.7	

Legend: BMI - Body mass index

Data collection

The partial aim of the research was pursued in the Covid period from January to March 2022, when measures were relaxed, and students attended the school in person. This pandemic period was challenging in terms of obtaining data, as it was difficult to predict the situation we had to deal with in the project.

In terms of data acquisition methods, we used two standardized methods for physical education practice.

a) Method for evaluating body posture according to Labudová, Thurzová (1992). It is he method of visual evaluation according to Klein and Thomas, modified by Mayer. The evaluation of the individual areas was expressed as the sum of points, each area being evaluated by points 1, 2, 3, 4 according to the current level of body posture. It was followed by classification into the qualitative body posture levels. The evaluation was focused on: I. Head and neck posture, II. Chest (shape), III. Abdomen and pelvic inclination, IV. Spine curvature, V. Frontal body posture (Evaluation of shoulders - Shoulder blades / scapulas).

Evaluation of body postures:

I. Correct body posture .....5 points
II. Good (almost correct) body posture .....6 – 10 points
III. Bad body posture ….....11 – 15 points
IV. Incorrect body posture .....16 – 20 points

b) The method of evaluating the quality of the locomotor system function according to Janíková (1998) with an intention of involving muscle groups in the muscle chains.

In the area of the head and upper trunk, we observed the upper cross syndrome between the following muscle groups:

type A - shortening of the upper part of m. trapezius and weakening of the lower blade fixators,
type B - shortening of mm. pectoralis and weakened interscapular muscles,
type C - imbalance between deep neck flexors and neck extensors.

In the area of the pelvis and lower trunk, we observed the lower cross syndrome, most often represented by muscle imbalance between muscle groups:

type A - weakened mm. gluteus maximus and shortened hip flexors,
type B - weakened m. abdominal and shortened m. erector spinae lumbalis,
type C - weakened gluteus medius and shortened mm. tensor fasciate latae (a m. quadratus lumborum).

Data analysis

In terms of data processing methods, the following were applied: percentage frequency analysis (%), frequency (n), arithmetic mean (x), standard deviation (s), range of variation ($Vr_{max\text{-}min}$) and Chi-square test of goodness (χ^2 $p < 0.01$, $p < 0.05$). We also used methods of logical analysis and synthesis using inductive and deductive methods, comparison, and generalization, compared with

the literature and presented in tables. The data were processed using the statistical program R-Project.

Results and discussion

The presented results must be understood in the overall context as indicative and initial in relation to the postural health of younger school-age pupils, as well as in the creation of the content of physical and sport education. The analysis shows that younger school-age pupils have functional disorders manifested by incorrect movement stereotypes, which also results in an increased degree of functional disorders in body posture.

Among the most common body posture functional disorders in younger school-age pupils **Σ** (n = 288), which is presented in Table 2, we found out the following. In both, boys (n = 54. 39 %) and girls (n = 78. 52 %), the highest percentage is kyphotic posture with a significant difference ($\chi^{2} = {}^{9.890}$, $p < 0.01$) to the detriment of girls. Also, in order for both genders are scoliotic posture (boys n = 37. 27 %, girls n = 38. 25 %), hyperlordotic posture (boys n = 34. 25 %, girls n = 24. 16 %) and finally, hypolordotic posture (boys n = 13. 9 %, girls n = 38. 25 %).

Table 2 Functional body posture disorders in younger school-age pupils (n = 288)

Functional disorders BP /gender	Kyphotic body posture	Hyperlordotic body posture	Hypolordotic body posture	Scoliotic body posture
Boys (n = 138)	n = 54 (39 %)	n = 34 (25 %)	n = 13 (9 %)	n = 37 (27 %)
Girls (n = 150)	n = 78 (52 %)**	n = 24 (16 %)	n = 10 (7 %)	n = 38 (25 %)

Legend: Body posture

The overall evaluation of body posture in boys is presented in Table 3. In the initial evaluation, we found out that from of the whole group of boys **Σ** (n = 138), only 18.84 % (n = 26) had I. level, that means the Correct body posture, where the total point value was equal to 5. II. level, that means the good body posture, for which it was necessary to achieve the sum of points between 6 and 10, reached only 18.11 % (n = 25) boys. Up to 49.29 % (n = 68) of boys (without one pupil almost 50% of the group) had the III. level of body posture (Bad body posture), whose total point was between 10 and 15. Incorrect body posture, represented by the fourth degree (point total was at the level of 16 - 20 points) we noticed in 13.76 % (n = 19) boys. The most common quality level in the monitored group of boys was Bad body posture (level III).

The overall body posture evaluation for girls was similar **Σ** (n = 150) (Table 3). I. level - Correct body posture we noticed in 13 % (n = 20) girls, II. level - Good body posture in 25 % (n = 37), III. level - Bad body posture in 52 % (n = 78) and IV. Level - Incorrect body posture in 10 % (n = 15) girls. The most common quality level in the monitored group of girls was Bad body posture (level III).

In terms of qualitative evaluation of the total body posture between the groups, we noticed significant differences ($\chi^{2 = 6.931}$, $p < 0.05$) in III. quality level to the detriment of the girls. The average point score was at (x) = 11 ± 2.12, with a $V_{Rmax-min}$ of 10.

Table 3 Total body posture of younger school-age pupils (n = 288)

Factors/gender	Correct body posture	Good body posture	Bad body posture	Incorrect body posture
Boys (n = 138)	n = 26 (18.84 %)	n = 25 (18.11 %)	n = 68 (49.29 %)	n = 19 (13.76 %)
Girls (n = 150)	n = 20 (13.00 %)	n = 37 (25.00 %)	n = 78 (52.00 %)*	n = 15 (10.00 %)

In the area of the *I. evaluation – posture of head and neck*, we evaluated 20 % (n = 30) girls and 26 % (n = 36) boys with mark 1, whose eyes were facing forward, the mandible was normal retracted. Direct view, but the axis of the neck was slightly tilted forward about 10 degrees, we noticed in 21 % (n = 32) girls and 20 % (n = 28) boys. We found the highest percentage of both, boys (n = 58. 42 %) and girls (n = 66. 44 %) with a mark of 3. We evaluated 15 % (n = 22) of girls and 12 % (n = 16) boys with mark 4.

In the area of the *II. evaluation – posture of chest*, we noticed a normal chest, that is symmetrical, its axis is vertical, is well arched, the ribs form a 30-degree angle with the spine, they move symmetrically when breathing, thoracic kyphosis is physiological, in 56 % (n = 84) girls and 59 % (n = 81) boys. We found out small deviations from the normal in the axis of the chest, a slope of about 10 degrees in girls in 39 % (n = 59) and in boys in 38 % (n = 53). With a 2% difference to the detriment of the girls and in the stated percentage, we found the same in boys (n = 4.3 %) as well as in girls (n = 7.5 %), which was evaluated with mark 3, which is characterized by a flat chest and the thoracic spine is considerably bent, the plumb line lowered from the nape of the neck bent over the enlarged thoracic kyphosis, the plumb line attached to the apex of the thoracic kyphosis pointed out of the head. A severe deviation of the shape of the chest, which is flat, the thoracic spine is strongly bent in a complete arch has not been detected.

By evaluating the area of *III. - evaluation of the abdomen and pelvic inclination*, we evaluated 21 % (n = 30) girls with mark 1, 29 % (n = 48) with mark 2, and 45 % (n = 65) with mark 3. In Boys, 25 % (n = 35) were evaluated with mark 1, 32 % (n = 44) by mark 2, and 41 % (n = 56) were evaluated by mark 3. We found out the evaluation at level of 4 in 2 % of girls as well as in boys ($n_G = 7$; $n_B = 3$).

In area *IV. - evaluation of the spine curvature*, with a mark1, we evaluated 22 % (n = 33) girls, and 29 % (n = 40) boys. We found out small deviations from the normal in the sense of plus or minus in 38 % (n = 57) of girls and 36 % (n = 50) of boys. We found out the apparently curved but also flat

back in approximately the same way for boys (48 %, n = 35) and girls (40 %, n = 60). We did not find out any severe deviations from the normal in the observed group.

Next evaluated area was *V. - evaluation of frontal body posture*. Complete symmetry, the same height of the shoulders, shoulders relaxed, the shoulder blades do not protrude, their inner axes are parallel, we found out in 26 % (n = 39) girls and in 29 % (n = 40) boys. We also found out a slight deviation in one point in girls (39 %, n = 59) and in boys (40 %, n = 55). We found out one side extension, asymmetry, one shoulder higher in 35 % (n = 52) girls and in 31 % (n = 43) boys. We did not find out any significant protrusion of the shoulder blades, considerable extension of the hips, asymmetry of the thoraco-abdominal triangles in our group.

From the above findings, in body posture, the incorrect posture in the thoracic area of the spine was found, with an intention for forward head posture, which dominated in both genders. Compensation for this was the position in the abdominal posture. The erroneous postural stereotype of forward head posture was found in all pupils, which was in the highest percentage affected by the observed A type, the development of functional disorders of muscle groups m. trapezius pars descendens and m. levator scapule, with the contribution of local imbalance between m. sternocleidomastoid and deep head and neck flexors. Upper cross syndrome, type C, showed a declining percentage-frequency tendency in both genders in relation to age (older age improved quality of deep neck flexors) (Table 4). At the same time, we also found out the upper type of breathing in the monitored group. This means that the probands helped with their shoulders when breathing, thus not using their entire vital lung capacity. This was due to the belly contracting, then the breath was automatically transferred to the higher segments. This way of breathing overloads the muscles of the neck and the abdominal cavity is unable to relax. It also affects the internal organs and, finally, it causes back pain.

The way of breathing and the stabilization of the trunk are very closely related. Disruption of static and dynamic muscle interaction creates tension and imbalance. The pelvis, with its position, most often by moving to the spine, significantly affects the function of the diaphragm.

Table 4 Upper cross syndrome in younger school-age pupils (n = 288)

Upper cross syndrome/gender	Boys (n = 138)	Girls (n = 150)
type A - upper part of m. trapezius and lower blade fixators,	n = 54 (39 %)	n = 63 (42 %)
type B - m. pectoralis and interscapular muscles	n = 44 (32 %)	n = 47 (31 %)
type C - deep neck flexors and neck extensors	n = 40 (29 %)	n = 41 (27 %)

Lower cross syndrome causes shortening the hip flexors, spine straighteners in the area of passing from the lumbar spine to sacrum, and weakening of the sciatic, abdominal muscles. Disturbed movement patterns are abduction and extension of the hip joint or enlarged lumbar lordosis (Table5).

In girls, the situation in area of the lower cross syndrome was as follows. With increasing age, we noticed a higher percentage of type A with a weakening of mm. gluteus maximus and shortening of the hip flexors. The above findings also show the relationship between the state of muscle groups and movement stereotypes in the activation of individual muscles in the extension of the lower limb in the lumbar joint. It turned out that the weakened m. gluteus maximus was substituted by the torso straightener and ischiocrural muscles.

Taner (2009) states that the gluteus maximus, which is associated with the thoracolumbar fascia and the femoral fascia, can affect the position of the knee. Therefore, understanding the relationship between the positioning of individual body segments is crucial for those, who are involved in preventing and correcting body posture.

Table 5 Lower cross syndrome in younger school-age pupils (n = 288)

Lower cross syndrome/gender	Boys (n = 138)	Girls (n = 150)
type A - m. gluteus maximus and hip flexors	n = 53 (39 %)	n = 55 (37%)
type B - m. abdominal and m. erector spinae lumbalis	n = 57 (41 %)	n = 69 (46 %)
type C - m. gluteus medius and mm. tensor fasciae latae	n = 28 (20 %)	n = 26 (17 %)

Quality level of m. rectus abdominis, as well as substitution movement stereotypes in the group of girls aged eight years had a low-quality level of function. With age, we noticed an improvement in the monitored muscle group.

A similar situation was also in the group of younger boys, where we noticed a significant weakening of the above-mentioned muscle group and substitution movement stereotype. In lower age groups, type B of muscle imbalance dominated. While in older age, the lower cross syndrome of type A, had a downward trend compared to girls. The findings show that the functional condition of the tested muscle group improves with age. From the above, we state that these changes correspond to the trend of ontogenetic development of the child.

In addition to these findings, the increased curvature of the cervical and lumbar spine in pupils was not caused by the primary functional state of muscles and muscle groups, but by an incorrect postural stereotype, which is caused by insufficient control of motor functions with low neuromuscular coordination, as well as other external and internal factors, which may include the number of hours spent in one-sided, statically overloaded positions, in the ergonomic layout and equipment of the workplace, as well as movement and postural habits, as we found out.

Hagner, Bak & Hagner-Derengowska (2011), who examined a group of children aged 6 to 10 years, observed a tendency for deteriorating body posture with increasing age. The percentage of good body posture in 10-year-old pupils has almost halved compared to 6-year-olds, from 42 % to 27 %. Significant changes were observed in the inclination of the arms in the sagittal plane, the position

of the scapula, the asymmetry of the back shape in the forward bend.

Systematic monitoring of body posture (established in children) should continue after a period of stabilization of body posture (Dolphens et al., 2012). Factors that affect body posture impairment, especially those that can be modulated, should also be identified. Examples of such factors are overweight and sedentary lifestyles. Their adverse effect on body posture quality has been demonstrated many times (Jung et al., 2016; Maciałczyk-Paprocka et al., 2017). The position of the individual body segments relative to each other is also important.

Body posture according to Khosravi et al. (2016) undergoes significant changes during their lifetime. It is a development during which any mistake can cause a reduction in normal functioning in the future, which is why it is important to monitor body posture, as children, adolescents and adolescents often experience poor body posture. According to Ludwig et al. (2018), Bendíková (2016, 2020), by regular physical activity we can improve the quality of body posture during adolescence, which will have a positive effect on the adult body in the future.

Conclusion

The pilot empirical research in question contributes to the expansion of knowledge about the state of postural health of young school-age pupils in relation to the occurring functional disorders in the field of body posture because of incorrect movement stereotypes realized in the normal movement regime.

The head, shoulders, and abdominal areas, which manifested themselves in the non-physiological curvature of the spine and in the position of the observed body segments, are considered to be the segments with the most frequent deviation from correct body posture in younger school-age pupils. In terms of functional disorders, we found out disorders in body posture area, muscle imbalance as a manifestation of movement stereotypes.

In connection with the issues addressed, the active school and physical and sport education lessons are gaining in importance as a space for primary prevention and early intervention in terms of supporting the postural health of pupils in the school environment (Bendíková, 2018).

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Demographic Factors towards Online Learning Readiness of Physical Education and Sports Science Undergraduate Students during the COVID-19 Pandemic

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Abstract

The unprecedented pandemic has adopted digital technology by shifting traditional teaching pedagogy to online learning which has emerged as the main methodology and continuity of education globally. This study aimed to examine the effect of demographic factors towards online learning readiness among physical education and sports science undergraduate students. The respondents comprised of (108 male and 102 female) aged between 18 to 23 years of age. Descriptive statistics, independent t-test and one-way ANOVA was utilised. The results revealed no significant difference in the students' readiness for online learning based on their gender and age groups. The Institution of Higher Learning needs to be more inclined towards creating academics and student-centric instructional and learning environment that can facilitate new online teaching and learning pedagogical approaches that can complement students' equity and diversity at tertiary-level.

Key words: Online learning readiness, Physical education, Sports science, Gender, Age groups

Introduction

The unprecedented pandemic global crisis has resulted in varying degrees of sustainable restriction by 186 countries to prevent, control and slow the transmission. The era of the pandemic has resulted in the world been evolved with technological advancements since 2019 that has reshaped, connect and embrace global societies at astonishing speed. These challenges have forced the global educational system to quickly adopt and integrate the usage of digital technologies as alternative to replace the traditional educational methodology of face-to-face teaching and learning in schools, colleges, institutes and universities (Valverde-Berrocoso, 2021). This option has led to major interruptions in teacher teaching and student learning having to adjust to online learning which have also led to numerous challenges such as internet accessibilities, lack of infrastructure and resources, insufficient training, developing and educating the teachers and students in their teaching and learning competencies through digital technologies. Studies had shown the importance of collaborative approaches in teaching and learning through different social practice strategies in order to facilitate the process of teaching and learning (Valverde-Berrrocoso, 2021). The complex process of integrating various practice-oriented and modelling strategies to improve the teaching and learning on the pedagogical utilisation of digital technologies need to apply, sustain and harness the potential of online-learning.

Among the disciplines which have disrupted are physical education and sports science which tended to be emphasised in term of education reform as compare to other majors in the institutions of higher learning. In these both disciplines require appropriate venues, instruments, equipment's, learning through movement, physical activities and exercises integrating with thinking activities which are the challenges faced through online learning (Zheng et al. 2021). With online learning through various digital resources and learning models to enrich the PE and sports science content, the PE educators and students have to adopt, adapt and apply technology in teaching and learning to satisfy the needs of modern education which play a crucial role in teaching methodologies and learning effectiveness. Therefore, the application of online learning environment in terms of its success would lies upon the students' readiness towards online learning. Bloom (1995) stated that readiness plays an imperative role in the education process in terms of inputs within the teaching and learning system. The readiness of the students' based on their level, ability and competence before the online learning started is crucial in their gradual progress in the learning effectiveness. Thus, online learning readiness (OLR) is the state of being motivated either physically and mentally for both teachers and students through the use of digital technologies towards digital learning (Nor Aniza & Chua, 2015). Studies had emphasised the importance and benefits of online learning through learning technologies such as synchronous and asynchronous and multimedia technologies towards learning stressing the essentiality to place digital learning competence with innovative online education models (Colarado & Eberle, 2021). Since future PE teachers are the emplemary role model in digital technologies within their disciplines, they would need to integrate technical training, reflective knowledge and skills in their pedagogical teaching and learning methodologies within the technological platform into online learning (Zheng et al., 2021). These

will lead to individual's readiness to learn online which would are crucial to the success of the performance academically (Engin, 2017).

There are five dimensions in OLR which comprised of self-directed learning, motivation for learning, internet self-efficacy, online communication self-efficacy and learner control which played a fundamental role in the online learning process. Studies had shown that university students have higher self-regulated learning such as elaboration, thinking critically and self-regulated in their online learning as well as ready in adapting and engaging online learning (Adams et al., 2021; Chung, Subramaniam & Dass, 2020). Herguner et al. (2021) study showed that sports science students had positive attitudes toward OLR in which online learning attitude of the students correlated positively with OLR.

Though studies have examined OLR of students but has not examined its readiness towards the disciplines of physical education and sports science (Chung et al., 2020; Kamaruzaman et al. 2021; Siti Norazian Miskam et al., 2020). Thus, this study sought to examine the OLR of physical education and sports science students in institutions of higher learning in terms of their level of OLR and relationship between the students' demographics and OLR.

Methods

Participants

The respondents comprised of undergraduate physical education and sports science students from several Institution of Higher Learning during the second semester of 2021. This is cross-sectional online survey design via Google Form which was the feasible way to facilitate data collection. The students participated in the study voluntarily with their consent and have the right to withdraw at any time.

Ethics

The study was approved by the Institute of Teacher Education Batu Lintang Campus Research Committee in accordance with the International Declaration of Helsinki guidelines. All respondents were briefed on the study in terms of the purpose, voluntary, confidentiality and anonymity and their consents were obtained.

Data analysis

The Statistical Package for the Social Science (SPSS) 24.0 was utilised to analyse the data. The descriptive statistics, independent sample t-tests and one-way Anova was used to examine the gender and age groups of the OLR variables.

Measures

The Online Learning Readiness Scale (OLRS: Hung et al., 2020) was utilised to measure the readiness of physical education and sports science students on online learning. The OLRS consists of 18 items that encompassed of 5 dimensions which include computer and internet self-efficacy,

self-directed learning, learner control, motivation for learning and online communication self-efficacy. The OLRS is measured on a 5-point Likert scale ranging from 1 (strongly agree) to 5 (strongly agree). The internal consistency for computer and internet self-efficacy (.94), self-directed learning (.92), learner control (.93), motivational for learning (.92), online communication skills efficacy (.93) and overall OLR (.90) demonstrating high consistency.

Findings and Discussion

Demographic Profile of Respondents

A total of 210 responses collected from all the respondents. Table 1 shows the respondents' general background information. It is noticeable that the respondents were at the age of 18 to 23 years old of which consisting of Malay (45.2%), Chinese (26.2%), Bumiputera Sarawak and Sabah (28.5%). There were 58.1% of them took up Physical Education while 41.9% of them took up Sports Science. Most of them (58.1%) came from IPGK Batu Lintang, Ilmu Khas and Kent. Whereas, the remaining (41.9%) studied in UiTM.

Table 1 Demographic Profile of Respondents

Variables	Group	Frequency	Valid %
Gender	male	108	51.4
	female	102	48.6
Age	18-19	76	36.2
	20-21	64	30.5
	22-23	70	33.3
Ethicity	Malay	95	45.2
	Chinese	55	26.2
	Bumiputera Sarawak	36	17.1
	Bumiputera Sabah	24	11.4
Education	Physical Education	122	58.1
	Sports Science	88	41.9
IPG / University	IPGK Batu Lintang	73	34.8
	IPGK Ilmu Khas	36	17.1
	IPGK Kent	13	6.2
	UiTM	88	41.9

Data Normality Test

In order to identify the relationship of demographic factors on the level of OLR among undergraduate students, t-test and anova was performed. The data normality assumption should

be fulfilled prior proceed with the t-test and anova. As mentioned in previous section, researchers applied skewness and kurtosis test to determine the data distribution of the variables involved. Z values for both skewness and kurtosis should be located in the acceptable region, -3.29 to 3.29 (Kim, 2013). From Table 2, the Z values for skewness was at -.226 whereas the values for kurtosis was at -2.078. Thus, the normality assumption of the data was accepted in this analysis.

Table 2 Descriptive Statistics

	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Deviation Statistic	Skewness		Kurtosis	
						Statistic	Std. Error	Statistic	Std. Error
Online Learning Readiness	210	2.31	5.00	3.901	.622	-.038	.168	-.694	.334
Valid N (listwise)	210								

Interpretative scales for the study variables

For the purpose of interpretation in descriptive analysis, each of the study variables was appropriately assigned an interpretative scale as according to the Mathematical formula recommended by Gravetter and Wallnau (2015). In order to standardise the interpretation for descriptive analysis on the overall level of the variables, researchers have set five value labels or divisions for each of them as in Table 3. For instance, very low, low, moderate, high and very high levels.

Table 3 Interpretative Scale for Online Learning Readiness Scale (OLRS)

Value	Value Level
1.00 – 1.80	Very low
1.81 – 2.60	Low
2.61 – 3.40	Moderate
3.41 – 4.20	High
4.21 – 5.00	Very high

Level on Online Learning Readiness

As shown in Table 4, descriptively, the overall OLR was at high level, 3.90 (SD=.043). The mean

score for all the dimensions: computer/internet self-efficacy, self-directed learning, learner control, motivation for learning as well as online communication self-efficacy was at high level too, 4.00 (SD=.736); 3.86 (SD=.695); 3.72 (SD=.744); 4.07 (SD=.690) and 3.86 (SD=.790) respectively.

Table 4 Descriptive Statistics on Students' Online Learning Readiness

	N	Minimum	Maximum	Mean	Std. Deviation
Online Learning Readiness	210	2.31	5.00	3.90	.043
Computer/internet self-efficacy	210	1.67	5.00	4.00	.736
Self-directed learning	210	1.40	5.00	3.86	.695
Learner control	210	2.00	5.00	3.72	.744
Motivation for learning	210	2.00	5.00	4.07	.690
Online communication self-efficacy	210	1.33	5.00	3.86	.790
Valid N (listwise)	210				

Effect Of Age Groups on Online Learning Readiness

A one-way between subjects ANOVA was performed to compare the effect of age groups on OLR of undergraduate students towards Physical Education and Sports Science during the COVID-19 pandemic. Table 5 indicated that there was no significant effect of age groups on online learning readiness at the p>.05 level for the three conditions [$F(2, 207) = .589, p > .05$]. This has shown that the age of the students does not have an effect on OLR. This may because of the range of the respondents are small of which only different by five years old. Therefore, the age groups did not influence much on their OLR. However, this finding was contradicted with Chung et al. (2020), Elumalai et al. (2020) and Zulaikha Khairuddin et al. (2020) which found that the students who were estimated different by five years old (Diploma to Bachelors; Bachelor's 1st year to Masters 2nd years) varied in their perceptions on e-learning. This is likely to occur because older students are more likely to have a higher level of confidence than younger pupils because they have had more online learning experience. As students in the upper levels of education are often older, the situation is likely comparable to that of students at different educational levels.

Table 5 Tests of Between-Subjects Effects Online Learning Readiness across Students' Age Groups

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.458	2	.229	.589	.556
Within Groups	80.490	207	.389		
Total	80.948	209			

Differences In Gender Towards Online Learning Readiness

An independent-samples-t-test was conducted to compare OLR among male and female students. From Table 6, there was a not significant difference in the scores for males (M=3.84, SD=.660) and females (M=4.00, SD=.576); t (208)=-1.476, p=.141. This finding is consistent with Cole, Shelly and Swartz (2014) which found that there was no significant difference in online learning satisfaction between male and female. However, the results were contradicted to the previous literature which has found that male and female students were different in terms of their quality of e-learning, satisfaction, motivation, study habits, learning experience and learning strategies (Chung et al., 2020; Cuadrado-García et al., 2010; Elumalai et al., 2020; Peixoto et al., 2012). These could be due to both genders have adopted digital technology from a tender age as they were from the Generation Z whose birth started from 1995 (Lau et al., 2021). Both genders could have equal opportunities and chances to learn and access to digital technologies in the educational system such as schools and Institutions of Higher Learning. In addition, with greater progress and support from the Malaysian government towards gender equality, women empowerment and educational opportunities have resulted in both genders being able to have similar equal competencies towards OLR.

Table 6 One-Sample Statistics

	Demography	N	Mean	Std. Deviation	Std. Error Mean
Online Learning Readiness	male	108	3.839	.660	.064
	female	102	3.966	.576	.057

Table 7 One-Sample Test

Variables	t	df	Sig. (2-tailed)	Mean Difference
Gender	-1.476	208	.141	-.126

Conclusion

Universities, faculties, and educators must be prepared to encounter more online learning in the future. This is due to the students' readiness, with the majority agreeing that they are virtually ready to participate in online learning in the future. This issue is also aided by the rapid advancement of technology that occurs every year.

Furthermore, students today are digital natives, meaning they are more comfortable with the usage of technology in their daily lives, such as utilizing gadgets and accessing the internet. As a result, educators must keep up with technological advancements in education and be more advanced than their students. This is because, in the future, instructors will need to be more prepared when creating lesson plans. As a result, additional training should be provided to both educators and students in order to provide them with the knowledge required to conduct online learning. The limitation of the study is that the respondents were mainly from Sarawak in which the findings cannot be generalize to other populations in Malaysia. Thus, future research could examine online learning readiness with students from other Institution of Higher Learning from Sabah and West Malaysia and how online learning readiness and sociodemographic variables are associated with emotional distress, mental health and well-being as relevant health outcomes

To summaries, lecturers cannot only deliver a better online learning approach, but also improve their online experience and satisfaction by knowing OLR among their students and how demographic factors affect this readiness. Based on the findings of this study, it is proposed that other researchers perform a qualitative research study to gain a deeper understanding of students' readiness to participate in online learning. This is where researchers may analyse more detailed data in order to better serve students' requirements and stay current with educational technologies. As a result, future investigations will be able to qualitatively support the findings of the current study.

Conflicts of interest

The authors declare that the study was conducted in the absence of any commercial or financial relationships that could be constructed as a potential conflict of interest.

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Characteristics of Morphofunctional Features of Men Engaged in Power Martial Arts - on Example of Arm Wrestling

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Abstract

The purpose of the study is a comparative analysis of morphofunctional features of arm wrestlers of different skill levels and weight categories. The study involved 40 arm wrestlers of various qualifications and training experience. The athletes were divided into two groups of 20 people each: athletes of low skill level with 1-3 years of training experience; qualified athletes with sporting achievements at the All-Russian and international level of competitions, with 4-10 years of training experience. The methodology for studying the morphofunctional features of arm wrestlers included the following indicators: standing height, body weight, chest circumference, shoulder, forearm. Dynamometric measurements were made: brush and deadlift dynamometry. The following indices were calculated: weight-height Quetelet index, Erisman's chest-height index, life index, Pinier's physique strength index, power indices. The results obtained indicate that qualified athletes have morphofunctional features that differ from athletes of a low level of skill, probably due to which they achieve great success in arm wrestling. These features are the best development of the girdle of the upper limbs: the muscles of the forearm and shoulder, as well as the muscles of the back, which allows you to show great results in carpal and postural dynamometry and in fights at competitions. As the weight category increases, a wave-like increase in the average value of carpal dynamometry was revealed. With the growth of the weight category, the indicators of the power index of the leading hand of qualified athletes decrease in waves.

Key words: Arm wrestling, Morphofunctional features, Anthropometry, Beginners and qualified athletes, Dynamometry, Power indices, Weight categories.

Introduction

Arm wrestling is a sport that has received nationwide recognition for its accessibility and entertainment. In 2020, a significant event for the development of this type of power martial arts took place - by the decision of the International Federation of Physical Education (FISU), arm wrestling was included in the program of the World Universiade. The growth in the popularity of arm wrestling is still ahead of the process of scientific and methodological support for the training and competitive activities of athletes.

Arm wrestling is a power sport, manifested in the form of martial arts, where the most important success factor is the actual power, speed-strength qualities and strength endurance. Motor actions in the process of performing various exercises, including power ones, differ in biomechanical structure, duration of performance, intensity, and other features. These features are associated with the mode of muscle work, which can be dynamic, static or statodynamic in nature (V.N. Kurys, 2013).

One of the most promising areas in modern sports is the accounting of morphofunctional data, since it allows to increase the success of athletes' performance by improving physical fitness, improving technique, as well as preventing injuries and improving the level of health in general.

Currently, in many sports (sports games, weightlifting and athletics), anthropometric and morphofunctional features of athletes are being actively studied, certain patterns of their changes under the influence of training have been identified, and a methodology for assessing physical development has been developed (E.M. Martirosov, 2010; D. B. Nikityuk, 2011; A.F. Zekrin, 2015, etc.). Comparative analysis of morphological and functional features is widely used in the analysis of the state of athletes in martial arts.

Yagello V. and co-authors (2004), studied the relationship of anthropometric indicators in relation to the level of sportsmanship of highly qualified judokas. The authors found the interdependence of the width of the pelvis, shoulder, elbow and diameter of the forearm with the improvement of sports skills.

V.V. Semenov V.V. (2013) analyzed the morphological features of sports talent in women's freestyle wrestling. The author highlights the most informative indicators that differ depending on the weight categories. These include longitudinal, transverse and girth indicators of the thigh, lower leg, shoulder and forearm.

L.V. Porigalo and co-authors (2016) studying the representatives of percussion (karate, hand-to-hand combat, taekwondo) and throwing martial arts (judo, Greco-Roman wrestling), found that anthropometric indicators are characterized by the greatest contribution to the formation of a functional system for the growth of sportsmanship: body length and weight, chest circumference, carpal dynamometry, shoulder width.

R.E. Sirazetdinov and co-authors (2021), based on a factor analysis of body size with the calculation of micro / macrosomia indicators, the features of body proportions in highly qualified combat athletes (various types of wrestling) characteristic of Russian and Altai men were revealed: a strong chest, broad shoulders, relatively short legs and elongated arms, minimal development of fat deposition on the body and limbs.

In arm wrestling, such studies are still few in number (L.V. Podrigalo et al., 2013, 2016; A.V. Posokhov et al., 2017; Akpinar S., 2013) and they cover a fairly narrow range of indicators. So, in his work L.V. Podrigalo et al. (2010) cite some anthropometric and morphological indicators confirming the superiority of athletes of the highest skill level over athletes of mass categories and those without categories. Akpinar S., 2013 et al. we considered some anthropological predictors that affect the effectiveness of arm wrestling competitions. At the same time, the authors examined athletes of a number of weight categories, but not all of them provided for by the Competition Rules. There are still not enough studies analyzing various morphofunctional data of arm wrestlers, especially taking into account the weight category of athletes.

Therefore, the **purpose** of this study was a comparative analysis of morphofunctional features of arm wrestlers of different skill levels and weight categories.

Materials and methods

A methodology for studying the morphofunctional features of arm wrestlers was developed, which includes a number of anthropometric, morphological and dynamometric measurements, as well as the calculation of several indices. When measuring the indicators of armwrestlers, we used the recommendations of well-known specialists in this field (G.D. Aleksanyants, 2005; E.G. Martirosov, 2006).

The methodology for studying the anthropometric and morphofunctional features of armwrestlers included the following indicators: standing height, body weight, chest circumference, shoulder, forearm.

Weight-height index Quetelet. It characterizes the ratio of body length to its mass. Calculated according to the formula: $I = \frac{P}{L}$, where P is the weight in grams, L is the length of the body in cm. The average values of the Quetelet index: men - 350-400 g/cm, women - 325-375 g/cm, athletes - 400 g/cm and above.

Erisman's chest-height index. Allows you to evaluate the development of the chest. Calculated according to the formula: $I = T - 0{,}5\text{x}L$, Where T is the circumference of the chest at rest in cm, L is the height in cm. For male athletes, it is on average 5.8 cm, for female athletes 3.8 cm. A large value indicates a wide chest.

The life index characterizes the functionality of the respiratory apparatus. It is determined by dividing the vital capacity of the lungs (in ml) by body weight (in kg), i.e., it calculates how much lung volume falls on 1 kg of body weight. For example, the body weight of the subject is 70 kg, and the vital capacity of the lungs is 5600 ml. Life index = 5600/70 = 80 ml/kg. For men, the index should be at least 65–70 ml/kg, for women at least 55–60 ml/kg. For athletes and female athletes, the index, as a rule, is higher than these figures.

Strength indices determine the development of the strength of individual muscle groups relative to body weight. They are obtained by dividing strength by weight and are expressed as a percentage. For example, the strength of the right hand of the subject is 60 kg, the dead strength is 200 kg, and the body weight is 70 kg. Force index for the hand = 60/70*100% =85%. Strength index for backbone strength = 200/70*100% = 285%.

The average values of hand strength in men are considered to be 70-75% of the weight (in athletes 75-81%), in women 50-60% (in athletes 60-70%). For back strength, the average values for men are 200–220% (for athletes 260–300%), for women 135–150% (for athletes 150–200%).

The indicator of body strength (according to Pignet) expresses the difference between standing height and the sum of body weight and chest circumference:

X = P — (B+O),

where: X - index, P - height (cm), B - body weight (kg), O - chest circumference in the exhalation phase (cm). The smaller the difference, the better the indicator (in the absence of obesity).

A difference less than 10 is rated as a strong physique, from 10 to 20 - good, from 21 to 25 - average, from 25 to 35 - weak, more than 36 - very weak. The material obtained during the study was processed using the method of mathematical statistics using Student's t-test.

The study involved 40 arm wrestlers of various qualifications and experience. Athletes were divided into two groups of 20 people each: athletes of low skill level with 1-3 years of training experience; qualified athletes with sporting achievements at the All-Russian and international level of competitions, with 4-10 years of experience.

Results

The results of the study of anthropometric and morphofunctional indicators of arm wrestlers are presented in Table 1.

Table 1 The results of the study of anthropomorphological indicators of arm wrestlers of various skill levels

№	Indicators	Low level athletes, M±σ	Qualified Athletes, M±σ	Difference	t	p
1.	Height, cm	177,6±2,06	177,6±2,06	0	0,0	>0,05
2.	Weight, kg	79,7±2,00	87,0±4,11	7,3	1,6	>0,05
3.	chest circumference, cm	97,6±2,06	102,0±1,73	4,4	1,6	>0,05
4.	Right shoulder circumference, cm	38,1±0,87	40,5±0,87	2,4	1,9	>0,05
5.	Left shoulder circumference, cm	37,8±0,76	40,4±0,97	2,6	2,1	<0,05
6.	Right forearm circumference, cm	33,1±0,65	36,2±0,54	3,1	3,7	<0,05
7.	Left forearm circumference, cm	32,6±0,65	35,4±0,70	2,8	2,9	<0,05
8.	Wrist circumference, cm	17,4±0,27	19,0±0,22	1,6	4,5	<0,05
9.	Vital capacity of the lungs,l	5,2±0,24	5,8±0,17	0,6	2,0	>0,05
10.	Carpal dynamometry, right, kg	52,7±2,38	73,3±3,35	20,6	5,0	<0,05
11.	Carpal dynamometry, left, kg	53,5±3,03	66,8±4,33	13,3	2,5	<0,05
12.	Deadlift dynamometry, kg	140,8±8,12	180,7±11,9	39,9	2,8	<0,05

Note: M is the average result for the group; σ is the standard deviation; t is the difference error; p is the significance of differences according to Student's t-test.

Statistical processing of the results of the study revealed that the average value of such anthropomorphological indicators as height, weight, chest circumference did not have significant differences in arm wrestlers of a low level compared to qualified athletes. In such indicators as the circumference of the right shoulder and the lung capacity difference is close to reliable in favor of qualified athletes and Candidate to Master Sport, and it can be called a trend.

Attention is drawn to the reliability of differences in such indicators as the circumference of the left shoulder (2.6 cm), the circumference of the right forearm (3.1 cm), the circumference of the left forearm (2.8 cm), the circumference of the wrist (1.6 cm) in qualified athletes, compared with athletes of mass categories. In indicators reflecting the strength of the hand and back, qualified arm wrestlers also significantly outperform athletes of mass categories. Thus, the strength of the right and left hand is significantly higher by 20.6 and 13.3 kg, respectively, and the strength of the back muscles is by 39.9 kg ($p<0.05$).

After calculating and analyzing various anthropomorphological indices presented in Table 2, the following conclusions can be drawn. According to the Quetelet weight-height index, all athletes have more than 440 g/cm of height, there are no significant differences between the groups. Significant differences were found in the Pignet index, which characterizes the strength of the physique. Also significant is the difference in the Erisman index, which characterizes the development of the chest.

Table 2 Indices of anthropomorphological indicators of armwrestlers

№ п.п.	Indicators	Low level athletes, M±σ	Qualified Athletes, M±σ	Difference	t	p
1.	Quetelet index, g/cm	448,7±9,71	488,9±19,33	40,2	1,9	>0,05
2.	Pinier index	0,4±4,00	-14,7± 4,83	15,1	2,4	<0,05
3.	Erisman index, cm	8,8±2,44	16,6±1,89	7,8	2,5	<0,05
4.	Life index, ml/kg	65,6±2,46	67,2±2,71	1,6	0,4	>0,05
5.	Power index of the right hand, %	66,3±3,13	85,1±4,10	18,8	3,6	<0,05
6.	Power index of the left hand, %	67,3±3,60	77,3±4,50	10,0	1,7	>0,05
7.	Strength index of the deadlift, %	176,9±9,44	208,6±13,12	31,7	2,0	>0,05
8.	Shoulder length to forearm length, %	133,1±3,50	133,9±1,45	0,8	0,2	>0,05
9.	Circumference of the right shoulder to the forearm, %	115,4±2,01	111,7±0,95	3,7	1,7	>0,05
10.	Circumference of the left shoulder to the forearm, %	116,0±1,44	114,2±1,26	1,8	1,0	>0,05

Table 2 shows that the power index of the right hand is higher in qualified athletes by 18.8% ($p<0.05$). As a trend, we note a higher strength index of the left hand and back strength by 10 and 31.7%, respectively.

When analyzing the average anthropometric data of arm wrestlers, a regular increase in weight and height indicators, as well as the circumferences of the links of the arm as the weight category increases, was established. The average value of wrist dynamometry also increases naturally (Fig.1). If the average gripping force of athletes in the 50 kg weight category is 59.7, then in the 110 kg weight category it is equal to 80 kg. The difference is 34%. Some exceptions to this trend have been established. So, the average result of the weight category up to 70 kg is quite significantly higher than the data obtained in the weight categories 80 and 85 and slightly exceeds even 100 kg. The average result of the 75 kg weight category is approximately equal to the result of the 90 kg category. However, the data obtained need further research involving a larger number of subjects and comparing them with similar results. It was found that with the growth of the weight category, the indicators of the power index of the leading hand in qualified athletes decrease (Fig.2). At the same time, there is a greater result in the 75 kg weight category compared to the previous categories, except for 55 kg.

Discussion

Studies to establish the specifics of the influence of anthropomorphological and morphofunctional indicators on the skill level of arm wrestlers are carried out in two main ways. The first is a comparative analysis of the data of athletes of various sports. The second is a comparative analysis of experimental data of athletes of the same sport, but of different skill levels.

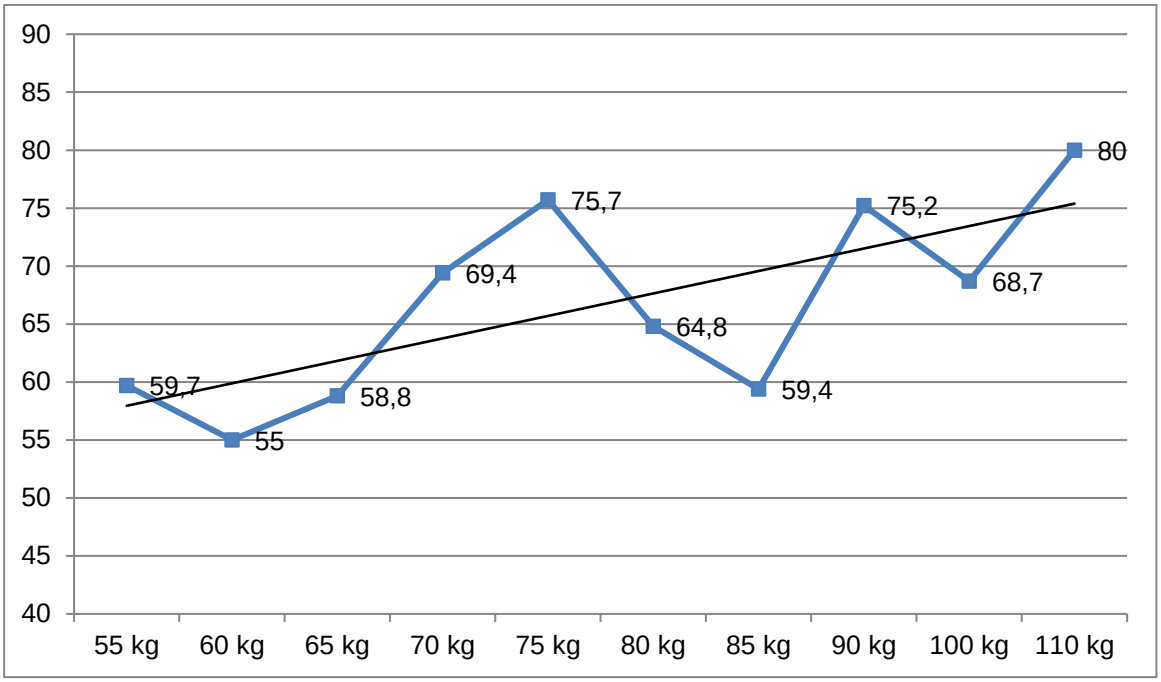

Figure 1 Average carpal dynamometry indicators for qualified arm wrestlers of different weight categories, kg.

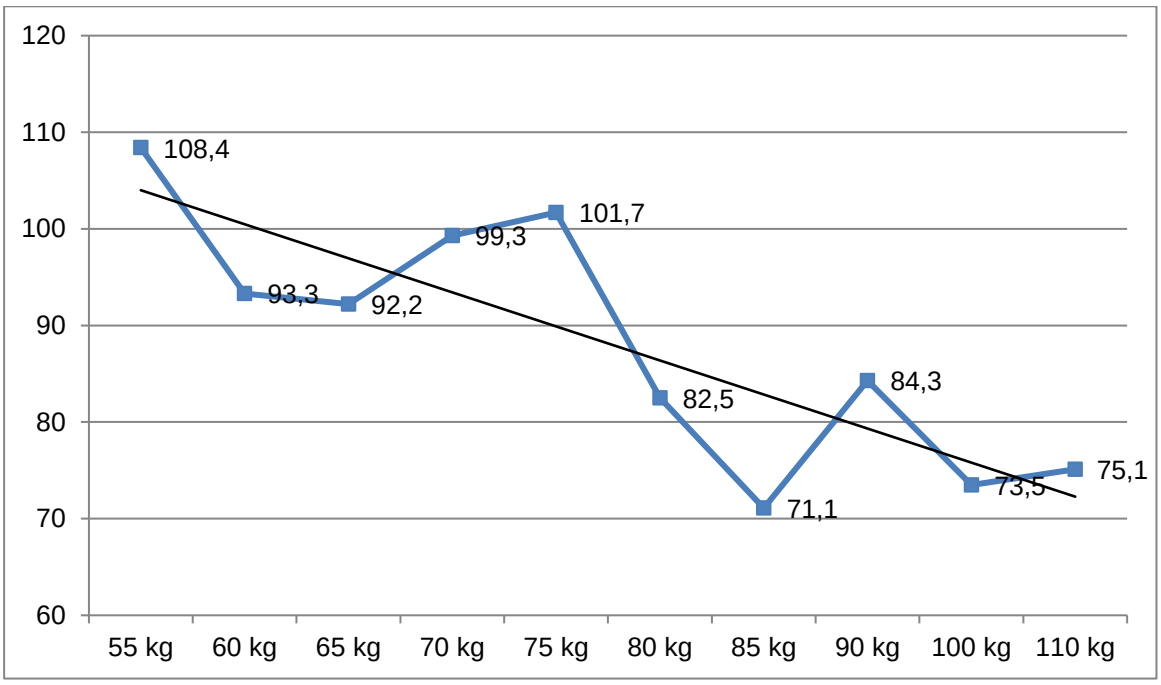

Figure 2 Average indicators of the power index of the leading hand in qualified arm wrestlers of different weight categories, %

The second method is more effective for identifying the features that allowed athletes to achieve a higher level of skill.

The absence of significant differences between some indicators (height, weight, chest circumference, vital capacity of the lungs) can be regarded as a reflection of the proximity of the level of physical fitness of the participants and the result of specialized training in arm wrestling. The correctness of this assumption is illustrated by the analysis of physical development. In such indicators as the circumference of the right shoulder and the vital capacity of the lungs the difference is close to reliable in favor of qualified athletes and Candidate for master of Sports and it can be called a trend.

Indicators characterizing grip strength are the most important in arm wrestling. All participants are characterized by high results of wrist dynamometry. Higher results from more qualified arm wrestlers indicate the importance of this indicator for the effectiveness of competitive activity. Similar data are given by Akpinar S., et al. (2013) and Podrihalo O.O. et al. (2020).

As the weight category increases, a wave-like increase in the average values of carpal dynamometry was revealed. However, with the growth of the weight category, the indicators of the power index of the leading hand of qualified athletes also decrease in waves.

The analysis of the left shoulder circumferences, right and left forearm circumferences, as well as the wrist circumference confirms the importance of these criteria for improving athletic performance. At the same time, Akpinar S., et al. (2013) found that the circumference of the forearm is a significant predictor only for the left hand. According to the authors, the indicators of the circumference of the forearm of the right hand did not reach a significant level in order to be a predictor.

The results obtained indicate that qualified athletes have morphofunctional features that differ from athletes of a low level of skill, probably due to which they achieve great success in arm wrestling. These features are the best development of the girdle of the upper limbs: the muscles of the forearm and shoulder, the muscles of the back, which allows you to show great results in carpal and postural dynamometry and in fights at competitions.

Conclusions

Thus, the research has established morphofunctional features that distinguish athletes of high skill levels in arm wrestling. These features are the better development of the girdle of the upper limbs: the muscles of the forearm and shoulder, the muscles of the back, which allows to show great results in strength tests and in competitive activity. As the weight category increases, a wave-like increase in the average values of carpal dynamometry was revealed. However, with the growth of the weight category, the indicators of the power index of the leading hand of qualified athletes also decrease in waves. However, the data obtained need further research involving a larger number of subjects and comparing them with similar results.

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Longitudinal Design of Measuring Physical Activity in Children: In Relation to Their Motor Abilities and Anthropometric Measurements

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Abstract

Objective: The study is aimed at a) observing the same group of children to identify the development of MA, anthropometric measures, and PA levels over two years, b) to assess how well changes in the anthropometric measurements will be able to predict the changes in each MA component, and c) to assess whether changes in MA components and/or anthropometric measurements over time were able to explain the changes in different PA levels. **Methodology:** A total of 21 children (11 boys and 10 girls) were tracked over two-year groups: year 4 (age 9.3 ± 0.3 years), year 5 (age 10.3 ± 0.3 years) and year 6 (age 11.3 ± 0.3 years) volunteered to participate at this study. Objective measurement of habitual PA was conducted by using an accelerometer for four days: two weekdays and two weekend days. MA tests included the flamingo balance test (FBT), eye-hand coordination (EHC), sit and reach (Sit-R), standing vertical jump (SVJ), hand grip (HG), sit-up, 30m dash, and figure of 8 agility (F8A) and 20m shuttle run test (20m SRT). **Results**: All MA improved with tracking year, with improvements in EHC and SVJ greater in males compared to females. BF% was increased over two tracking years, with a greater percentage increase in females than males over time. Height, body mass and BMI were found to be main predictive factors of MA components. Longitudinal methods of tracking MA and anthropometrics over time nullified the dominating nature of gender in predicting MA. Moreover, 8 to 12-year-old children tend to spend significant time in a sedentary lifestyle and are insufficiently active, according to WHO.

Key words: Pediatric population, Accelerometer, Motor ability, Anthropometrics, Body composition, Health

Introduction

According to the World Health Organization (WHO, 2018) sedentary lifestyle is the fourth leading risk factor for premature mortality, being responsible of 6% of deaths globally. Generally, studies have reported that moderate and vigorous physical activity (MVPA) are associated with better health benefits in adults such as cardiorespiratory fitness, better skeletal health, and controlled body weight (Sallis, Patrick. 1994, Gunter, Nader. 2015) as well as in 3–18-year-old children and adolescents. (Wu, 2017). During the last decade, the benefits of physical activity (PA) have been extolled as an important component for a good quality of life and improved sense of well-being. In this context, numerous studies in adults have shown that being physically active is positively associated with the ability of an individual to perform daily tasks throughout their life due to the observable benefits to the musculoskeletal, cardiovascular, and respiratory systems (Blair et al., 2001; Riddoch & Boreham, 2000; Sirard & Pate, 2001; U.S. Department of Health and Human Services, 1996).

In comparison with the adult population, the relationship between PA and health outcomes is not yet clear in children. However, it is widely believed that being more physically active during childhood is positively associated with remaining more physically active in adulthood (Fuentes et al., 2003). Tracking studies have suggested that regular participation in PA during childhood plays a significant role in the prevention of children's development of chronic disease (Blair & Connelly, 1996; Kohl & Hobbs, 1998; WHO, 2009), while physical inactivity is linked with increased risk of hypertension, being overweight or obese, insulin resistance, and impaired lipid and lipoprotein function (Katzmarzyk et al., 1999; Guillaume et al., 1997; WHO, 2009). According to the Chief Medical Officer (2004), for general health benefits and to prevent obesity in young people; 60 minutes of moderate PA should be achieved every day and activities that improve bone health, muscular strength, and endurance should be achieved twice a week (Department of Health, 2004). It has since been suggested that this recommended level of PA be increased and instead children and adolescents should participate in moderate PA for at least 90 minutes each day (Anderson et al., 2006).

Numerous studies have illustrated that increasing sedentary activities, in particular watching TV and using mass media technology (computer and internet use), has a significant relationship with increased levels of being overweight and obese, and has been reported throughout the WHO report, participating in a less active life style is one of the main risk factors causing a rise in worldwide mortality rates (WHO, 2009).

There is an increasing recognition that children are usually mechanically active and coordinated in basic motor performances by the time they are 5-7 years old (Gallahue, 1995; Malina et al., 2004). As a child grows, the body undergoes a gradual progression from general to specific motor performance (Katzmarzyk et al., 1997). Improvements in motor ability occur and may lead to increases in physical activity performance. Consequently, researchers suggest that the development of basic motor performance should play an important role in physical education programmes from an early age (Oja and Jürimäe, 2002). However, it is still unclear which factors determine the level

of physical activity participation in children and adolescents. One essential influencing factor may be the level of mastery of motor abilities which children and adolescents need in order to participate in different physical activities (Okely et al., 2001).

PA tracking studies attempt to quantify whether a child will preserve his or her PA position within a cohort of children over a period of time (Kelly et al., 2007). It is also a constructive way to predict children's PA behaviour and health in the future according to their initial behaviours at a younger age (Pate et al., 1996), as it has been accepted that PA is one of the important independent risk factors for several chronic diseases (Boreham et al., 2004). Therefore, PA tracking in children can be used as an approach to determine a suitable age to begin an intervention programme (Loucaides, 2002), as it is widely believed that children who have high risk behaviours tend to maintain the same behaviours during their adulthood (Pate et al., 1996).

To summarize, since the tracking studies require longitudinal observation of the same individual at not less than two points in time (Malina,1996), there are a relatively small number of studies that have examined the tracking of PA behaviour during childhood and adolescence. Based on the methods and findings from previous studies, there is a difference concerning the studies' population, PA measurements, length of tracking, and analysis methods to assess PA tracking and the findings from these studies. From the review of the literature, studies have reported a low to moderate tendency of tracking PA behaviour during childhood to adolescence from different backgrounds and with a wide range of age groups (Janz et al., 2005; Pate et al., 1996; Pate et al., 1999; Raitakari et al., 1994; Sallis et al., 1995). According to Raitakari et al. (1994), the PA tracking correlation coefficient declined as the interval time between the measurements increased therefore, the majority of the previous studies used an average 3-year interval period to track PA behaviour (Janz et al., 2005; Pate et al., 1996; Pate et al., 1999; Raitakari et al., 1994). However, other studies have extended the tracking period to 5 years (Janz et al., 2005) or 6 years (Raitakari et al., 1994; Sallis et al., 1995; Kelly et al., 2007) or have minimised the tracking period to just two years. Therefore, the current study is aimed at a) observing the same group of children to identify the development of MA, anthropometric measures and PA levels over time in 8–12-year-olds, b) to assess how well changes in the anthropometric measurements will be able to predict the changes in each MA component, and c) to assess whether changes in MA components and/or anthropometric measurements over time were able to explain the changes in different PA levels.

Methodology

The total number of participants who managed to complete three phases of motor ability tests from year 4 to year 6 was (n = 21). The total tracked number of participants from year 4 to year 5 was (n = 27), and that from year 5 to year 6 was (n = 26). More details of total participants tracked from both genders is described in Table 1.

Participants were recruited from a local primary school. All participants and their parents or guardians gave their written informed consent for the testing prior to the commencement of the test for each year.

Table 1 The number of participants involved in the motor ability, anthropometric and PA measures in the longitudinal study

Tracking years	Year 4		Year 5		Year 6		Total number of participants tracked
	Gender		Gender		Gender		
	M	F	M	F	M	F	
2 years	13	14	14	12	18	12	21

Furthermore, all participants or guardians confirmed that their child was free from any medical condition that would preclude the child from participating in the study. Ethical approval for the study was obtained from the University Ethical Committee. All tests were administered in the sports hall and school playground at the same time of day. There was adequate interval time between each test.

Physical activity measurement

PA was monitored using a unidirectional accelerometer that measures acceleration in the vertical plane (model ActiGraph GT1M, ActiGraph LLC, Fort Walton Beach, FL). The ActiGraph is a uniaxial accelerometer (Figure 1) that measures body movement in terms of acceleration, which can then be used to estimate physical activity intensity levels over time (Chen & Bassett 2005, Troiano, 2005).

Motor ability tests & Body composition

To determine body fat percentage, the median of the triplicate measurements at each site (triceps and calf) were used. Then, equations provided by Slaughter (1988). The participant's motor ability components were assessed by using eight different tests, included general balance, coordination, flexibility, explosive strength, static strength, running speed, abdominal and trunk strength, and agility as well as 20m SRT.

Results

Anthropometric characteristics over two tracking years

For the analysis group, data of a total number of 21 participants were tracked over two years, and a summary of the participants' characteristics over two tracking years are shown in table 2. A significant within tracking year effect was found in height, body mass, BMI, and BF% (all $P < 0.05$). Gender had an effect on BF% which was higher in females in year 4 and year 5 ($P < 0.05$), but not year 6 ($P > 0.05$). Looking at gender specifics (males), year 6 shows a significantly higher BF% from year 4 and year 5 ($P < 0.05$), whereas year 4 females showed a significantly lower BF% from year 5 and year 6 ($P < 0.05$).

Table 2 Mean ± SD participant descriptive characteristics tests of (n= 10 male) and (n= 11 female) in years 4 to 6 who were tracked over a two-year period (n=21). († indicates significantly different from year 4, * indicates significantly

Table 2 difference between genders at the same year, a indicates gender specific (male) significant difference from year 6, a indicate gender specific (female) significant difference from year 4 (P < 0.05)

	Male Mean ±SD	Female Mean ±SD	Male Mean ±SD	Female Mean ±SD	Male Mean ±SD	Female Mean ±SD
Age (yr)	9.36±0.20	9.24±0.035	10.41±0.20†	10.33±0.35†	11.33±0.18†	11.25±0.32†
Height (m)	1.36±0.05	1.36±0.003	1.40±0.06†	1.43±0.04†	1.45±0.07†	1.49±0.04†
Body mass (kg)	31.32±4.05	33.56±4.30	33.25±5.53†	36.59±5.00†	39.18±5.69†	41.65±6.36†
BMI	17.03±1.87	18.13±2.00	16.90±2.39†	17.95±1.96†	18.52±2.24†	18.60±2.14†
BF%	16.04±5.27[a]	22.51±3.65*	17.06±5.76†[a]	24.91±4.80†*[b]	22.24±6.84†	24.74±4.54†[b]

The longitudinal impact on motor ability over two tracking years by gender

A main effect for gender was found for EHC and SVJ ($P < 0.05$). For EHC, significant gender differences were found at year 5 and year 6 ($P < 0.05$); but not year 4 ($P > 0.05$). Males showed an improvement over the two years and significantly outperformed females in all year groups ($P < 0.05$), whereas females' significant improvement was found between year 4 and year 5 and between year 5 and year 6 ($P < 0.05$). In (SVJ), no significant differences have been reported between genders during each of the tracking years ($P < 0.05$). However, both genders improved significantly from the pre-testing to post-testing phase ($P < 0.05$).

Interrelationship between changes in MA score and anthropometric measurements over two tracking years

Differences in year explained 17.6% ($p < 0.01$) of the variance of changes in EHC. However, the inclusion of differences in height increased the variance of changes to 28.1% ($p < 0.001$). Whilst the changes in EHC increased if the differences in year increased, the opposite interrelation was seen with differences in height. The final multiple regression model was:

Δ EHC = 1.221+ 6.130 × Δ Year – 124.877 × Δ Height

Where Year is coded as first tracking year = 1 and second tracking year = 2.

The differences in Year also explained 42.3 % ($p < 0.01$) of the variance of changes in Sit and Reach, which could be increased to 53.3% ($p < 0.001$) by additional inclusion of differences in BF%, meaning that the increases of differences in Year together with the decrease in differences of BF% led to a better flexibility performance. The final multiple regression model was:

Δ Sit-Reach = -9.716 + 7.715 × Δ Year -0.452 × Δ FB%

Differences in Year also explained 21.3% ($p < 0.01$) of the variance of changes in SVJ, meaning that being in a higher school-year improved the changes in the development of participants' explosive strength. The final multiple regression model was:

Δ SVJ = -6.448 + 5.924 × Δ Year

The Differences in age explained 9.9% ($p < 0.01$) of the variance of changes in EHC. However, the inclusion of differences in body mass increased the variance of changes to 19.8% ($p < 0.001$), while the changes in HG increased if the differences in both age and body mass increased. The final multiple regression model was:

Δ HG = -83.032+101.967 × Δ Age +2.583 × Δ Body mass

Differences in year explained 85.1% ($p < 0.01$) of the variance of changes in F8A, which indicates that a higher difference in year led to a better agility performance. The final multiple regression model was:

Δ F8A = 9.112 – 8.801 × Δ Year

*Table 3 Mean ± SD for each motor ability tests in male and female of years 4 to 5 and 5 to 6 who were tracked over a two-year period (n=21). († indicates significant difference from year 4, * indicates significantly different between genders within the same year, a indicates gender specific*

MA tests	Year 4		Year 5		Year 6	
	Male Mean ±SD	Female Mean ±SD	Male Mean ±SD	Female Mean ±SD	Male Mean ±SD	Female Mean ±SD
FBT(number of step downs)	3.8±2.30	5.7±2.76	3.9±2.47†	4.6±3.75†	5.5±3.60†	4.4±4.03†
EHC (number of catches of ball)	12.1±4.99 [a]	10.3±4.22 [b]	17.4±7.78†[a]	6.1±3.70†*	21.5±5.28†	13.8±3.97†*[b]
SitR (cm)	19.1±7.53	20.6±4.72	16.5±7.78†	17.6±5.39†	21.1±8.89†	22.4±5.66†
SVJ (cm)	26.1±4.53 [a]	23.0±4.07 [b]	26.8±4.96† [a]	21.4±7.13† [b]	30.9±6.15†	27.4±4.92†
HG (kg)	12.5±3.26	11.5±1.99	15.5±3.45†	14.8±2.14†	18.4±3.54†	17.0±3.48†
30m dash (s)	5.4±0.39	5.6±0.26	5.2±0.34†	5.4±0.37†	5.1±0.40†	5.2±0.29†
Sit-ups (number of performances)	16.9±3.73	14.3±5.73	20.0±3.16†	17.6±4.57†	23.7±3.40†	19.5±5.09†
F8A (s)	35.3±2.71	36.4±1.29	35.7±2.55†	36.7±1.21†	26.3±2.21†	28.2±2.04†

(male) significant difference at the same test, b indicates gender specific (female) significant difference at the same test ($P < 0.05$).

The longitudinal impact on PA levels over two tracking years

Six participants who met the criteria for PA monitoring were found to have significant differences from the main group (n=21) in EHC, HG, SVJ, sit-reach, and FBT ($P < 0.05$) using independent sample t-test.

Table 4 Mean ± SD participants' time (minutes) spent in different physical activity levels PAL at years 4 to 5 and 5 to 6 who were tracked over a 2-year period (n=6).

Table 4 shows the Mean ± SD of participants' physical activity levels (PAL) over the tracking years (years 4 to 6). No significant main effect within school years was found at

	year 4	year 5	year 6
PA levels	**Mean ± SD**	**Mean ± SD**	**Mean ± SD**
SPA	579.4±35.77	565.6±98.65	594.4±64.23
LPA	140.3±23.29	156.7±89.93	152.6±60.02
MPA	2.0±4.73	1.2±1.41	3.8±4.80
VPA	2.0±4.74	1.3±1.60	0.2±0.28
MVPA	4.1±9.48	2.5±3.00	4.1±4.84

any physical activity level

Interrelationship between changes in MA score and anthropometric measurements over two tracking years

Differences in year explained 74.0% ($p < 0.01$) of the variance of changes in EHC. The changes in EHC tend to be greater with the increasing differences of year and gender. The final multiple regression model was:

Δ EHC = -68.833+29.000 * Δ Year

*Where gender is coded as male = 1 and female = 2.

The differences in year explained 43.8% ($p < 0.01$) of the variance of changes in sit-reach, where the equation shows that increasing the differences in year lead to an increased change in sit-reach performance. The final multiple regression model was:

Δ Sit-Reach = -8.667 + 5.167 × Δ Year

Differences in body mass explained 39.5% ($p < 0.01$) of the variance of changes in HG, which means that increased differences in body mass led to a better HG performance. The final multiple regression model was:

Δ HG = 16.915 + 4.114 × Δ Body mass

The differences in BMI explained 36.2% ($p < 0.01$) of the variance of changes in sit-up. The equation shows that having less difference in the BMI means a better sit-up performance. The final multiple regression model was:

Δ Sit-up = 5.611 – 1.940 × Δ BMI

Differences in year explained 88.3% ($p < 0.01$) of the variance of changes in F8A, where having a high difference in year means a better agility performance. The final multiple regression model was:

Δ F8A = 10.808 – 10.063 × Δ Year

Interrelationship between changes in PA levels and MA and/or anthropometric measurements over two tracking years

The differences in FBT explained 49.1% ($p < 0.01$) of the variance of changes in SPA, and 45.4% ($p < 0.01$) of the variance of changes of LPA. These mean that having less difference in FBT results in higher changes in SPA, whereas higher differences in FBT result in higher changes in LPA. The final multiple regression models were:

Δ SPA = 6.188 - 16.107 × Δ FBT

Δ LPA = 7.697 + 18.510 × Δ FBT

Differences in BF% explained 29.1% ($p < 0.01$) of the variance of the changes in MPA, meaning that high differences in FB% lead to a higher change in MPA. The final multiple regression model was:

Δ MPA = -2.800 + 1.022 × Δ BF%

Discussion

The current longitudinal study focused on tracking the level of MA, anthropometric measures, and monitoring of PA level over a period two tracking years in 8 to 12-year-old children. The main finding from the current study demonstrated that all MA components significantly improved over two years of tracking, which is unsurprising. Furthermore, although both males and females showed an improvement over the tracking period, gender only appeared to have an effect on improvements in EHC and SVJ tests, with males improving to a much greater extent than females. When MA components and anthropometric measures were tracked over a period of two years, improvements of MA components were observed, apart from FBT, which did not change significantly over the two years. gender appeared only to affect improvements in EHC and SVJ tests. Interestingly, improvements in EHC (i.e. change from pre- to post) were not significantly greater in males than females for year 4 but males increased their EHC scores to a significantly greater level between year 5 and 6 than females. SVJ was found to be significantly improved when looking at a specific gender over time, but no significant difference was found between genders within one school year. Over two years of tracking, increases of height, body mass, BMI, and BF% (all $P < 0.05$) were found. In addition, two tracking years showed an increase in females' BF% from year 4 to year 5 compared to males, but not from year 5 to year 6.

The current study showed that all MA components measured improved with time. This is likely due to maturity, growth and increased skill levels that come with increasing age. Gender differences in improvements occurred only in EHC and SVJ, with males improving their performance of EHC ability over the tracking year to a greater extent than females. The EHC test that was used in this study has not previously been defined as a gender-specific task. However, it may be that this greater improvement in males is due to males participating in more eye-hand coordination activities than females, particularly in their free play. The majority of activities in which males participate at this age involve balls, whereas for females, this involvement is greatly reduced. Alternative EHC tests which could have been used generally involve ball skills or are less specific to EHC, for example

ladder gross body agility tests, and thus tend to look at general motor co-ordination. Interestingly, in a preliminary study conducted, the researcher observed that in this ladder stepping task, females outperformed males in all years. However, Thomas & Marzke (1992) suggested that the gender differences in throwing skills are not only because males have a greater amount of practice than females. At a young age it was noted that even males as young as 3-4 years old were three times better than females. This suggests the skill is developed very early on (maybe by different types of play) or is an innate ability. However, throwing is only a small part of EHC ability and therefore links between the current study and the throwing study should be made with caution.

The growth of the muscles and body mass may affect the improvements in SVJ of both genders. However, the superior performance of males is likely to be as a result of males having greater increases in muscle strength in their lower limbs than females as the SVJ measures lower body explosive power. Furthermore, females tended to have a high BF% which will result in increased fat mass relative to muscle mass (Malina et al., 1995; Raudsepp and Pääsuke, 1995).

The current study showed that tracking PA levels over two years does not illustrate any differences for either the main effect of gender or school year. Both genders tend to spend about 8 to 9 h.day-1 at SPA, and about 2 to 3 h.day-1 at LPA over both one and two tracking years. The current study also illustrated that participants tend to spend only a few minutes per day participating at MPA, VPA, and MVPA levels which means that children are insufficiently active, according to current government guidelines on healthy PA levels. (Department of Health (DH), UK, 2011). The UK Department of Health recommended that children from 5 to 18 years old should be engaged in at least 60 minutes of MVPA including strengthening muscles and bone activities about 3 times a week. The guidelines also recommended that children should minimise the amount of time spent being sedentary and less active. On the other hand, the current study result of PA levels was not different to the current literature (Riddoch, 2007), where 11-year-old UK children tend to participate in about 7.5 h.day-1 at SPA, 5.5 h.day-1 at LPA, 13 min.day-1 at MPA and 2 min.day-1 at VPA levels (Riddoch. 2007). This study also confirmed that a large majority of children are insufficiently active, according to current recommended health levels.

Effect of anthropometric factors on selected MA components

To explore how well changes in the anthropometric measurements were able to predict the changes in each MA component over a period of one tracking year, stepwise multi-regression analysis was used. It illustrated that height, body mass, and BMI were the dominant factors affecting the changes in balance, hand and abdominal strength, and agility.

The positive changes in height were found to be negatively associated with change in balancing. Balance is in part determined by centre of gravity and increases in height and mass may affect centre of gravity, resulting in attenuated balance development. According to Rival et al. (2005), the processes underlying balance ability are mature by 6 years of age, but obviously as height continues to increase the body will have to adapt to the new centre of gravity which will then attenuate an increase in balance performance.

Change in body mass was found to positively affect the changes in hand static strength, but negatively affect abdominal strength. This is likely to be due to increases in upper body mass making it more difficult to undertake the sit-up task, as the upper trunk has to move a considerable distance against gravity. However, hand-grip is a more static strength test which isolates muscle strength from the change in body mass.

Agility improved with increased height and BMI. As this is a more complex task involving different aspects of MA function, this may be due to maturity. However, the improvement in agility with increases in BMI is surprising, as agility requires a quick change in body direction, with a good level of both speed and dynamic balance which may be expected to be lower with increases in BMI. Furthermore, change in balancing ability showed improvement with a reduced change in height. Anthropometric measures showed that changes in sit-up could be predicted only through changing body mass, although none of the other anthropometric measures could predict any other MA components. To summarize the results from this group, some of these changes in MA are likely due to general maturity leading to increased growth, although this is not the case with balance tasks and height. By tracking MA and anthropometric measures over two years, tracking year could also be added as a variable in the regression equation to explore whether the first or second tracking year could predict any of the MA components. The results illustrated that changes in tracking year were the dominant factor in interaction with EHC, sit-up, SVJ, and F8A tests, meaning that the second tracking year showed greater improvements in MA.

The data from two tracking years confirmed that the HG test improved with both increasing change of age and body mass which has been explained earlier through the one-year tracking group. Two years of tracking has also shown an interaction between the sit-up test and BF%. The increase of BF% plays a role in decreasing abdominal strength.

Effects of anthropometric measures and MA components on PA levels

Results from the six participants tracked over two years showed that balancing ability could explain some of the SPA and LPA but in two different directions: negatively with increasing SPA and positively with LPA. This means that children who are deficient in balancing ability tend to spend a great amount of time being inactive, whereas having a better balancing performance relates to increased participation at a light physical activity level. BF%, on the other hand, was shown to be a good predictor of MPA. The findings from the current study showed some relationships between anthropometric measures and MA components and how they could be a good predictor of change in PA level. However, the sample is very small and therefore, interpretations of the results should be made with caution.

In conclusion, the main findings of this study were that all MA improved with tracking year, with improvements in EHC and SVJ greater in males compared to females. BF% was increased over two tracking years, with a greater percentage increase in females than males over time. Height, body mass, and BMI were found to be main prediction factors of MA components. Longitudinal methods of tracking MA and anthropometrics over time nullified the dominating nature of gender

in predicting MA. Moreover, 8 to 12-year-old children tend to spend much time in a sedentary lifestyle and are insufficiently active, according to current UK Department of Health and WHO recommended levels.

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The HEPAS Model: A Healthy and Physically Active School Model Promoting Physical Activity and Healthy Lifestyles in School Settings

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Abstract

The Healthy and Physically Active Schools project aimed at building up the capacity of school-related stakeholders (e.g., teachers, educators, school headmasters) when it comes to the improvement of school-based physical activity (PA) for children and adolescents, as well as their healthy lifestyles in general. (HEPAS; https://www.movingschoolsaward.com/hepas). One of the most important outcomes of the HEPAS project included the development of a complex theoretical model, which is the main focus of this paper. The HEPAS model includes the dimensions and layers that represent the functions and environment of a school from the PA promotion perspective. These dimensions are: 1. Physical Activity; 2. Physical Education; 3. School Sport; 4. Healthy Lifestyles; and 5. Transversal Dimension (i.e., Inclusion and Diversity, Professional Development, Facilities, Equipment & Resources, Community Partnerships, Events, Project Weeks, and Camps). The dimensions are both surrounded and influenced by the social climate and the physical environment. Finally, the model includes an overarching aim of supporting students' physical activity/health behaviours and important considerations are also discussed.

Key words: Active school, Physical activity, Physical education, School sport, Healthy lifestyles

Introduction

Schools have frequently been suggested as valuable settings for interventions to promote physical activity (PA) and wellbeing, and public health entities throughout the world have advocated an increase in PA opportunities for children and young people through comprehensive whole-school approaches (Böcker, 2014; Pavelka, Sigmund, & Sigmundová, 2014; Volkmann, 2015). There are several characteristics of schools that make them well-suited as settings for the promotion of health-enhancing PA:

- Schools can reach almost all children regardless of social background, and have long-term, in-depth contact with them (Bailey, Agans, Côté, Côté, Daly-Smith, & Tomporowski, 2021);
- This contact happens during a crucial period of development, during which many health-related behaviours and interests are formed that can be carried forward into later life (Karnik & Kanekar, 2011);
- Schools present a unique setting for integrating PA with other health-related messages (Böcker, 2010);
- Schools can create easily accessible physical environments in which children regularly engage in PA (Ip et al., 2017);
- Schools, especially primary schools, often act as a hub of community activities, creating a focal point for PA opportunities, both directly [e.g., by organising school-based PA and Physical Education (PE)], and indirectly (e.g., by encouraging PA at home, in the neighbourhood, and during commuting to and from school) (Guinhouya, 2010);
- School lessons and other supervised periods are the only formal opportunities for the promotion of knowledge, skills, attitudes, and values that underpin regular PA (Cale, 2020).

It is crucial to highlight that PA can be intentionally used before and after the school day (i.e., in the frame of leisure time and active homework), during the school day (i.e., in the frame of pre-school and after-school clubs and activities as well as physical activity-related school events) and during classes (i.e., in the frame of PE but also as active-dynamic sitting, active breaks, active classroom learning, relaxation phases and cross-curricular classes) as well.

In general, low levels of PA, and negative attitudes toward sports and PA can be significant issues at the school level. Low levels of competence and confidence may result in children avoiding PA settings, thereby removing themselves from the context that is most needed. One way of envisaging the evidence that relates to this situation is the *virtuous cycle* presented in Figure 1.

The Healthy and Physically Active Schools (HEPAS) Model

The HEPAS model (Figure 2, below) attempts to represent some of the key features of an Active School. The label 'model' is deliberately chosen. In the words of Keeves (1988, p. 559), "the model, like the hypotheses, which are contained within it, can be built from accumulated evidence, intuition by analogy, or derived from theory". This model describes a framework for investigating the realisation of a school environment in which PA is fully integrated and promoted.

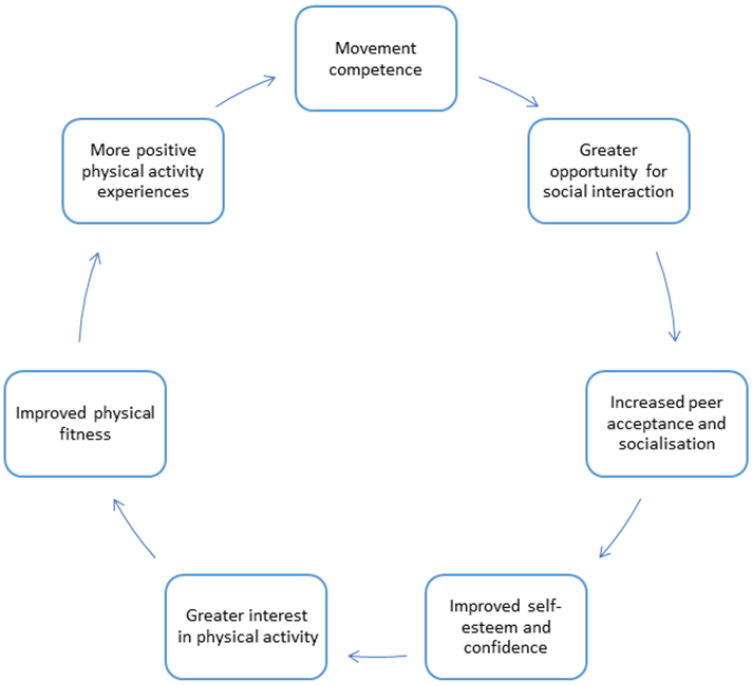

Figure 1 The virtuous cycle of interactions between movement skill development and psycho-social development (adapted from Bailey, Doherty, & Pickup, 2007)

From the perspective of the Active Schools concept, it is important to understand the range of forces directing educational practice. It is also important to understand how those forces can be directed towards or away from PA promotion. Numerous authors discussed in this document have suggested that whole school activity promotion requires an "activity leader" who can coordinate the various elements and activities, but, importantly, act as a central advocate for the growth of the Active School.

Within the school, several key stakeholders for PA can be identified. An activity leader is obviously going to play a pivotal role, and will usually be either a PE specialist or someone who has experienced considerable professional development. Most teachers, it is known, have not received significant preparation to promote PA, and the need to ensure continuous professional development is a theme that repeatedly emerged from the literature reviews. Parents and the wider community need to be engaged, as a central concept of the Active School is the abandonment of the traditional division between in-school and out of school activities. Active Transport and Active Homework are good examples of this new approach; they would be impossible without the full support of parents and within an activity-friendly local environment. And with the growth of public and private partnerships in developing new facilities, there is likely to be a growing expectation across Europe that schools explore ways of co-funding, co-managing, and co-using facilities.

The most important people within the school are, of course, the students. The realisation of the WHO goals will not happen if it is left solely in the hands of teachers and parents. Daily PA

assumes a great deal of cooperation and decision-making by children and young people, and several studies examined in the HEPAS project have highlighted the importance of early engagement of students in change towards a more active school environment. The word 'active' is interesting within this context, as it has two distinct meanings within the educational literature. The first, which will be familiar to readers of this paper, relates to PA and exercise, and its opposite, 'passive', indicates sedentariness. The second sense of 'active' within educational theory indicates pro-activity, enthusiastic, and dynamic. The opposite idea is 'passive' as docile, apathetic, and uninvolved. Perhaps both senses of the term 'active' should be applied to the concept of the Active School?

The different elements of the HEPAS framework are discussed later in this paper. It is important to remember that these are not the only settings for the promotion of PA in schools, nor are they the most effective. Some of these elements are under-researched, and so it is difficult to make an informed judgement about their use. Active Homework is, perhaps, the best example of this. Of course, other settings and approaches could be added to this list. For example, standing desks, bike-desks, walking buses, outside clubs for PE lessons, morning exercises, and many other activities might be considered and added to the list of settings.

To avoid the danger of repetition or redundancy, there is the necessity of some sort of coordinator, such as an activity leader, to ensure that the different elements work synergistically. So, the movement skills developed in PE lessons could be applied and practised in Homework. They could also be practised during Recess and sports clubs, especially they are planned collaboratively. Likewise, professional development will probably be needed to support Active Breaks and Active Learning, which could easily connect with PE lessons and Active Recess. In other words, whole-school PA requires whole-school planning.

Another aspect of the model relates to the context in which PA takes place. The importance of facilities and equipment has been discussed earlier. Despite a lack of research in this area, it seems reasonable to suggest that the absence of adequate space and play equipment will limit PA. Indeed, there is some evidence that the amount of available space (playgrounds, fields, gymnasiums) positively relates to the amount of PA taking place (Pawlowski, Tjørnhøj-Thomsen, Schipperijn, et al, 2014). There was also persuasive evidence that perceptions of the physical environment are more important than the environment itself. Dark, untidy, or badly maintained equipment or play areas reduce the likelihood of activity. Bright, colourful playgrounds are known to promote active play. Social climate refers to the non-physical aspects of PA within the school. Friendly, supportive and inclusive environments are much more likely to promote PA, especially those who are traditionally marginalised, such as girls and the overweight. Teachers and other school staff are vitally important in creating this climate, by promoting and enforcing relevant rules and norms, promoting positive peer relationships, and celebrating diversity.

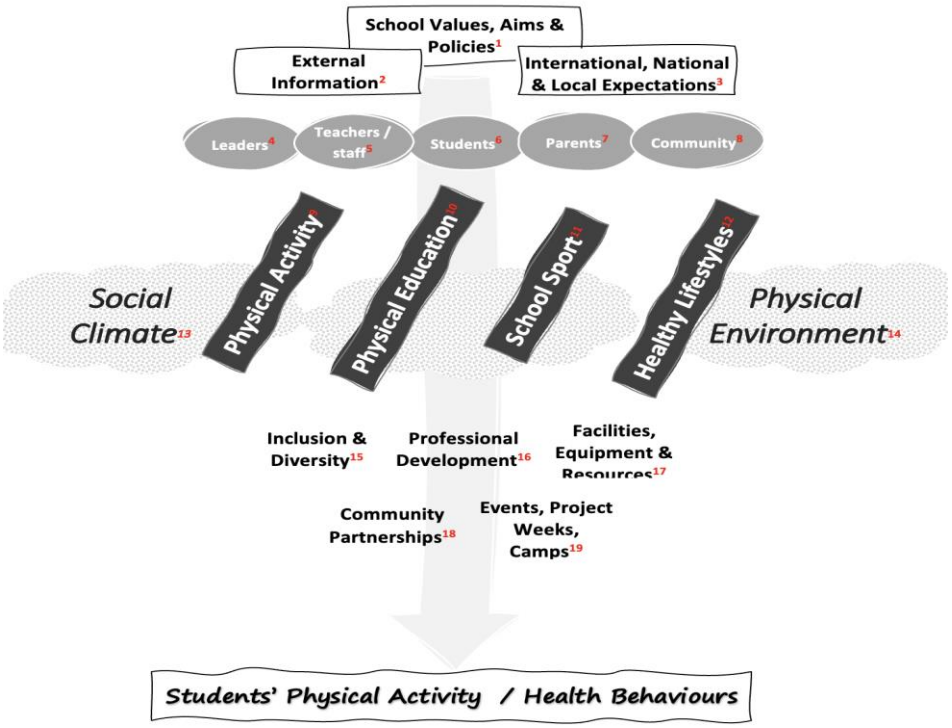

Figure 2 The HEPAS Model of an Active School

The project team used the following definitions to describe the different elements of the HEPAS model:

1. **School Values, Aims & Policies** often discuss aims and values regarding physical activity and health promotion, as well as more general goals. In addition to these explicitly presented aims and values, schools called implicit aims and values that are not discussed but reflect assumptions and priorities.
2. **External Information** might include information from scientific research, traditional and social media, and consultants and advisers.
3. **International, National & Local Expectations** range from international guidance, such as the WHO Physical Activity targets, to national curriculum, and municipal and local policy statements.
4. **Leaders**, such as school headteachers/principals, school governing bodies, and other leadership bodies, are known to be crucial mediators between policy and practice.\
5. **Teachers / Staff** and other significant adults are responsible for the promotion of physically and healthy lifestyles of learners. In addition to teachers, this might include sports coaches, teaching assistants, and volunteers.
6. **Students' voices** in planning, delivery, and evaluation are vital elements in supporting sustainable health-related initiatives.
7. **Parents** and families influence learners' engagement with healthy lifestyles, both in and outside of school.
8. **Community** refers to members of the local area, relevant service providers (such as school neighbours, sports club owners, municipal leisure stakeholders).

9. **Physical Activity**, according to the HEPAS Project, includes Active Homework, Active Learning (active lessons), Active Recess, and Active Transport (to and from school).
10. **Physical Education**, according to the HEPAS Project, includes school PE lessons and physical teacher education.
11. **School Sport**, according to the HEPAS Project, includes competitive and non-competitive activities taking place outside of the normal school day.
12. **Healthy Lifestyles**, in this context, refers to the findings of the consensus study on the most effective elements of learning and health support systems influencing school students' healthy lifestyles education.
13. **Social Climate** refers to characteristics of the psycho-social environment and includes interpersonal relationships, staff-teacher relationships, peer relationships, staff beliefs and behaviours, staff communication styles, lesson and activity management and group processes.
14. **The Physical Environment** is made up of the real and perceived characteristics of the physical context in which children spend their time (e.g., home, neighbourhood, school) including aspects of urban design (e.g., presence and structure of sidewalks), traffic density and speed, distance to and design of venues for physical activity (e.g., playgrounds, parks and school fields), crime and safety.
15. **Inclusion and Diversity** refers to policies and practices that promote the participation and engagement of all learners, irrespective of dis/abilities, gender, or other socio-economic factors.
16. **Professional Development** refers to the formal, informal, and non-formal professional training opportunities for qualified teachers and other school staff.
17. **Facilities, Equipment & Resources** refer to any school capital structures and spaces associated with the promotion of health and physical activity, including gymnasia, play equipment, fields associated with the school, and sports equipment.
18. **Community Partnerships** include any formal or informal understandings between the school and members of the local neighbourhood. This might include, for example, sports groups, religious and community associations, and shop owners.
19. **Events, Project Weeks, Camps** are examples of extra-curricular activities that support the promotion of physical activity and healthy lifestyles, but usually take place outside of school hours and away from school premises.
20. **Students' Physical Activity / Health Behaviours**, in-, after-, and out-of-school, are the intended outcomes of Active Schools.

The Five Dimensions of an Active School – Definitions and Categories

Physical Activity

Physical activity (PA) is behaviour that involves human movement, resulting in physiological attributes including increased energy expenditure and improved physical fitness. It includes the following categories:

Active Breaks
A short bout of PA performed as a break from academic instruction to increase or decrease students' activation.
Active Homework
Assigned physically active homework tasks that students can do on their own or with family members.
Active Learning
The use of PA lessons in which curriculum topics are delivered through movement.
Active Recess
The dedicated break time for school-based children to engage in spontaneous play (self-organised) or in structured play (active), but out of the formal subject-content curriculum.
Active Transport
Travel that incorporates all modes of transport relying on human power for propulsion.

Physical Education

Physical Education (PE) is supervised, structured PA experiences that are part of an explicit curriculum domain, taking place during the school day. It includes the following categories:
Curriculum PE Lessons
Curriculum PE lessons are written, articulated plans for how standards and education outcomes in PE will be attained. Curriculum PE can be viewed as the content of the lesson that is taught and also as the result of how children can include PA into healthy lifestyles later.
Teacher Education Workforce
Physical Education Teacher Education (PETE) and workforce training are an essential part of quality PE. PE teachers may be the only members of school staff professionally trained to work with students in PA settings and thus promote a Healthy and Physically Active School concept.

School Sport

School sports are organised sporting activities within the school with the primary goal of enhancing pupils' knowledge, skills, and competencies in a selected sport. It can be competitive or non-competitive. It includes the following categories:
Competitive School Sport
Result and performance-oriented individual or team sporting activities with comparable competitiveness, in local, regional and/or national championships systems, such as Student Olympics and Inter-School competitions.
Non-Competitive School Sport
Regular, non-result-oriented individual or team sporting activities for educational, health, recreational, fun, or social reasons, such as school running, movement, dance clubs etc.

Healthy Lifestyles

Healthy lifestyles

The collection of decisions by individuals which affect their health, and over which they have some degree of control. The deployment of a healthy lifestyle education programme in a school setting is shown to be more effective through the empowerment of key stakeholders to develop the basic components of the practices that will develop the strategy and policies. It includes the following categories:

Healthy School Policies

Healthy school policies are part of the strategy of the school and define those elements that are most effective for promoting healthy lifestyles, both in a general plan that will contemplate health promotion programmes for staff, family & community engagement, and healthy eating, as well as on a more specific level with concrete actions in promoting physically active lifestyles or social, emotional, and sex education.

Family & Community Engagement

Six types of family and community engagement have been identified as especially relevant: parenting, communicating, volunteering, learning at home, decision making, and collaborating with the community. By observing active behaviours and lifestyles in their families and communities, students can internalise healthy habits, especially if health messages are shared among the triad of school-family-community.

Healthy Eating

Healthy eating means eating a variety of foods from each of the major food groups, in the amounts recommended, so that diet contributions positively to overall health. Healthy eating could be developed through specific programmes, school-based interventions combining easier access to fruit and vegetables within classroom lessons and even using engaged students as change agents.

Social & Emotional Education

Social and emotional education is the process through which students acquire and apply the knowledge, attitudes, and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions.

Health Promotion Programmes for Staff

Health promotion programmes involve deliberately training in specific topics such as school policies, physical environment, social environment, community links, and health-sector partnerships.

Sex Education

Sex education involves teaching and learning about a variety of topics related to sex, sexuality, and relationships, exploring values and beliefs about those topics, and gaining the skills that are needed to navigate relationships and manage one's sexual health.

Transversal Dimension

Transversal dimensions are the themes that cut across the settings and elements that provide the HEPAS framework. These themes feed into and are relevant to each of the settings. What follows are summaries of these categories as they relate to the reviews above, with specific examples from the literature to highlight their application within HEPAS. It includes the following categories:

Inclusion and Diversity

These themes deliberately address and respond to the diversity of needs of all learners through increasing participation in learning, cultures, and communities, and reducing exclusion within and from education. It involves changes and modifications in content, approaches, structures, and strategies, with a common vision that covers all children of the appropriate age range and a conviction that it is the responsibility of the regular system to educate all children.

Continuous Professional Development

Continuing professional development is the intentional maintenance and development of the knowledge, skills, attitudes, and values needed to perform in educational contexts. It can include formal training, collaborative practice, coaching, mentoring, peer review, reflective practice, enquiring practice, action research, etc.

Facilities, Equipment, and Resources

These represent the physical sites and materials necessary for participating in curriculum activities.

Community Partnerships

These partnerships allow schools and community members to work together to identify a common issue or problem and develop a plan of action to address it.

School Events, Project Weeks, and Camps

School events are events that take place either in the school itself or by the school community in other settings. Within the context of the Active School concept, school events give a special focus on students' physical activity experiences. Project weeks are extended educational activities that give students the opportunity to exp0lore different aspects of a specific theme. Examples of project week topics might focus on physical activity, health, sport, or the local environment. Camps enable students to explore, extend and enrich their learning and development in a non-school setting. Camps typically involve activities requiring at least one night's accommodation away from home. Physically active camps may have sports, health, or cultural emphasis and can be important aspects of the educational experiences offered by schools.

Conclusion

The Active School concept is a practical solution to the challenge of promoting PA among school-aged children and young people. By expanding, extending, and enhancing settings and opportunities for PA, it offers a manageable methodology for achieving the international target of at least one hour per day, including periods of moderate-to-vigorous PA and vigorous PA. Evidence suggests that the Active School concept is popular with students and teachers, causes no harm to academic achievement (and can enhance it), and can significantly increase the quantity and quality of PA experiences. Of course, not all students benefit from PA opportunities equally,

and schools and teachers must work to ensure that the PA settings do not merely result in more opportunities for those who are already active. Strategies need to be put in place to support the needs and interests of girls, overweight/obese students, and other groups who have been marginalised or excluded from PA in traditional school settings.

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Behavioral Disorders in Children Owing to Confinement by the COVID-19 Pandemic - Proposal of Daily Goals to Restart Physical Activity for Mental Health

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Abstract

There is increasing scientific evidence that continuous physical exercise offers significant positive effects for improving mental health. Health restrictions show how children react to these events (pandemic confinement), in the results of the tests applied, we can see how children are emotionally affected and we must think about how we are going to compensate for these deficiencies, from parents, family, neighborhood and society. There are notorious eating disorders, not only mental ones, it is not a lost generation, they are just fragile, they are affected and they are cautious with the way in which assistance and safe return to social activities are gradually normalized.

Key words: Confinement, Physical activity, Quarantine restrictions, Mental Health, Pandemic, COVID-19

Context

On March 11, 2020, in a statement given by Tedros Adhanom Ghebreyesu, Director of the World Health Organization, thus declaring Covid-19 a pandemic, in this way the world leaders took sanitary measures to bring down or at least try to mitigate the effects of the virus in their countries, borders were closed, the population was confined to their homes, declaring a quarantine that expanded to 2 years of confinement, there were businesses closed, and people lost their jobs for the same reason, life as we knew, radically changed, the work has been done remotely and only at the beginning of 2022 has it returned to face-to-face classes. (Caballero, 2021:15)

The confinement practically led children from all over the world to a period of 2 years of inactivity and if we add to this the serious problems of sedentary lifestyle that the Mexican population already had, which in addition to poor eating habits, 6 of each 10 Mexican children have obesity, overweight or even some type of chronic degenerative disease derived from these same health conditions according to the 2020 National Health and Nutrition Survey on Covid-19 National Results, applied in the year 2020 and published in the year 2021 by part of the Ministry of Health of Mexico.

Having this context, we will be able to give an analysis of the severe problem that comes as an act of repercussion in the form of a whiplash in children that will increase their symptoms in the long run, that is why this type of proposal They seek to generate changes in the physical and mental plane to be able to have health in both directions.

The effects of exercise on psychological health in children and adolescents specifically on children and adolescents, reviews have been carried out on the topic we are dealing with. Among the most recent, we can first highlight that of Biddle (1993), who states as a summary that the study of the benefits of exercise on psychological health requires an expansion in pediatric research. Given the fact that physical exercise can have positive emotional effects and whose children suffer from emotional problems, the rational arguments for the preventive and therapeutic effects of exercise that are used from the biological perspective can also be applied from the biological point of view psychological. In this sense, one of the key issues facing educators at the moment is the development of self-esteem in children.

Consequently, the potential beneficial effects of physical exercise on this subject are an important issue to consider, both from the point of view of health and from the educational point of view. Calfas and Taylor (1994) analyzed the existing literature on this subject in the ages between 11 and 21 years, as a result they concluded that the most consistent effect about the improvement of psychological health is the increase in self-esteem. In addition, they also found a relationship between the practice of physical exercise and a decrease in anxiety among the practicing subjects. (Tejada, J. & Nuviala. 2016:18)

From behavioral problems to behavioral disorders

At first, it is important to define when children's attitudes are a relevant problem and when it is just one more step in their normal self-development, that is, not all the behaviors observed in this pandemic are the result of confinement, many of the Behaviors are now carefully viewed due to the global health situation, but not all of them are caused by COVID-19.

From this consideration, the importance of evaluating behavioral problems is observed, to see if they are at risk or not; in this sense to adhere to a possible diagnosis and subsequent physical and mental treatment since without a doubt one cannot exist without going hand in hand with the other. On the other hand, behavioral disorders are characterized by repetitive patterns of dissocial, provocative or aggressive behavior in children between 8 and 11 years of age according to ICD-11, which is the International Statistical Classification of Diseases and Related Health Problems (WHO) in its last update 2019 and replicated for Latin America, through PAHO (Pan American Health Organization).

When we evaluate behaviors in a child, it is important to take into account the age, the level of socioeconomic development, among many other traits, since many behaviors that can be called normal at certain ages or situations are not, however we must remember that the origins of our behaviors are of a multifactorial, environmental order and it is important to detect any physical, psychological or mental situation at an early age in a timely manner and more so when talking about what happened in this pandemic that paralyzed the world, since any mental disorder can evolve in future adults with a type of disorder or with a problem at some stage of their future life which could lead to mental consequences due to confinement and all its social remnants, which is already beginning to be called the second pandemic, the mental pandemic of COVID- 19.

Although we cannot confirm at this early stage of the pandemic's progress with such certainty whether or not children and young people could develop a mental disorder or some type of disorder associated with the pandemic, what we can confirm by reviewing the history of the planet, are the social experiences where there was also confinement due to the war, for example, in them we can observe that isolated people, replicated some personality disorder or even chronic mental disorder at some point in their lives and that they present some unwanted personality traits that were directly negatively affected by this situation, that is why we must be guided by past experiences to project and see that they somehow left knowledge, experiences and thus on this occasion to be able to diagnose promptly and act promptly to be able to counter by giving a range of healthy physical activity options for health so that children (body and mind) can better integrate into society after two years of confinement, where at this point in the year it already appears to be the final part of the COVID-19 pandemic.

The research methodology used in this chapter is mixed, supported by the collection of data supported by the survey tool of a single edition for parents and interviews with children. In order not to start from assumptions, but from tangible realities, it is necessary to mention that a battery

of psychological evaluation was used, the ESPERI test for parents of children aged 8-11 years (questionnaire for the detection of behavioral disorders in children and adolescents, answered by the parents of the children) with linear scale interpretation, on this occasion it is very difficult to have a control group, since everyone suffered from the pandemic so it would be very difficult to find people who have not been confined.

Results

In order to interpret the questionnaires applied to a population in the first instance, the ESPERI Test, a questionnaire for the detection of behavioral disorders in children and adolescents, created by the O Belén Madrid foundation, was used. The Purpose is the early detection of behavioral problems to carry out an early and precise intervention. It must be remembered that this test is not for a conclusive diagnosis, but rather indicators of the probability that you suffer from a behavioral disorder are sought.

On this occasion there was the participation of 87 parents of children between 7 and 11 years old who were male and female, the conclusions and results of the study highlight all its manifestations, with differences between males and females, the latter have higher score in impulsivity and hyperactivity in males. The score and interpretation ranges are applied as normal, mild, moderate and severe, the risk cases are subjects who are above the 600th percentile in the various factors, if it is less than 600 they do not present a disorder in that trait, the three factors to analyze are Attention-impulsivity-hyperactivity (IIH), the second is Oppositional Defiant (OD) and the last is Predisocial and Dissocial (PDDI). The first two show a high rank and the third is below the middle percentile, the results of the analysis of the answers of the questionnaires are shown in detail and in this way to elaborate the profiles, everything is based on the criteria of the DSM-V and the ICD-11 of the World Health Organization.

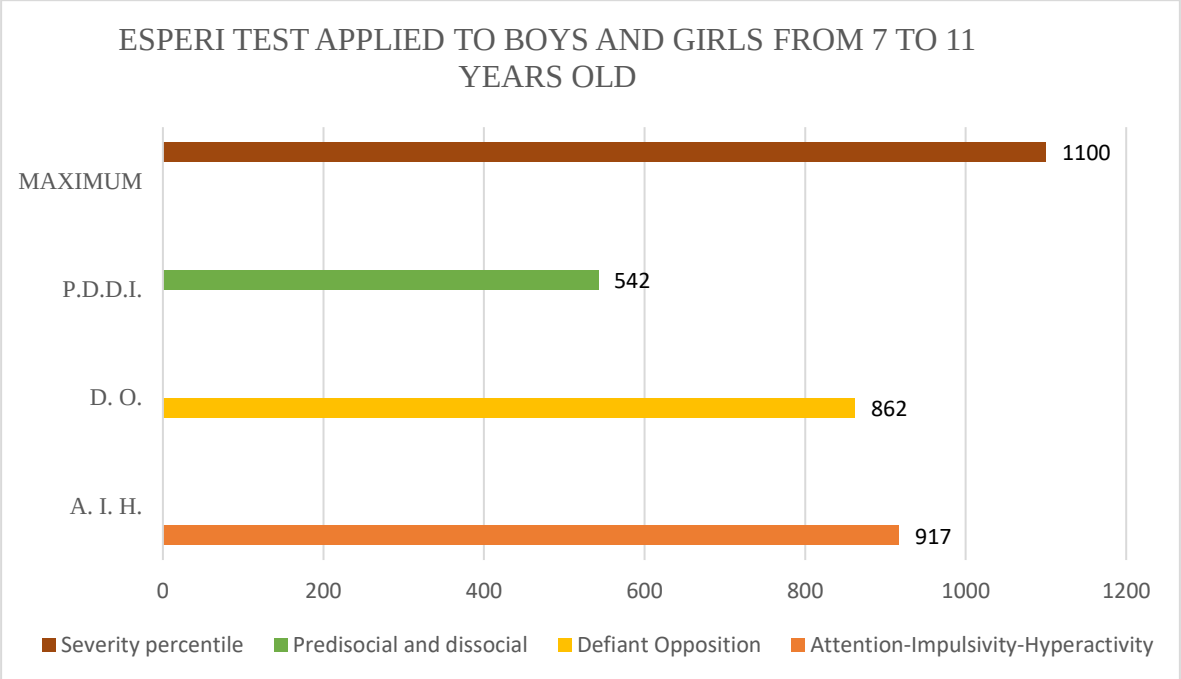
In this sense, it is necessary to briefly comment on what these three criteria that it evaluates refer to in order to have a clearer result divided as factors:

Table 1 Observation factors ESPERI Test with brief description

Factor 1 A.I.H. Attention-Impulsivity-Hyperactivity	It is based on different predictive components of ADHD (Attention Deficit Hyperactivity Disorder)
Factor 2 D. O. Defiant Opposition	It is a pattern of disobedient, hostile and defiant behavior towards authority figures.
Factor 3 P.D.D.I. Predisocial and dissocial	Children with Conduct Disorder are selfish and insensitive to the feelings of others and may bully, damage property, lie, or steal without feeling guilty.

The cause of oppositional defiant disorder isn't exactly known, but it may involve a combination of genetic and environmental factors. Symptoms usually appear before the age of eight. They include irritability, combative and defiant behavior, aggressiveness, and revengefulness that last more than six months and cause significant problems at home or school. The symptoms of conduct disorder, usually, in children with conduct disorder have the following characteristics: they are selfish, they do not relate well to others, they lack an appropriate sense of guilt, they are insensitive to feelings and welfare of others, they tend to misinterpret the behavior of other people as a threat and react aggressively, undertake intimidating actions, threats, frequent fights, may be cruel to animals, may damage property, lie or steal.

Conduct disorder affects boys and girls differently. Girls are less likely to be physically aggressive. Instead, they often run away or lie. Children tend to get into fights, steal or vandalize. They often seriously violate the rules, including running away from home and frequently being absent from school. These children are prone to drug use and abuse and have difficulties in school. They may have suicidal thoughts and should be seriously considered. Children with conduct disorder may have other disorders, such as depression, attention deficit/hyperactivity disorder, or a learning disorder. About two-thirds of children outgrow inappropriate behavior by the time they reach adulthood. The earlier Conduct Disorder appears, the more likely it is to persist into adult life. If the behavior continues into adult life, it often leads to legal problems, pervasive violation of the rights of others, and frequently a diagnosis of antisocial personality disorder. Some of these adults develop mood disorders, anxiety, or other mental disorders.



Picture 1 Resultados del Test ESPERI 2022

Target

Develop a social policy that promotes attention to the main demands of society for physical activity for health after the COVID-19 pandemic from the perspective of physical activity for all, that is, from a holistic perspective to contribute to the global development of children in the State of Veracruz, Mexico, through strategic planning with real impact over time motor commitment and controlled aerobic activities improving health conditions, inclusion, transparency, opportunities and thus expand the scope of action of the municipalities serving all sectors of society in a state of vulnerability.

The concept of health, according to the world health organization is the complete state of physical, mental and social well-being, here two of the topics addressed in this research are included. "Among the behaviors that are considered favorable for health, and that consequently should be part of a healthy lifestyle, three types of habits are fundamentally identified: correct nutrition, adequate and regular practice of physical activity, and rest patterns. regular and of appropriate duration. ((Tejada, 2016:15))

Project scope (target audience)

Develop healthy lifestyle habits through physical activity and sports for all in children and adolescents, as well as with people with and without disabilities. Correct use of free time, creative and recreational physical activities, creating permanent healthy lifestyles after the COVID-19 Pandemic in the State of Veracruz, Mexico.

To achieve our objective, we propose 4 core programs:

1. Sports Promotion.
2. Sports Material Support, with municipal management.
3. Creation and Rehabilitation of Sports Spaces.
4. Education and Training of Trainers and Sports Promoters.

Action Plan and Strategies

- Planning and Quality in the services provided.
- Suitable and trained Human Resources to develop the activities.
- Acquisitions and quality services.
- Healthy Finances.
- Infrastructure.
- Comprehensive communication and social closeness plan

Permanent campaign of physical activation for health. "Sport for all"

Supporting physical activity, along with an approach (educational and informative), This comprehensive action plan identifies four strategic objectives:

1. Inform all the fathers and mothers of the children to raise awareness towards an active society.
2. Educate physically through various activities, creating active environments.
3. The action lines of permanent physical activation.
4. Evaluate the results, through monitoring and reporting, can be achieved through 13 benchmarks that apply to all residents, obviously graduating depending on age, whether or not they have a disability, health status, clinical history, among other factors. , recognizing that Mexico and especially the State of Veracruz is going through some stage of obesity and that we show sincere efforts to reduce the levels and habits of lazy sedentary lifestyle:

Actions

1. Communication campaigns on optimal practices of physical activity for health, thus sensitize parents with the knowledge, understanding and appreciation of healthy lifestyles and their visible long-term impact on the body, the family, the neighborhood, the community and the State.
2. Organize regular mass activities in public spaces hand in hand with the municipal sports committees, such as yoga classes, Zumba and night activities by bicycle, where the community participates, with easy access and free of charge.
3. Training of professionals who provide the service before and during this series of events, especially in recreational activities, leisure and recreation, social sports and physical training in community groups based on the person's biotype, age and health status.
4. Converse with the powers of government to integrate urban planning policies, reinstatement of abandoned or neglected sports areas, among others.
5. The use of the bike lane in the city to generate the habit of traveling to work places by bicycle and thus cover the demand for transportation, reduce pollution, as well as traffic in the city and therefore physical activity that generates active lifestyles and healthy.
6. Improve access to open public spaces and green areas, green networks and recreational spaces, as well as parks to make the most of them and make them safe areas where people can walk, carry out some specific physical activity or of a recreational nature adapted the activities to people with disabilities and older people reducing inequality gaps.
7. Real massive physical activations in schools, as well as in public institutions to activate workers who lead sedentary lives and generate good movement habits in them.
8. Start up an evaluation and follow-up system for people with sedentary behavior from the State Health Secretariat and in this way refer them to where they can carry out physical activity according to their current physical situation, that they be gradually activated and provide a tracing. (this is where physical and sports educators are in charge of prescribing physical activity)

9. Encourage people who have the opportunity to promote an active state of health, supporting companies with subsidies or even vouchers that serve to be exchanged in committed and sponsoring companies that generate active lifestyles with repercussions on social support.
10. Physical activity for the elderly for a healthy and active ageing.
11. Strengthening of active community environments in marginal areas or areas of difficult access where someone is trained and can be a physical activating agent.
12. Strengthening and creation of school leagues, not only as seedbeds for future athletes, but also for people who from a young age can have the experience of physical activity through sports to generate healthy lifestyles, the earlier the age is better and will be lasting to generate healthy and active lifestyles. With various sports with the support of state sports associations and specialists in physical activity.
13. Development of programs for vulnerable groups, to offer these sectors ignored by the government physical activity for health in a systematic way to generate healthy lifestyles in this part so neglected by society and provide them with the opportunity of movement and lifestyles assets, away from vices and delinquency.

Conclusions

The restrictions against social interaction, without a doubt, are the ones that brought the most negative effects in terms of the well-being and behavior of all children, the decision made by the World Health Organization to confine ourselves in the face of the serious pandemic and even the organisms Health officials from each country who, depending on the incidences, mortality rates and despite the risks caused by the contagion and the symptoms of covid-19, locked us up, where it can be mentioned that there is a brief risk as a side effect of damaging the sense of smell and children's taste in the long run and there are even studies that indicate a prevalence of persistent Covid-19 contagion and even an increase in childhood diabetes, really although we have this information, the truth is that definitive conclusions cannot yet be given, because we are still in a very primary phase to be able to establish forceful criteria of the effects of this pandemic on a physical and therefore mental level.

Director of the Psychiatric Center for Children and Adolescents of the Medical University of Innsbruck in Austria, Dr. Kathrin Sevecke, investigates the repercussions of the pandemic on children and adolescents, aged between 3 to 13 years, she confirms that in children allied in their research, the feeling of negative emotional charge has increased, persisting the feeling of threat, uncertainty, worsening of mood, emotional deprivation, feelings of fear and this without a doubt has greatly reduced the quality of life in children which has decreased, some children express loneliness, and a notorious difficulty to carry normally all the festivities and social activities to which they were accustomed in their daily life, burdened with worries from adults since there were layoffs and the uncertainty of the parents and their concerns permeate the mental health of children, they learned so many things as adults that in other circumstances they would not know They would also comment that there is a brief difference between the sexes, since it was noted that boys express

themselves more quickly, showing aggressiveness, while girls are more cautious in these circumstances, although it really shows that both are equally overwhelmed and mentally exhausted. The rates of domestic violence also cause repercussions, and although all this is multifactorial, as well as seeing friends again, resuming classes, we really think of mixed solutions where we gradually move from virtuality to the present, it is important to observe little by little Little how the behavior of children and young people develops to be able to give attention to any trait that implies some kind of mental disorder in them.

Physical activity has important benefits for the health of the heart, body and mind, physical activity helps prevent and manage non-communicable diseases such as cardiovascular diseases, cancer and diabetes, physical activity reduces symptoms of depression and anxiety, Physical activity improves thinking, learning, and judgment skills Physical activity ensures healthy growth and development in young people Physical activity improves overall well-being Globally, 1 in 4 adults fall short of physical activity levels recommended globally, up to 5 million deaths a year could be prevented if the world population were more active, people who are insufficiently active have a 20% to 30% increased risk of death compared to people who are sufficiently active, more than 80% of the world's adolescent population does not have enough physical activity, according to the Pan American Organization Of the health.

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Best Practices

"Creix amb Dansa": Healthy Active Living Project for Children and Youth, based on a Leisure Education initiative and NeuroEF principles through Dance and Physical Education

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Abstract

This article draws from a specific Healthy Active Living intervention within leisure education scheme, carried out from 2015 in rural accommodations in Catalonia. The project has been implementing over 7 years as part of a summer camp unique curriculum intervention for students aged 8 to 16 years old. The main objective of the initiative is to provide a quality educational setting based on student's social interaction and critical thinking as well as acknowledging Dance and Physical Education as tools for improving health quality standards and Social Transformation values within the participants. The initiative is promoted by education professionals and taking the shape of a joint project between *Creix amb Dansa* and *Inncredu* organisations. A multi-method intervention and pedagogical strategies such as peer-feedbak and project-based learning have been adopted over the years to promote specific encounters among students, and to reinforce the importance of health in several areas. According to neuroscience findings related to physical education known as *NeuroEF* (Pellicer, 2015), the project has wanted to highlight the importance of understanding health as a wider spectrum of "healths" (*Physical Health*, *Mental Health*, *Emotional Health*, *Inner Health* and *Social Health*) and deploying a number of activities to cover them. Over the years, participants have been benefiting as the intervention have met general Dance and Physical Education objectives and competencies, as well as improving emotional intelligence, personal and social values.

Key words: Quality Physical Education (QPE), Leisure Education (LE), Dance, Neuroscience, NeuroEF, Health, peer-feedback, project-based learning, Social Emotional Learning, Personal & Social Values, Social Transformation.

Introduction

Creix amb Dansa was created by a group of enthusiastic professionals planning to deliver leisure education activities based on neuroscience findings about the impact of motor movement into several human body systems and the learning process of the brain. The initiative was originated, putting into practice years of leisure education knowledge, aiming to generate a unique educational proposal with a renovated vision and generating a fulfilling educational option for families. Although leisure education has been improving their summer time proposals, back in 2015 there were still large number of proposals in the market based on a sequence of activities with a lack of educational objectives, or made as a part of a massified proposal produced in order to gain large sums of income during a short period of time.

On one hand, there were sporting initiatives, covering a wide range of sports during a period of time with a certain technical input, depending on the age and aims of the group of participants. In this group we could also find a large number of mountaineering-related activities led by scout organisations, a very popular activity across the Catalonia region. On the other hand, a number of mixed initiatives presenting a wide range of activities from different disciplines, but with a lack of intentional educational input and generated to solve a particular family organisation management during summer time. Both proposals, as well as many specific others such as technology campus, arts and crafts or more specialised options, were created with the aim of entertaining rather than generate a place for alternative education.

Literature review

For the realisation of this project, over the years, relevant literature has been reviewed in order to obtained documentation to reinforce the professional praxis. We have looked at the importance of the brain in improving general health thanks to the motor movement of the body and the *NeuroEF* impulse as a way to implement Neuroscience findings; as well as Dance as an educational tool, Quality Physical Education principles and Social Transformation as a critical pedagogy for education.

General aspects of neuroscience

Since the beginning of the century, neuroscience has proved the close relationship between movement and brain health in order to delay its ageing process. In fact, doing regular exercise can be seen as one of the crucial aspects to help in improving the cognitive functioning. Back in 2008, John Ratey stated that exercise help in enlighten the brain, thanks to the improvement of the prefrontal cortex as a responsible of many executive tasks: planification, organisation, evaluation, learning, keeping attention, etc. (Ratey, 2008). According to the author, this is possible thanks to the deployment of BDNF (Brain-Derived Neurotrophic Factor) during exercise. Increasing BDNF helps in improving learning factors, attentional skills, motivation and the lasting effects of the memory (Ratey, 2008).

In more recent years, other scientists have proved that doing exercise produces an increase of blood flow that helps in having more cerebral activity and generating substances responsible for increasing synaptic plasticity and neurogenesis (Morgado, 2014). It has been also proved that doing physical exercise creates new blood vessels into the brain helping in the learning process. Finally, some scientists have suggested that without regular physical activity the brain perceives that its neurones are not as important as other neurones across the body and tends to cut them off, seriously impacting in brain's capacity to solve mathematic problems and producing reflexive writings. (Sousa, 2014).

NeuroEF (a neuroscience Physical Education perspective)

NeuroEF is a theoretical proposal of Irene Pellicer (2015) put into practice thanks to its delivery during PE sessions. Within the theory, health is broken up into 5 dimensions (**Physical Health, Mental Health, Emotional Health, Inner Health and Social Health**) that help in building a general integrative Health of human beings. The idea is to create a path, starting with understanding, protecting and working with our body as the basic element for the generation of movement and the **Physical Health**. After providing movement into the body the second steps lead us to the **Mental Health** as a result of increasing exercise and in relation to neuroscience findings of benefits directly related to the brain.

The third level impacts on **Emotional Health**. Incorporating the treatment of this health into the educational process helps in treating emotions as a fundamental part of children and youth curriculum. Provide learning tools for a better listening, knowledge, expression and management of emotions that have a direct relationship with our physical body (Pellicer, 2015). Dealing with emotions helps in having a better understanding of our inner body related to **Inner Health** as a fourth level of this process. Helping students in taking time to look and work with their inner health will result in a better self-understanding and therefore, in a better relationship with their outer world in terms of harmony and sustainability (Pellicer, 2015).

The last stop of the health journey ends up with the **Social Health** as a way to connect everyone's inner world with the rest of the people and their own personal perspective about life. Taking into account that human beings are considered gregarious animals it is crucial to learn how to relate to others. Improving non-verbal communication, solidarity, cooperation and other basic social skills are crucial in order to be able to function within a group of people. Some scientists support the theory that in adolescent ages the brain creates a sophisticated net of neuronal connections linked with rewards and positive social interactions. Social rejection during youth period could end up in a general perception of danger towards others and block, peer social learnings.

Dance as an educational tool to improve overall wellbeing

Dance can be worked individually in order to discover a range of self-perception and creativity, as well as in group in order to enhance fellowship and positive coexistence towards reaching a joint objective. In spite of being a part of an educational process, participants in a dance project can

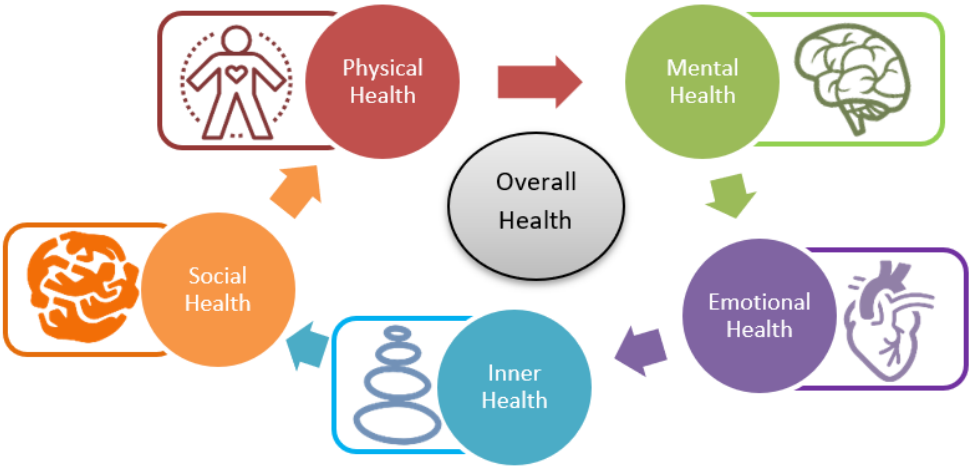

Figure 1 Range of Healths impacting on overall Health according to NeuroEF Theory by Irene Pellicer (2015)

discover the main features of a dance world, valuing the dancer dedication and the dose of effort needed to achieve in a cooperative way (Bautista, 2016).

Improving body expression, self-perception, social capital and overall wellbeing and health as well as reducing stress and mental health potential issues are some of the pursued objectives of introducing dance (Sheppard & Broughton, 2020). Over the years, results have revealed a significant increase in the socio-emotional skills of the pupils who participated in dance programs in relation to self-management and relationship skills (Pereira & Marques-Pinto, 2017).

Quality Physical Education for lifelong participation and inclusion

Taking into account neuroscience and NeuroEF learnings, the overall purpose of the implementation is to consolidate students' lifelong participation strategies towards improving their health and help them seeing Physical Activity as a crucial item to promote their wellbeing through dance and Physical Education. Following Quality Physical Education (QPE) principles, a need for enhancing participants' interpersonal skills, social learning and provide specific encounters between students has been secured during the summer camp experiences (Castillo, Campos & Sebastiani, 2018).

Specially related to this particular summer camp, Quality Physical Education (QPE) principles state that it has to be a consideration in how girls' approach and experience sport and physical activity to make the experience relevant and enjoyable for them. Initiatives have to be taken to support and encourage girls to engage in physical education and physical activity, overtaking barriers such as body image and physical education/sport image (McLennan & Thompson, 2015). Besides, an accompanying role from professionals in overseeing the big picture relationships between

sport/physical activity and gender, has to be monitored to avoid future rejection of girls in taking part in sport and PA activities.

Social Transformation to introduce critical pedagogy

Social transformation pedagogy has a potential to mobilise empathy, social acceptance and solidarity within participants. This educational approach helps in pushing participants' imagination towards situations and contexts outside of the usual setting, both in space-time and symbolic levels. It helps in minimising the gap between educational curriculum and society challenges (Martos-Garcia et al., 2021). Discussions followed by using social transformation pedagogy, helps in mobilising participants' attitudes, feelings and facilitates the production of critical reflections to help in building a more openness oneself personality (Martos-Garcia et al., 2021).

Promoting autonomy patterns, increasing critical thinking and activating Social Transformation attitude towards life are the accompanying, but yet, equally important objectives of the intervention deployment. According to the three-level achievement process related to Social Transformation (Identification, Familiarisation and Transformation), participants have been able to recognise an issue topic within a social context, have been able to relate their own actions according to the topic and plan actions for improving their relation towards the topic in real life (Castillo, 2020).

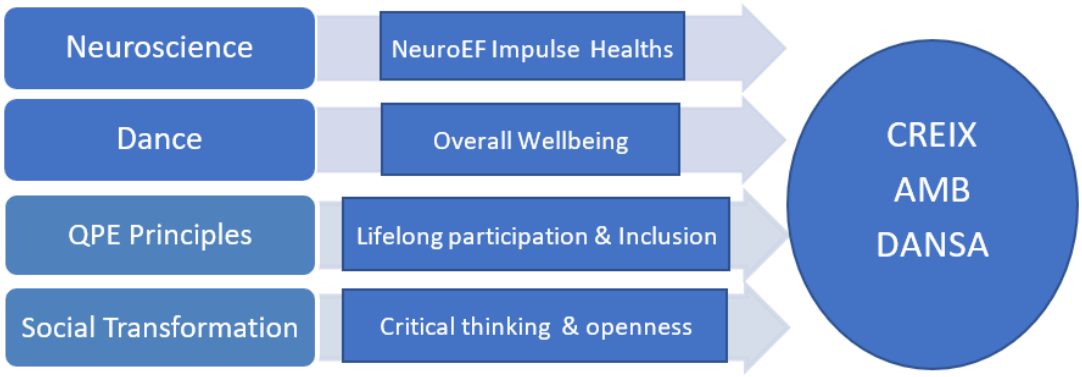

Figure 2 Theorical components of Creix amb Dansa Project and the implementing elements.

THE PROJECT GENERALITIES

Objectives

The whole project has been delivered in order to explore *NeuroEF* theory put into practice in a non-academical setting and based on Leisure Education principles of having fun while improving various skills without the need of following and strict curriculum. Therefore, the objectives respond to this general idea of combining leisure with conscious learning and having dance as a central theme.

- General objectives:
    - To enjoy themselves and others while improving overall wellbeing.
    - To experiment several dance techniques and disciplines.
    - To participate in a range of activities based on alternative education.
    - To activate social transformation attitude and critical thinking.
    - To improve autonomy patterns and the spirit of overcoming.

- Objectives related to *NeuroEF* implementation:
    - *Physical Health:* to improve physical fitness properties to enhance health and life quality standards.
    - *Mental Health:* to develop cognitive abilities, especially those related to memory and coordination.
    - *Social Health:* to reinforce coexistence principles and positive attitude towards the group of participants and society.
    - *Emotional Health:* to learn how to express, identify and communicate feelings and emotions through dance and performing body.
    - *Inner Health:* to value own personal capacities in order to improve self-esteem and self-recognition.

Group of participants and setting

Since its creation, the project has reached over 40 families and their children. The participants are aged 8 to 16 years old, with a notorious presence of females. Despite the fact that this was not the original option, it has helped in treating more specific female concerning topics, working on girl empowerment and use their voice and exercise leadership skills (Voelker, 2016). Worries about self-image peer pressure, eating disorders and social media addictions derived from inadequate usage, have been some of the common issues treated. Professionals in charge of the project have worked towards treating these issues with respect and in accordance with parents and professionals' guidelines.

The intervention has experienced three different locations over the years, but from 2018 onwards it has been taking place in *Mas Comademont*, a rural accommodation located in Olot, the capital city of one of Catalonia region counties. This final settlement has improved project opportunities in various areas such as organising better outdoor activities, giving participants more autonomy (the house is booked just for the project participants') and improving meal options and opportunities to work on a healthier diet as a part of the educational input.


Figures 3 & 4 Participants in two of the activities of 2022 edition.

Timetable and activities pattern

The Project has a duration of one week, starting on Sunday. The timetable is structured following three daily time zones (morning, afternoon and night). In the morning pupils take part in dance activities (contemporary dance, hip hop, jazz, African dance, acrobatics and body percussion) as well as music (with percussion instruments). After having lunch and a midday break to facilitate digestion, the afternoon activities start with a number of physical education and motor games and creative workshops. At night, a number of social transformation games are deployed as well as film projections and other specific activities to accompany the main objectives of the project.

Each activity is organised following the same pattern with a general introduction to the activity, a main part where participants can interact with each other and with the topic and a final plenary activity where the group is organised in a big circle and everyone have a chance to share their opinions and feelings about the activity, as well as highlighting particular learnings gained from it. Besides, throughout the whole campus, participants can deliver messages to other members of the group by posting them into a named envelope hanging in one of the main rooms of the house.

Topics organisation

Topics are being organised following the general views on health achieving process of *NeuroEF* impulse. The five dimensions of health are present during the whole week and sometimes they cannot be split from one another. However, a particular health is chosen as the main one to be considered in each of the activities. This action helps in keeping a balance among each health and it is overseen during the whole process, making sure that all of them are present during activities deployment. Therefore, all dimensions of health are put into practice in order to facilitate group interaction with all of them.

In general terms, the physical health is worked during the dance activities, as well as during the nutrition workshops, in meals and resting time. The guiding professors highlight the importance of having proper rest and nutritive guidance as basic elements to improve physical health and facilitating a better energetic supplementation for the body. Although not being the main one, physical health it is also present during physical education and motor game activities. During this interaction time among participants, social health gets especial attention and becomes the main area of development, as well as in other social encounters such as thematic escape rooms and social transformation night games.

Inner Health is worked in a more relax and calm atmosphere with activities related to yoga, postural breathing and using particular mindfulness routines. By using creative and sensorial workshops to accompany mental health, we incorporate a number of arts and crafts activities, music therapy dynamics and other initiatives that provide time to create the final show scenery, outfits and the script. On the emotional side, various tools are used in order to follow up the health. Emotional thermometer, calming areas, resolution strategies to overcome conflicts, as well as particular activities to identify emotional status are used throughout the campus.

All the activities have a joint objective of working the dimensions of health in order to prepare participants for a final dance and multidisciplinary show that englobes all the learnings of the week. During the show, spectators, mainly parents and family members of the participants, are invited to dive into the world of health and other topics treated within the week (human rights, environmental protection, refugees' situation, etc.). The show has about an hour of duration and it is a clear example on how important is to work a wider concept of human health and all its dimensions in order to get the most out of each participant.

Figure 5 Topics organisation activities in relation to the final show

THE PROJECT DELIVERY

Methodological tools and strategies

Despite the fact that the campus is organised under a ludic and dynamic methodology through the use of alternative education parameters, there is a deployment of a battery of methodological approaches in order to uplift participants experience during the activities. Most of these tools are taken from mainstream and special education system delivery patterns adapted to a lesser strict and curricular environment, but with the same level of professionalism and dedication. The main methodological tools used throughout the project are: **project-based learning**, **guided discovery**, **peer-feedback**, **problem-solving** and **gamification**.

The main methodological process is planned as a **project-based learning** structure where participants had to work together playing their particular role in the group in order to reach the objectives and work towards the final show creation. This highlights the importance of a **guided discovery** pattern strategy, commonly used throughout dance lessons due to the visual and practical assets of the subject. Professionals propose the task and different levels of difficulty and participants have the responsibility to decide which level match their own skill in order to choose the appropriate routine (Chatzipanteli et al., 2015). By using this methodology participants realise their own potential in performing dance and other activities, while having a realistic guidance by the teacher.

Encouraging **peer-feedback** derives into a sense of solidarity towards the rest of the group and compromise effective teaching strategies commonly used for affective learning (Teraoka et al., 2020). This methodology is used both in particular couple dynamics, where one of the members guides the other one and in a wider cooperative group initiative. Solidarity born as a result of applying previous methodologies induce the group to create their own **problem-solving** strategies out of a particular difficult situation that may arouse in order to achieve what was planned. This process is accompanied by emotional strategies taken from the emotional health implementation such as relaxation techniques and positive self-talks, where participants can reflect on the sources of stress and negative thoughts (Teraoka et al., 2020) out of any social situation.

The implementation of particular methodologies helps in improving outcomes and enhancing participants and professionals' encounters throughout the project, as well as increasing the leisure background. This is the case of applying **gamification** where participants are prompted to work cooperatively and supporting each other during particular activities. By applying this methodology, a number of game elements are taken into account in order to use them in an educative framework and in non-game contexts (Deterding et al., 2011). The social and collective intentionality of the games helps participants in experiencing relevant social issues such as migration, human rights, health habits, etc., as part of a planned social transformation proposal.

Attention to diversity of participants

Attention to diversity starts when professionals in charge of an activity understand that every one of the project participants has their own personal feelings and biorhythms. Only by accepting and respecting this premise, we can generate a thoughtful set of activities that guarantees the correct functioning of the project and the generation of personal learnings. Within the project, this acknowledgement is put into practice by reinforcing parallel SEL (Social and Emotional Learning) activities based on emotional health activities in order to facilitate a personal approach to improve self-knowledge and personal discovery.

Personal discovery can be especially seen during reflection times at the end of each day where participants can rely upon their own daily experiences to express their feelings, likes and dislikes. Reflection times as well as resolutions and other emotional strategies can be delivered as a big group conversation, in small groups or individually, by taking advantages of calming areas and the personal diaries provided. The usage of emotional tools such as emotional thermometers and the named envelopes to write down messages can enhance personal learnings within the group of participants.

Potential learnings

Participants can experiment a set of direct, personal and indirect learnings. Direct learnings are mostly linked with dance disciplines, as participants had the opportunity to rehearse in order to perform in a final show that give them a sense of achievement. Personal learnings are assessed by each participant with the usage of personal diaries and named envelopes and as a group in democratic discussions. These learnings are mostly related to helped students improve basic social and personal skills for life as well as interacting with social transformation topics. Direct learnings are gained by generating new ways of expressing and communicating with the body freed of stress issues, while personal learnings are enhanced by having a better understanding of opinions and accepting different ways of participation

At the background, and without even noticing, students had the opportunity to daily interact with health in all forms and shapes, understanding its impact in their own lives. Therefore, the project learnings in all areas, not only help in producing a final dance multidisciplinary show, but in understanding a wider concept of health and open up their minds to critically analyse a complex society. Although provided in a leisure education setting, all these learnings help participants to gain lifelong healthier skills that can be put in practice in several situations in real life experiences.

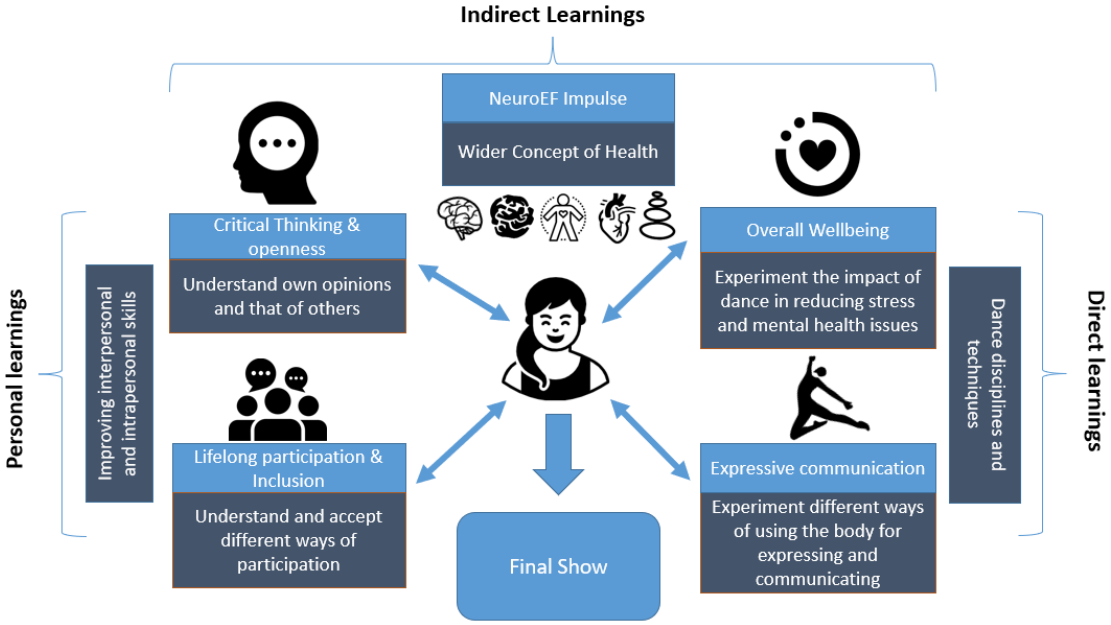

Figure 6 Relationship of different participants' learnings at the end of the campus

THE PROJECT OUTCOMES

Participants' benefits based on testimonials

Alongside the named envelope activity, where participants can give messages to each other's, a testimonials box is presented. At the end of the campus, testimonials are recorded into three categories: negative outcomes, positive outcomes and improvements to apply. Most of them are largely deposited in the positive outcomes as participants see in *"Creix amb Dansa"* a way to overcome years of repetitive and non-meaningful leisure activities. Following testimonials, participants appreciate the idea of being treated as equals and having the chance to develop autonomy patterns throughout the campus. Managing own learning, fully interact and cooperate with others are other benefits express by participants.

Different types of participants value the improvement of self-esteem, the generation of new relationships and the promotion of inclusion throughout the campus activities. The wider treatment of health, induces a sense of self-responsibility and future changes in their own lives. Although over the years we had few male participants, the will to empower female participants does not attempt male benefits, yet give them a wider sense of social empathy towards others. Resizing personal and social expectations are other outcomes experimented by males to confront today's heteropatriarchal society.

Strengths, Limitations, and Future improvements

Although COVID-19 affected the normal deployment of the campus in 2020 and 2021, as it happened with many sports school and leisure education organisations in Catalonia (Castillo,

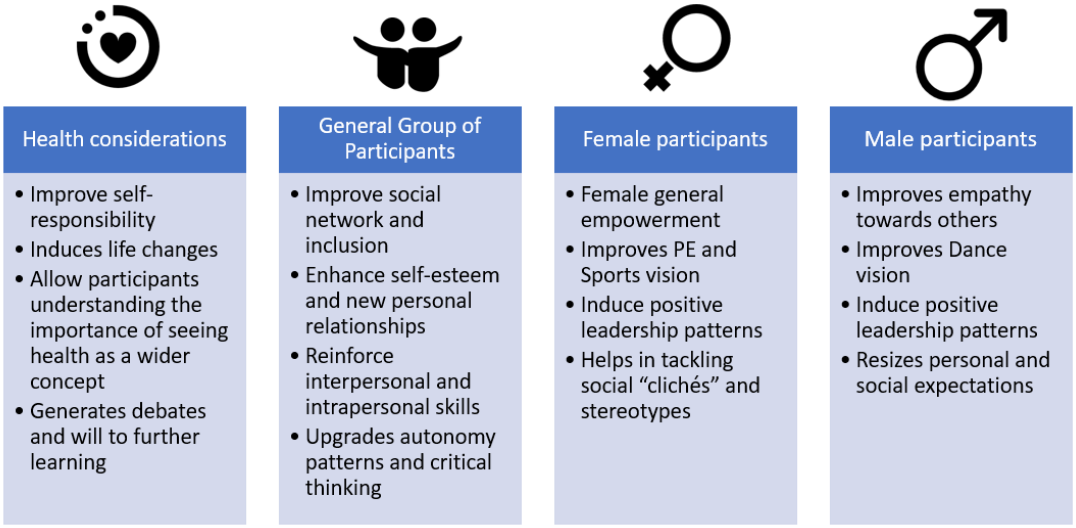

Figure 7 Participants' benefits drawn from testimonials.

Pesarrodona & Usón, 2021), the will of parents and participants was to carry on with the activity with the implementation of pandemic measures. Wanting to be provided with the activities in difficult circumstances is a clear example of families' loyalty towards the project, as well as the yearly petition by participants for extending the campus days and parents request for the organisation of similar adult initiatives alongside the children and youth ones.

If we look at limitations, the main one is not being able to compete against big companies that can have a big number of participants with the same price, although not paying sufficient attention to the quality of the project. Following this issue, not having enough marketing power to reach a broader public with social media and television advertising it is always handicapping. Limited ways to reduce the cost of organising a quality product to reach families with lesser income is another of the limitations to take into account in order to work towards an equitable society.

As per future improvements for the project, it is planned to start a specific promotion to reach more schools and secondary education placements in order to provide a bigger range of participants and guarantee the engagement of more males within the group of participants. Strengthen the project by planning more weeks of activity and increasing the number of participants, without the need of sacrificing the quality of the project or professionals' wages, will give the opportunity to offer grants to socially handicapped families and enhance social interactions and outcomes within the group.

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Creating a Global Index Measuring Countries' Levels of Fitness: The "World's Fittest Countries Ranking"

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Abstract

Several indicators are used worldwide to measure the levels of fitness of countries' populations. Some are based on quantitative measurements such as the obesity rate and the "ALPHA Health-Related Fitness Test Battery for Children and Adolescents". Others use qualitative reports such as the International Physical Activity Questionnaire (IPAQ) and the Global Physical Activity Questionnaire (GPAQ). The last two mentioned indicators are employed by the World Health Organization (WHO) to evaluate the level of physical activity in every country. In this chapter, we will further explain each of these methods, identify their limitations and suggest a new index that will measure the level of fitness in every country, which will be named the "World's Fittest Countries Ranking" (WFCR). Our proposed indicator will partly be based on the World Ranking of Countries in Elite Sport (WRCES), a research-based ranking that measures the performances of all the countries having National Olympic Committees (NOCs) in all the sports recognized by the Global Association of International Sports Federations (GAISF), in addition to other sports that are not yet recognized but have a significant popularity and universality. Although this index targets elite sport results, its features allow to give an accurate evaluation of the level of physical activity in each country. The main purpose of the WFCR is to give to all the governments around the world an accurate idea on the fitness status of their populations, so they can undertake adequate policies to improve them.

Key words: Index, World, Fitness, Countries, Ranking

Traditional methods used to measure fitness and their limitations

The Obesity Rate

The obesity rate (OR) is defined by the percentage of a country's population that is considered to be obese. Obesity is characterized by a variable called the Body Mass Index (BMI), which is defined as the body mass divided by the square of the body height, and is expressed in units of kg/m2, resulting from mass in kilograms and height in meters. According to the WHO (2022), commonly accepted BMI ranges are underweight (under 18.5 kg/m^2), normal weight (18.5 to 25 kg/m^2), overweight (25 to 30 kg/m^2), and obese (over 30 kg/m^2).

The OR is considered to be a relevant indicator to measure the level of physical inactivity in a country. A high percentage of obese people among the population shows that there is a high level of inactivity (Rippe and Hess, 1998). However, there are two major factors that limit the pertinence of the OR in evaluating the average fitness of a country:

1. 1 - Although it gives a rate of the potential inactive people within a country, it does not give any indicator on the level of fitness of those who are active.
2. 2 - In some countries, a low OR can largely be due to a high level of undernourishment. The latter is actually calculated by indicators such as the Hunger Map (HM), established by the United Nations World Food Programme (WFP, 2020). Undernourishment is defined "as the condition in which an individual's habitual food consumption is insufficient to provide the amount of dietary energy required to maintain a normal, active, healthy life. The indicator is reported as the prevalence of undernourishment (PoU), which is an estimate of the percentage of individuals in the total population that are in a condition of undernourishment. To reduce the influence of possible estimation errors in some of the underlying parameters, national estimates are reported as a three-year moving average". There are six categories of PoU: Less than 2.5%; Less than 5%; Between 5 and 14.9%; Between 15 and 24.9%; Between 25 and 34.95; More than 35%. We have looked at the PoU of the world's 20 least obese countries in 2020 and found out that 18 of them (90%) have nourishment issues. So, due to the fact that the populations of many non-obese countries are undernourished, the OR cannot systematically be an accurate measurement of the level of physical activity.

"ALPHA Health-Related Fitness Test Battery for Children and Adolescents"

Established by the European Union (EU) in collaboration with the University of Granada (Spain), the University of Cadiz (Spain), Karolinska Institute (Sweden) and the UKK Institute (Finland), the ALPHA test measures cardiorespiratory fitness (through a 20m shuttle run test), musculoskeletal fitness (through handgrip strength and standing long jump), body composition (through BMI, Waist circumference, triceps and subscapular skinfold thickness) and motor fitness (through 4x10m shuttle run) (Ruiz and al., 2011). Although this test proposes a relevant assessment of a very broad range of

physical qualities (aerobic capacity, strength, endurance, speed, agility, coordination, flexibility…), in addition to body composition, the time needed to do it on a group of 20 individuals is around 2 hours and 30 minutes. It is therefore very difficult to apply it on a whole population.

In addition, although physical tests can be very pertinent, their accuracy can be very limited for athletes who engage in sport competitions. Indeed, Montgomery & al. have shown how "live play is substantially more demanding" than training in "both physical and psychological attributes" in basketball (Montgomery and al., 2010). Broad & al. have also demonstrated how sweat rates are greatest in competition than in training in basketball, netball and football (Broad and al., 1996).

The IPAQ and GPAQ

The IPAQ assesses the types of intensity of physical activity and sitting time that people do as part of their daily lives (Craig and al., 2017). It targets youth of 15 years of age and older. It is characterized by open-ended questions surrounding individuals' last 7-day recall of physical activity. The persons taking the questionnaires will be asked about the activities that they do at work, as part of their house and yard chores, to get from a place to another and in their spare time for recreation, exercise or sport. The GPAQ uses the same concept as the IPAQ. It was developed by WHO and its objective is to collect information on physical activity participation in three domains (Armstrong and Bull, 2006): Activity at work; Travel to and from places; Recreational activities.

For Guthold & al. (2018), the IPAQ and GPAQ have numerous limitations, such as:

- Data are not available for every country and year.
- Availability varies across countries and regions. For example, Latin America, the Caribbean, high-income Western countries, Oceania, and sub-Saharan Africa had a very low proportion of countries with data.
- Nationally representative data for physical activity using scientific measurements, like accelerometers, are only available for high-income countries.

For Stefan Hey (2021), PhD in biomedical engineering, research consultant for the company Movisens (Movisens, 2021), which produces sensors that "capture high resolution Electrocardiogram, electrodermal activity, physical activity data to record and analyze psycho-physiological parameters in everyday life", the correlation between self-report questionnaires on physical activity and actual physical activity is 0.41. This shows the lack of reliability of measurements such as IPAQ and GPAQ. The inaccuracies identified in the OR, ALPHA Test, IPAQ and GPAQ have led us to propose a new index, which we will name "World's Fittest Countries Ranking" (WFCR). We will further explain this indicator in the second part of this paper.

Creating a new index to measure a country's level of fitness: The WFCR

One of the variables that will be used to establish the WFCR is the WRCES. Although the WRCES concerns only countries' results in elite sports, its characteristics will contribute to give a pertinent measurement of the level of fitness in every country. We will start by giving an overview of the WRCES and then see how it can be used to create the WFCR.

The WRCES

Nassif has created the WRCES because he considered that the Olympic Medal Table (OMT), traditionally used by scholars, media and politicians to compare results in elite sport, does not give an accurate measurement of countries' results in elite sport (2018). He found that the OMT methodology has several limitations:

1. The superiority of a gold medal over any number of silver and of a sliver over any number of bronzes will create false inference, where a country having only one exceptional athlete capable of winning one gold medal ranked above another one endowed with several athletes who were placed second and third.
2. The number of medals awarded per event does not take into account neither the level of competition of the sport to which it belongs, nor the number of countries and athletes that it involves. For example, a sport like sailing that has 10 events and that is played in 115 countries, offers 10 gold medals, whereas a sport like basketball, that only has two events played in 215 countries, only offers two gold medals. Moreover, for the same event, as an individual sport, sailing can offer medals to several athletes of a same country whereas, as a team sport, basketball, can only offer one medal per country.
3. Although the Olympics is the largest multidisciplinary competition in the world, it is not the pinnacle event of several mainstream sports such as boxing, football, tennis, golf and cycling.
4. The number of countries that win medals are limited. Indeed, only 94 countries won medals if we combined the OMT of the last Olympics to date, Pyeongchang 2018 and Tokyo 2020 (Olympics, 2022). This fact will prevent a proper comparative analysis of countries' success in elite sport considering that almost 54% of the participants are absent. According to Henry & al. (2020), the limited number of countries ranked is one of the main weaknesses of the OMT.
5. The OMT only considers the Olympic sports, which were 40 if we combined the 2018 and 2020 Olympics. Many sports recognized by GAISF (GAISF, 2022), which sanctions a total of 98 sports, are not included.

Those limitations led Nassif to create a methodology, that incorporates main features, which are:

1. A computation model that attributes to each country its share of points in at least one sport, and, consequently, its ranking on the basis of the total number of points, which this country would have garnered in all sports.

2. The introduction of universality and popularity coefficients for each sport being considered. The universality and popularity of each sport can grow and new sports can be added. All the yearly methodology updates are found in the WRCES website (WRCES, 2022). Popularity indicates the international media ratings for each sport. It shows to which extent a sport is covered; consequently, how much this sport attracts private and public funding and raises competition's level by engaging the most talented athletes. Universality takes into account the number of all countries participating in a given sport. The more countries participating, the more difficult it is for them to win.

The WRCES was able to bring the following changes:

1. In the 2021 WRCES edition (last edition to date), 206 countries were ranked instead of the 94 that were only ranked by the combined 2018-2020 OMT.
2. An annual evaluation of countries' performances in more than 100 sports (115 in 2021), including the Para-sports (which were grouped into one sport) instead of one done once every 4 years in only 40 sports by the combined Winter and Summer OMT.
3. An accounting of countries' performances in all the major international competitions like the FIFA World Cup, Tennis Grand slams and the Rugby Union World Cup where success is not recorded by the OMT.
4. A more accurate measurement of countries' performances in sport, since it rewards countries that succeed in highly popular and universal sports that do not offer a lot of medals, and scales appropriately those that win several medals in minor sports that have a multitude of events.

In September 2018, the WRCES was presented to the Association of Sport Performance Centers (ASPC)- first African Forum that took place in Durban, South Africa. The ASPC, which has among its members the Loughborough University, United Kingdom (UK) Sport, INSEP (French Center for Sport Excellence), FC Barcelona and the United States Olympic Committee (USOC), is an international body with a mission to "provide opportunities that enhance training for high performance sport (elite sport) worldwide" (ASPC, 2022). The ASPC is currently (2022) investigating whether it will formally sanction this ranking. Three of the ASPC centers: the Kuortane Olympic Training Center of Finland, Berlin Olympic Training Center of Germany, and the Centre d'Alt Rendiment (CAR) Sant Cugat of Spain have already started a pilot project using the WRCES to measure their contribution to the success of their countries in elite sport. In its 2021 ASPC General Assembly, the newly elected president, Tapio Korjus, has declared that the ASPC will continue its collaboration with the WRCES in the years to come (General Assembly of the ASPC, November 30, 2021).

By giving an accurate ranking of the 206 countries having NOCs, the objective was to open the door for a holistic and precise comparative analysis of countries' performances in elite sport as well. After explaining the methodology of the WRCES, we will explain how this index can contribute to show the level of physical activity, hence fitness, of each country.

How can the WRCES contribute to the creation of an index that measures the fitness level of the general population?

Unlike the OMT, which awards medals only for the top three competitors, the WRCES can actually show the depth of participation in every country, considering that all the countries that take part in international competitions will gather points, even if they achieve very modest results. Competing in a sport at a world stage, even without succeeding, systematically shows that there is a formal and/or official local participation from which those elite athletes are selected. Countries that are able to be ranked in a large number of sports have systematically a higher local participation. So, to examine if achieving success in elite sport reflects a higher sport participation, we have looked at the percentage of the total number of sports in which the top 20, mid-table (countries which positions were between 93 and 112) and bottom 20 of the WRCES final ranking were ranked in for the 2014, 2015, 2016, 2017, 2018 and 2019 editions. We have found out that, the top 20 were on average ranked in 84% of the sports, the mid-table in 26% and those who are in the bottom 20 in 6%. This undoubtedly shows that succeeding at the international stage cannot be achieved without a large and diversified local sport participation. Through the analysis of the Chinese model, Zheng & al. has advocated that the success at the elite level cannot be reached without a large base of youth practicing sport (Zheng and al., 2019), as we can see in Figure 1:

Figure 1. Interpretation of the Chinese's elite sport system defined by Zheng et al.

Nassif has also upheld the concept of the pyramid when he analyzed the success of France between 2002 and 2005 (Nassif, 2009). He found out that it is out of the 26 million people participating in sport (43% of the population at that time) that the 9.7 million federation licensees (16% of the population) emerged, and constituted the base of the 15586 elite athletes that made France succeed in international sport competitions.

Zheng & al. (2019) and Nassif's (2009) examples show that the more a country is developing an elite sport system, the more youth will take part in sports. We also believe that the countries that will have the highest performance are those that have the fittest youth. Indeed, for Serrano and al., sport performance is characterized by four factors: physical, technical, tactical and psychological (2013). Therefore, higher physical abilities among the youth will lead to a higher success at the elite level.

Although the WRCES constitutes a pertinent variable to assess the fitness of a population, we believe that it cannot be its only method of measurement for the following reasons:

1. It does not give an evaluation of all the people that do not engage in competitive sport whether they are children, youth or adults. For this reason, the OR must not be dismissed as long as it is considered with the PoU of every country.
2. Countries' performances in elite sport are not only achieved with the fitness of the competitors. There are other factors that need to be considered like wealth, population or scientific advancement, which were the main subjects of the study of scholars aiming at identifying which are the most determinant variables that lead to countries' success in elite sport. To determine which of these factors has the higher incidence, we have undertaken correlation calculi between the WRCES results with the population, GDP and research output rankings for the years 2014, 2015, 2016, 2017, 2018 and 2019. The comparisons were done between the points won by each country in the WRCES and the number of inhabitants for the population, the total amount of US dollars (in millions) for the GDP, and the number of publications for the research output. We have found that the correlation between the WRCES and the population ranges between 0.30 and 0.39, the one of the WRCES and the GDP between 0.74 and 0.78 and the one of the WRCES and research output between 0.78 and 0.82.

Therefore, among the three most studied factors, population has the weakest correlation. Media often use the medal per capita ranking to identify the countries that are able to "punch above their weight" (Businessinsider, 2016; US News, 2016; Time, 2016). Less populated countries usually top this ranking and are consequently considered as the most efficient in terms of international sport results. This statement seems to be very inaccurate whether we take the Olympic Medal Table or the WRCES:

- In terms of medal collection first, several scholars have advocated the low incidence of the population on sport results (Andrew and Busse, 2004; Den Butter and Van Der Tak, 1995; De Bosscher, 2008; Kuper and Sterken, 2001; Bian, 2004). And the simplest reason behind it that they provide is that no matter how populated countries are, they can only send a limited, often the same number of athletes in every event.
- By correlating the WRCES with the population ranking, we have been able to measure the impact of population on sports results on a wider number of countries (206 by opposition to the 86 countries ranked in the Olympic Medal Table). We have even found that for the countries that have more than 30 million inhabitants, the correlation is even less than 0.2, which is very weak. Correlations that are above 0.35 are for countries that have below 6 million inhabitants. Consequently, one can conclude that a number approximately close to 6 million inhabitants appears to be a large enough size to compete with anyone. It is also possible to have a good number of athletes with a smaller number. Indeed, as an example among many other similar ones, Luxembourg, with around 600 000 inhabitants, outperformed Iraq (40 million inhabitants), Ivory Coast (25 million inhabitants), Jordan (10 million inhabitants), Lebanon (6 million inhabitants) and Kyrgyzstan (6 million inhabitants) for six consecutive years (WRCES, 2022).

The two factors that have the highest impact are the GDP and the research output. Since funding is needed for research, we believe that the countries that will be considered to have "punched above their weights" are the non-wealthy ones who achieved good results in the WRCES. Those underprivileged nations will have to count mainly on the human factor. This is why, if we are aiming to measure the fitness level of every country, a parallel WRCES index must be considered. This indicator will be entitled the WRCES Merit Ranking and will be calculated by doing the difference between the GDP and the WRCES ranking of a country. The higher this difference is, the better the WRCES Merit Ranking will be. We will give the examples of two countries in 2019, Saudi Arabia and Egypt: Saudi Arabia GDP ranking – Saudi Arabia WRCES ranking = Saudi Arabia WRCES Merit Ranking 18 - 55 = -37. Egypt GDP ranking – Egypt WRCES ranking = Egypt WRCES Merit Ranking 41 – 55 = -14. Egypt will therefore have a better WRCES Merit Ranking.

Considering the WRCES Merit Ranking does not mean that the WRCES will have to be dismissed. In fact, countries topping both the WRCES and the GDP ranking like the USA will be unfairly penalized if we were to consider only the WRCES Merit Ranking as it cannot do better than first, and will therefore fall victim to its own success. In addition, we cannot also assume that a country like Switzerland (20th in the GDP ranking) will have a better WRCES position than France if it has a similar GDP (7th GDP in the world) or if France will be below Switzerland in the WRCES if it has a similar GDP to Switzerland. As an example, in theory, if the French region of "Ile de France" was a country, its GDP will put it just behind Switzerland in the GDP ranking (Parisjob, 2022). We don't have solid evidences that this French region will rank below Switzerland in the WRCES.

So, our proposed new index that will measure the level of fitness in every country (WFCR) will consider countries results in elite sport (WRCES), countries result in elite sport considering their wealth (WRCES Merit Ranking), the Obesity Rate (OR) and the Prevalence of Undernourishment (PoU). This methodology will be explained in the last part of this proposal.

The methodology of the WFCR

As we explained above, four variables will be considered to get the WFCR: the WRCES, WRCES Merit Ranking, OR and PoU. To level them, they will all have a maximum of 100 points.

For the WRCES, the country topping the ranking will have 100 points and all the other countries will get a score below 100 according to the rule of three. As an example, in 2019, the USA came first with 1,627,293 points (WRCES, 2022). They will get 100 points. France, who placed second, with 979,438, will have the following amount: (979438 * 100) / 1627293 = 60.2

For the WRCES Merit Ranking, we will first take both the country having the highest difference between its GDP and WRCES ranking (A) and the one having the lowest difference (B). We will then make the difference between both amounts, and A will get points that are equal to this difference

while B will have 0 points. The points obtained by A will be scaled to 100 and all the other countries will get points according to the rule of three.

As an example, if A has a difference of 50 between its GDP and WRCES and B a difference of -34, A will first get: 50 - (-34) = 84 points. B will get 0. We will then scale the 84 points obtained by A to 100.

If a third country, C, has a difference of 60 points with B, it will get the following amount: (60*100)/84 = 71. For the OR, countries will have a value equal to 100 minus their OR. As an example, Vietnam who has an OR of 2.1% will have the following score: 100-2.1 = 97.9. For the PoU, countries will also have a value equal to 100 minus their PoU. As an example, France who has a PoU of 2.5% will have the following score: 100 – 2.5 = 97.5.

In the following step, we will consider either the countries' WRCES or their WRCES merit ranking score. If a country has a higher WRCES than WRCES Merit Ranking score, we will consider their WRCES score. Conversely, we will consider its WRCES Merit Ranking score if it is higher than its WRCES one.

For example, if France has a score of 60.2 in the WRCES and 30 in the WRCES Merit Ranking, we will take 60.2. If it has a score of 30 in the WRCES and 45 in the WRCES Merit Ranking, we will take 45. This was done to be fair to both the countries succeeding in the WRCES and those who are over performing considering their low GDP.

We will then take the average score between the OR and PoU scores of each country. For example, if France has a score of 78.4 in its OR and 97.5 in its PoU, it will have an average score of: (78.4+97.5)/2 = 88. This was done to avoid the false inference that a low OR is a systematic indicator of a high physical activity.

The final formula to reach the WFCR score will be done by calculating the average of the WRCES/WRCES Merit Ranking score and the OR/PoU average score:
WFCR score = (WRCES or WRCES Merit Ranking score) + (OR/PoU average score) / 2

As an example, if France has a WRCES score of 60.2 points, a WRCES Merit Ranking score of 30 and an average OR/PoU score of 88, it will have the following WFCR score: (60.2 + 88) / 2 = 74.1
On the other hand, if it has a WRCES score of 30, a WRCES Merit Ranking score of 45 and an average OR/PoU score of 88, it will have the following WFCR score: (45 + 88) / 2 = 66.5

The final WFCR ranking will be done according to the WFCR scores of each country.

Conclusion

Having an ideal ranking to measure the level of fitness in every country is a complex endeavor. Our proposed methodology seeks to be the most accurate possible. For this purpose, we have taken into consideration the development of sports among their population, the obesity rate and the prevalence of undernourishment. We believe that by considering these variables, we will help governments implement the proper policies to improve the fitness level of their populations. When they will have feedback on their WFCR score, they will be able to know which areas they must focus on more: Developing their sports, doing awareness campaigns to reduce obesity or investing to fight undernourishment.

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Coaches Help Czech and Slovak Teachers in Primary Schools

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Abstract

In Slovakia and the Czech Republic, sports coaches attend physical education classes every day to help primary school teachers. Through working in tandem with the teachers, they inspire them and give children in grades 1-4 (age 6-10) a safe environment for joyful physical activities. Children experience a variety of activities throughout the year as the individual sports alternate regularly. The Government of the Slovak Republic, various universities, the Czech National Sports Agency, and a number of municipalities in the Czech Republic support the programme.

Key words: Physical education, Sports coaches, Primary school teachers, Attitude and joy of movement

Many studies confirm that the percentage of overweight and obese children rose by a significant margin in both countries over the last decade. Children spend less time on physical activities, spontaneous physical activities almost disappeared from the afternoon activities. It results in health problems, and therefore a financial burden for the state.

Both governments are starting to be aware of this, addressing the problem by developing an infrastructure, increasing investments to sports federations and clubs. However, it seems that the environment of primary schools and kindergartens isn't taken seriously. Typically, in Czech and Slovak primary schools, the children have two physical education (PE) classes (2 × 45 minutes) a week, conducted by primary teachers (for grades 1-5, age 6-12) who aren't trained to a standard that they are able to meet the increased needs of today's children.

Although some schools are equipped with modern equipment and multiple indoor arenas, they are still in a minority. It is not uncommon for schools with more than 500 students to have a single sports hall, where the size is no bigger than that of a volleyball court. Lessons are normally held indoors for six months of the school year. School classes typically consist of 25 students, although there are exceptions with classes with more than 30 students.

Judo lessons at school (Image: Trenéři ve škole, z.s.)

It is challenging for a specialist PE teacher to conduct a safe and varied PE lesson with 30 children in a small hall, therefore it is even more challenging for non-specialists. **Most of the general primary teachers** (for grades 1-5, age 6-12) **have only a basic PE education from their pedagogical faculty so it proves difficult to deliver varied, fun, engaging and educational lessons every week on their own. In other demanding subjects, like for instance in foreign languages, they are often helped by specialists.**

There is a large percentage of female teachers in primary schools, therefore they may not be as comfortable teaching certain sports and activities as their male counterparts. Observations suggest that 50 percent of female teachers do not change for a PE class.

Sports clubs and sport federations are the preferred target of state investments into programmes of physical activity interventions for the broad population. In the Czech Republic, funding for sport has increased significantly since 2015. The positive outcome is that many sports clubs have improved their facilities by replacing grass with artificial surfaces, such surfaces can serve the athletes all-year round. Many clubs pay their coaches, many of whom started out as an involved parent. Only a small percentage of these clubs can afford to contract full-time employees.

After the students come home from school and change their school bags for the sports kit, training usually takes place in the late afternoon. Similarly, the coaches work nine-to-five jobs and attend training as a voluntary activity. Their education is provided by the federations and varies sport by sport. While some sports federations follow strict international protocols for youth coaches' education, including hundreds of on-field hours of coaching and mentoring, and lessons in children's' pedagogy, physiology, psychology, sports training theory, other sports bodies apply much more relaxed approach to the expense of quality.

Unlike in **other** countries, Czech and Slovak sports clubs are financially motivated to engage children in organised competitions in their respective sports **from an early age**. It leads to an ever-increasing **demand on the** level of performance needed to participate in these competitions, and therefore it puts more pressure on coaches to specialise their athletes at an early age. **On the other hand, judging by the government finances**, general physical preparation programmes **are in the minority**. Many of the above-mentioned competitions for primary school children are regional or national, meaning that they require travel of more than an hour to reach. That's why children, coaches, and their families spend weekends travelling to these competitions.

The **late** evening training times in sports clubs rob children of time they should be spending with their parents. Only a portion of the lessons are held in the early afternoon hours as many of the coaches cannot be released from their jobs **or** because the parents cannot drive children from school to training grounds. Some of these early afternoon sports activities in schools are run by coaches, who often use them as a recruitment activity instead of striving for general physical development of the children.

Programme focuses on the positive emotions of children (Image: Trenéři ve škole, z.s.)

Seven universities in Czechia and Slovakia educate PE teachers who get teaching qualifications for secondary and tertiary schools only (students of age 12-24). According to our estimate, only a handful of specialised primary school PE teachers are educated through individualised study programmes every year.

It has been proven that physical activities have an influence on cognitive functions. Physically active children have better attention, memory, and creativity during the learning process. These facts are nothing new in both countries. They are often pointed to in the press and in the media, in fact the need for comprehensive physical development is taught at the sports faculties of the aforementioned universities.

It is therefore surprising that while children's physical activity has declined, we have seen an increase in the teaching of their mother tongue, foreign languages, and IT but the number of PE classes remains the same. As mentioned above, there is a growing disparity between amounts of general, varied physical activities and specialised training in sports clubs. Experts have long warned of the dangers of early specialisation and they seem to be confirmed by shrinking numbers of engaged adults compared with children.

During an excursion to the INSEP Olympic centre in Paris in 2018, several Czech coaches met and created a programme that would bring sports coaches to schools. They included Antonín Barák, a PE teacher and youth football coach, Michal Prokeš, a visionary coach and Jan Macháček, an inventive mind and former rugby player.

The "Coaches at School" programme takes a good example from abroad, where children play sports mainly in the school environment and try a lot of sports under the age of 15. During the 2019 pilot programme, coaches from seven sports were assigned to teach PE lessons in four state schools in the district of Prague 6. Although the trial period lasted only three months, the response was so strong that it was requested by twelve school principals in Prague 6 from the new school year.

Although news of the programme's success spread rapidly and new municipalities quickly became interested, the founders emphasise a slower approach and a focus on the quality of the coach and education. Especially in the beginning, the programme relied on the dedication of club coaches from Prague 6, who dedicated hundreds of hours to teaching, administration, persuading finance backers, observations, and methodology.

At the beginning of 2020, the programme started outside of Prague, in the 30,000-strong town of Příbram at seven schools. A national symposium took place in March 2020, where the programme was presented to the public. It was noted by former Slovak elite tennis player Karol Kučera, now a member of the Slovak Parliament and ambassador for sports for the government. After assembling a team of experts, he brought them to Prague to learn about the programme. Currently, the main programme leaders in Slovakia are psychologist Tomáš Gurský, Ice Hockey mentor Diana Kosová, Karate coach, scientist Miroslav Sližik and mathematician and coach Martin Dovičák.

The main goals of the programme are to give young school children the joy of movement, to involve sports coaches in the morning times and to inspire primary school teachers.Side effects are the creation of relationships between sports clubs and schools. Local clubs are starting to work together and not just compete for sports grants. Individual coaches of various sports make friends and develop their range of exercises outside their specialisation.

A focused programme like this already receives the support of many public figures and institutions. In Slovakia, the programme started in March 2021, its activities are operated by the government. As of June 2022, there are 110 schools in Slovakia that run the programme. There have already been 8 courses organised by the *Comenius University* in Bratislava, *Matej Bel University*in Banská Bystrica, and *Technical University of Košice*. There are small differences in the programmes of both countries. Slovak coaches are selected by an individual selection procedure directly, in Czechia they are recommended by local sports clubs.

In order to support the varied programme, the Slovak government provided the involved coaches with modern sports equipment - ropes, foam balls, eye straps, colored parachutes and hoops, bluetooth music speakers etc.

New coaches ready to be deployed in March 2022. (Image: Trenéři ve škole, z.s.)

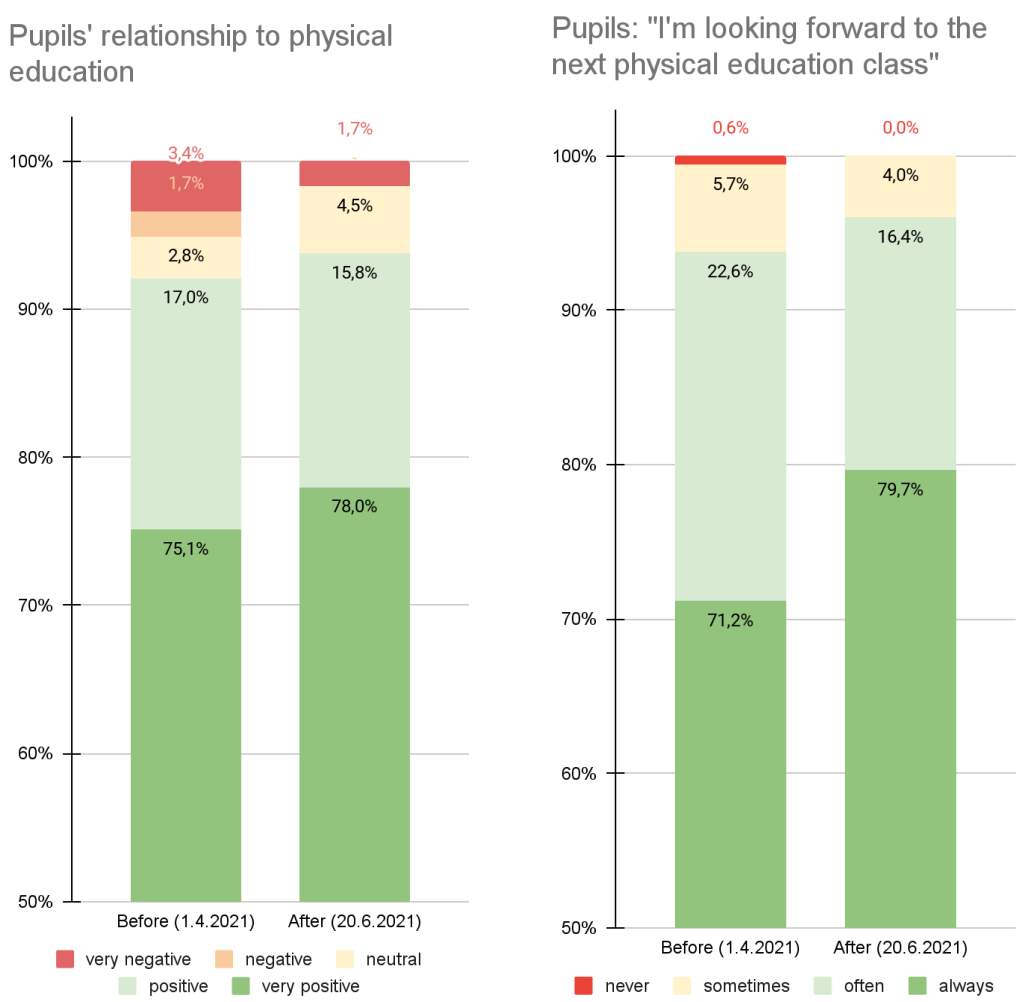
In the Czech Republic, the main finance backers are municipalities, which are the founders of schools; full government support has not yet been negotiated. However, good indicators of the interest of other public institutions are the support from the City of Prague (which is not the founder of primary schools) and from the National Sports Agency, which provided CZK 1.5 million (€ 60,600) last year for pilot testing in 30 schools in four different cities. Česká spořitelna bank has been significantly helping with sponsorship donations for the third year in a row.

Dancing class led by a professional coach and teacher (Image: Trenéři ve škole, z.s.)

At the end of June 2022, the programme was operating in 17 areas in the Czech Republic, where 111 schools and 483 classes were involved. The faculties that educate future teachers are gradually joining the programme. In the spring of 2021, *Dr. Martin Dovičák with Dr. Iveta Cidhová* from Comenius University in Bratislava conducted a study focusing on children's attitudes towards physical education and showed that they improved significantly after the coaches' interventions. The main principles of the programme are simple. Sports coaches attend lessons once a week in each of the first, second and third grades (children aged 6-10 years) of the involved primary schools, where they work in tandem with the teacher. They teach together with the goal of joint physical and mental development of the children.

The coaches effectively organise the lessons so that the children do not stand in line for a long time before it is their turn. Whenever possible, they use games where everyone is engaged without being eliminated. It is important to involve those children who are less physically fit.

Psychomotor exercises and games are used, which aim at the emotional experience and perception of one's own body. Coaches pay attention to the sensitive windows of development and focus mainly on developing coordination, speed and strength appropriate to their age. Coaches develop creativity through an "extra playground", where pupils play and oversee the rules themselves. All involved coaches have a strict ban on recruiting pupils to their clubs, because the main goal is to help the children and not get them for their sport. It is important that the child decides for himself, later on, what sport he or she wants to pursue.



Pupils' attitudes to the subject of PE before and after the coaches' interventions. 177 interviewed. Data and chart by Martin Dovičák and Iveta Cihová CU Bratislava

A prerequisite for the involvement of coaches is a coaching licence from their sports association and a proven experience in working with children. Courses for the involved coaches are 4 days long (40 hours) in Slovakia and 3 days (30 hours) in Czechia.

The courses are experiential, so participants go through a lot of physical activities during them, up to two thirds of the time in the sports hall. The coaches mainly learn the difference between the environment of a sports club, where children are sports-ready, and a school where some kids are inexperienced. Participating coaches learn to apply the ten principles and present them in practice, where other colleagues represent schoolchildren and the teacher. Every coach will receive a 200-page manual that describes the methodology developed for this programme.

Coaches act as school children during the courses (Image: Tréneri v škole)

As soon as the coach passes the course, he obtains a licence for two years. Then he has to renew it with a one-day course. In the Czech Republic, evaluations take place where lecturers visit schools where coaches lead lessons with a real class and a teacher.
Coaches and their sports regularly alternate in Czech schools in monthly cycles, in Slovakia after two months. The coaches attend one of the two PE classes per week, the other is led by the teacher herself.

The coaches have their own distinctive jerseys so that the children can recognize them immediately and form an association. A colourful chequered shirt also helps them not to be afraid if a different coach comes in a month. In Czechia, teachers also wear the jerseys to connect even more with the coach. As the image above demonstrates, children wear bibs with numbers, in the colours of each neighbouring state, names of personalities or geographic information. These are used in games and exercises.

Especially thanks to the Slovak colleagues, interdisciplinary relationships are developing, where coaches link physical education with other subjects through imaginary environments involving fairy tales, farms, Olympics, anthill, construction sites etc.

Antonín Barák, one of the founders of the programme, wearing a "trademark" chequered shirt. Children wear colourful bibs with numbers, flags and neighbouring countries. (Image: Trenéři ve škole, z.s.)

In Slovakia, "cooking books" are now being prepared for teachers to teach PE through stories using interdisciplinary relationships. This type of storytelling is something the programme wants to build on in the next step (table 1).

Conclusion

The programme where sports coaches help primary teachers in physical education classes proved successful in both Czech Republic and Slovakia. The coaches work in tandem with the teachers, who confirm that they get inspiration from them. The programme gives children in grades 1-4 (age 6-11) a safe environment with joyful physical activities. Children experience a variety of activities throughout the year as the individual sports alternate regularly. The Government of the Slovak Republic, various universities, the Czech National Sports Agency, and a number of municipalities in the Czech Republic support the programme. State authorities, schools, municipalities, academics and sports officials in both countries indicate serious interest in the scheme and promised continuing support. Further research aimed at the process of integrating the coaches into the school environment and its effectiveness is planned.

Table 1 Facts about the program

	Czechia	Slovakia
Started	2019	2021
Financing	Municipalities, Prague Magistrate, National Sports Agency (NSA), private (Česká Spořitelna bank)	Slovak government
Average annual cost for a class	€1 000	1330 €
Municipalities involved	17	38
	České Budějovice, Prague 2, Prague 6, Prague 8, Prague 10, Prague 11, Prague 13, Prague 15, Prague 16, Prague 17, Kosoř, Veselí nad Lužnicí, Havlíčkův Brod, Liberec, Kladno, Karlovy Vary, Klatovy, Písek, Příbram.	Bratislava, Trnava, Pezinok, Nové Zámky, Trenčín, Považská Bystrica, Banská Bystrica, Žiar nad Hronom, Žilina, Čadca, Kysucké Nové Mesto, Košice, Prešov, Poprad, Stará Ľubovňa and others
Schools	111	110
Classes	483	550
Courses held	12	8
Coaches	148	91
Sports involved	aerobics, American football, athletics, basketball, beach volleyball, dancing, fencing, floorball, football, golf, gymnastics, handball, hip-hop, ice hockey, yoga, judo, karate, lacrosse, parcours, rugby, softball, table tennis, taekwondo, Thai boxing, volleyball, water polo, wrestling	

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Instructional Effectiveness in Physical Education: Factors for Attaining Motor Skill Equity

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Abstract

Having the appropriate motor skills lays a foundation for many movement possibilities throughout an individual's life. Physical education class may be the first time that students experience physical activity. Therefore, allowing as many effective instructional possibilities in physical education becomes increasingly important. If students experience success in physical activity, this may create future movement possibilities. Repeated failure during movement possibilities, however, may have long lasting consequences, as students may not want to continue activities that are unsuccessful. Motor skill equity, a term developed by Lysniak (2020), explores the attainment of motor skills despite a student's skill level. This chapter will explore the important factors in teaching, so that students can attain successful movement opportunities. The factors are: a) time and practice, b) level of difficulty and skill progression, and c) class structure, including clarity, accountability, and feedback.

Key words: Physical education, Instruction, Motor skill equity, Skills

Introduction

The physical education class experienced by students relies on the environment that is created by teachers. Creating environments in physical education that are individualized to meet the needs of all the students, are developed by effective physical education teachers (Lysniak, Gibbone, & Silverman, 2019). These environments support the ability and opportunity to participate and succeed in physical activity, described as motor skill equity (Lysniak, 2020). Having motor skill equity enables participation in physical activities. Allowing students, to practice at their own skill level and develop competency, develops motor skill equity. Although motor skill equity was proposed for low skilled students, it can apply to all skill levels. To further this term, several factors to augment motor skill equity on all skill levels will be explored.

Students in physical education classes have differing skill levels that may range from the high skilled to the low skilled student. Effective teachers find ways to help individual students maximize their abilities throughout the full range of student experiences. Activities can be modified in ways that will increase each student's chances of successful achievement and learning. Students, who are successful and are learning skills, enjoy physical education and are more likely to stay physically active as adults (McKenzie, 2003).

When students continually experience failure in performing activities in physical education, often they attribute their failure to their lack of ability and come to believe that nothing they do can change future outcomes in physical education (Behzadnia, Adachi, Deci, & Mohammadzadeh, 2018). Teachers' instructional decisions are crucial so that students can experience success. When students are unable to participate in activities, they avoid learning new tasks, announce failure in advance, act out their frustration in the form of anger, and accept failure while at the same time practicing the skill (Bartholomew et al., 2018). It is then up to the teacher to be an effective and influential educator and find what works best for those students. Effective teaching practices can be diluted by socialization in their in-service placement (Richards, Housner, & Templin, 2018), as the role of the teacher is influenced by one's approach to teaching physical education and socialized into that role. The traditional sport practices, in which physical education is grounded, may be preserved by socialization. The role of socialization and how it might influence effective instruction has been critically examined (Richards, 2015), and, therefore, it is important that teachers are proactive in their effective teaching practices.

This chapter will examine factors that affect instructional effectiveness that may promote motor skill equity: (a) the use of time and students' practice, (b) the difficulty level and skill progression, and (c) the class structure, which includes clarity, accountability, and feedback. The following sections will explore these factors as they relate to instructional effectiveness.

Time and Practice

Time management skills have been linked with student satisfaction in physical education (Cronin, Allen, Mulvenna, & Russell, 2018). Good time management leads to optimal efficiency in use of

class time, use of positive motivational management techniques, and the ability to cope with and handle any unexpected classroom disruptions. An effective teacher uses classroom time effectively and structures practice that is relevant, focused, and paced (Siedentop, 2000). Redefining time, through a students' experiential perspective of learning, can be critical to setting up an environment where students can learn productively (Casey, Dyson, & Campbell, 2009).

Carroll (1989) proposed a framework that students needed time to practice and to successfully participate in a task to engage in learning. Students need time to learn, and each student needs a different amount of time. The quality of learning is based on the quality of instruction; the amount of learning is the actual time devoted to learning divided by the total amount of time needed. Silverman (2005) states that the more time spent practicing a skill, the more learning will take place. The inequality of practice opportunities has been highlighted, and social justice through movement has been discussed (Walton-Fisette, Richards, Centeio, Pennington, & Hopper, 2019). These opportunities would allow for all students to achieve motor skill equity, and this foundation of skill attained in physical education class could be used throughout the students' lives.

The single most valuable commodity in teaching and learning is time (Silverman, Tyson, & Morford, 1988). Students ought to be engaged with the subject matter during that period. To learn, the student needs sufficient time to practice successfully (Engel, Broderick, van Doorn, Hardy, & Parmenter, 2018). This however, might not be the case. A good deal of student time, in early studies, was spent waiting for an opportunity to practice the actual skill being taught (Metzler, 1982; Piéron, 1983; Placek, Silverman, Shute, Dodds, & Rife, 1982). Powell, Woodfield, Nevill, Powell, & Myers (2019) found that students perceived that teacher spent much of the time in class on non-practice related factors, such as stopping the class to give instruction, giving instruction for long periods of time, and students waiting on line for a practice trial. Teachers, however, might not perceive the use of time as wasted, as they think they are clarifying instruction and keeping order.

Yet, it is not only the time spent practicing, but it is also necessary to practice appropriately. Appropriate practice of motor skill is strongly related to student achievement and learning (Silverman & Mercier, 2015). However, as appropriate practice trials are limited, students do not have enough time to correct inappropriate practice (Lonsdale et al., 2013). Successful trials can lead to good technique being used and repeated, whereas with unsuccessful attempts, mistakes are being made and are not being corrected.

Practice at an appropriate level produces related gains in skill, and inappropriate practice is negatively related to success (Brian & Tauton, 2018). Practice does have a greater effect on low skilled students, whose skill improves more from practice appropriate to their skill level. Having effective intervention, where students are practicing skill and experiencing success, could allow students to increase their foundation of skill and lay a foundation for future physical activities (Lorås, 2020). Students practicing at a level that is too difficult for them could get frustrated or overwhelmed and, therefore, will not learn (Silverman, 2005). This can be seen in physical education classes, when in one class period, students go from dribbling around cones to full-

fledged game play. This is not enough time to practice and learn the skill of dribbling, nor to dribble within the complexity of game play.

A teacher's behavior with respect to the physical education class environment is vital. Teachers are the ones who make decisions as to the amount of practice opportunities, the level of the motor skill, the skill level of the student, and the instructional strategy they will use with the students. Effective teachers recognize the diversity among individuals and strive to meet their individual needs and motor skill equity (Lysniak et al., 2019; Lysniak, 2020).

Level of Difficulty and Skill Progression

In every class, the teacher is faced with students of varying skill levels (Martin, 2003) and potential for achievement. Motor skills that are performed in physical education range in levels of difficulty from simple to complex. Curricula can be designed, so students develop the motor skills in a progressive method and are, therefore, efficient and successful in physical education (Hebert, Landin, & Solmon, 2000). Students master each skill level before progressing to the next level (Rink, 2020), otherwise success, and learning, will not be achieved. Inexperienced teachers might not use task presentations effectively (Kwak & Kwon, 2022). When these teachers begin to present tasks effectively, often it is a result of their improving their use of skill progressions (Iserbyt et al, 2022).

Excellent teachers adapt instruction to their students (Lysniak et al., 2019), because students learn best at an appropriate level of difficulty. The level of difficulty and the amount of practice trials the student completes are more important than the length of practice time (Stodden et al., 2008). When practice progressions are inappropriate for students, there is a possibility that regression can occur in their performance (García-Hermoso et al., 2020). It can be inferred that the difficulty level of the skills being taught has an effect on students. High and low skilled students have different experiences in physical education as they strive for motor skill equity. Various instruction is necessary for different student skill levels and task difficulty; one type of instructional strategy or teaching style will not work best for all the motor skill levels found in a physical education class (Silverman, 2005). To meet the students' needs, a teacher must change the level of difficulty of the task to make it simpler or more complex for them (Rink, 2020). When teachers establish a sequence of tasks that propels students to a goal and then build new practice tasks based on their previous performance, students will most likely successfully complete the tasks (Kolovelonis, Goudas, & Dermitzaki, 2011).

If teachers teach at too high a skill level for low skilled students, for example, moving them to games before they can actually perform the activity, the low skilled students defer to the higher skilled students (Silverman, 2005), because they are not enjoying the class and are not able to perform the skill (Rikard & Banville, 2006). When the tasks are arranged for the high skilled students, the environment is not a positive one for the low skilled students (Ennis, 2000). According to Walling & Martinek (1995), low skilled students do not often find success in physical education, but rather humiliation, isolation, and alienation.

If students find the situation in the gymnasium boring, if it has no personal relevance, they withdraw (Bernstein, 2020). When they withdraw, after constantly experiencing failure, their perception of their ability changes, and they do not believe they have any power to alter their outcomes (White et al., 2021). Conversely, high skilled students possess a strong sense of control over their circumstances and ability to execute skills (Walling & Martinek, 1995). Unfortunately, low skilled students feel a lack of affinity with physical education. They come to think that achieving in physical education is beyond their capabilities, and they withdraw mentally, emotionally, or physically. They feel as though they do not have control over their enjoyment (Subramaniam & Silverman, 2002).

Skill progressions are critical to the proper teaching of movement skills. Progressions in physical activities move students from less difficult, less complex tasks to more difficult, more complex tasks, and eventually to the accomplishment of the motor skill, a movement from motor skill inequity to motor skill equity. A teacher's first goal is to ascertain the level of skill and understanding of the students. This information will allow the teacher to develop content by planning progressions that lead to terminal goals (Siedentop, 2000). Instructional tasks relate to the achievement of final goals, and within physical education there are several options for categorizing these tasks. Rink's (2020) model would direct students' concentration upon performing various skills, which could then be expanded to each student's need to acquire a specific skill. It would be the teacher's task to categorize the instruction in such a way as to facilitate skill development and reach the envisioned goal.

There are four tasks to Rink's model (2020) that deal with changing the complexity of a task. Initially, Rink's model begins with the informing task, as the teacher provides information to the students about the new motor skill, specifically explaining skill requirements. Students then get to practice the motor skill. Refinement tasks are given when the teacher is concerned with improving the quality of the performances by the students. This is accomplished by focusing the student on a particular movement skill, so that they can concentrate on improving one aspect of their performance. From observing the students, the teacher can modify subsequent tasks to meet the students' needs. Extending tasks are a way to establish progression. These progressions can move from less complex to more complex, or the task can be practiced in a different way (no complexity added), or the complexity of a task will be reduced. Refinement or extension can help to make the tasks more appropriate for students of different skill levels. Application tasks provide students with opportunities to move from how to do the movement to game or scrimmage situations.

As with Rink's model (2020), Graham, Holt/Hale, & Parker's (2019) generic levels of skill proficiency (GLSP) categorize instructional tasks to function as a rubric of a student's ability in regards to different skill proficiency. The GLSP consists of four stages, pre-control (for beginners), control (for advanced beginners), utilization (for intermediate students), and proficiency (for advanced students), which coincide with Rink's stages (informing task, refinement tasks, extending tasks, and application tasks) by accommodating the complexity level of the task to match the skill level of the student. These two models are similar in that they guide the students

to eventually move automatically as they focus on other elements of complexity. Both models take steps to achieve motor skill equity.

A common mistake in physical education is to move students too quickly, before they have sufficient practice, from practice to games (Bernstein, Phillips, & Silverman, 2011). Students may be more successful at motor skills if task complexity is gradually increased, as students become more competent at their tasks. It is a progression of steps that build upon each other in order to reach the target set by the teacher. Thus, moving from simple to more complex tasks allow students to attain a higher rate of success and greater enjoyment at the given activity (Silverman, 2005). The practical applications of level of difficulty and skill progression should be considered while learning forearm passing in volleyball, for example, by having three levels of skill practice, based on students' individual needs. For the basic level, the students perform the forearm pass on a stationary, held ball. Once the students are proficient at the skill, they move to the next level of skill practice. The forearm pass is then practiced using a dropped ball. And, finally, the ball is tossed by a partner, and the forearm pass is executed by passing the ball back in a high arc to the tosser. As the students' skills advance, the volleyball can be tossed to the left and to the right of the students passing the balls to include variation.

Class Structure

Factors in effective teaching are important in student learning and achievement (Michael et al., 2019; Wibowo & Dyson, 2021). Teachers' decisions in the structure of the physical education class often reveal a balance among goals that reflect the students' needs, limitations, and knowledge. A teacher's perspective influences the importance of particular components and the emphasis each will receive in the instructional plan (Bernstein, Herman, & Lysniak 2021). Class structure and the way tasks are presented have a great effect on student learning. More specifically, task structure provides a basis to understand what happens in a physical education environment (Roure & Pasco, 2018). Factors important to student learning and achievement in physical education have been identified. Much of the research in physical education has focused on three factors that affect class structure – clarity, accountability, and feedback.

Clarity. Effective teachers are clear as they communicate the meaning and importance of what is to be learned by the student (Chesebro, 2003). When information is presented to students, it has to be clear in its objectives, contain specific and concrete procedures, have step-by-step presentations, and be understood by the students (Simonton, Garn, & Solmon, 2017). Rink (2020) suggested that teacher clarity in physical education is a teacher's ability to present and organize material in a logical progression, while concurrently monitoring the student's understanding of the given tasks. The teachers' goal is to create a learning environment that enables students to think and act in ways that helps them to maximize learning opportunities (Lysniak et al., 2019).

One of the primary roles of the teacher is to structure the content for the learner. Students must understand the purpose of the task before it is performed. Students might fail to complete a task as intended by a teacher when they are not clear about the expectations for participation (Heath

et al., 2012). Effective teachers communicate appropriately to the students by explaining the skill, giving examples and demonstrations, and using verbal cues, which can enhance both affective and psychomotor domains (Ciotto, 2018).

Teacher clarity was one of the first effective teacher variables identified by early research on teaching (Kennedy, Cruickshank, Bush, & Meyers, 1978). Clarity, also, was one of the most consistent variables identified as being related to teacher effectiveness. It was found to be related to student achievement and learning. Research studying teacher clarity also focuses on the evidence of lack of clarity in classroom settings. Constructs such as vagueness, redundancy, discontinuity are common detractors from clarity (Kangalgil & Özgül, 2018). For example, describing a skill without clear steps, or giving too many cues, often occurs in physical education and can confuse students. Also, calling out, "Hey, you" to a student, rather than using their name, is ineffective and unclear instruction as students may not know whom the teacher is referring to. These are missed teaching opportunities.

Accountability. Accountability plays an important role in physical education. It refers to the way the teacher ensures that students learn and complete tasks and achieve motor skill equity. Without accountability there is no record that the teacher is providing for motor skill equity (Lysniak, 2020). When students are held accountable, the result of motor skill learning is more likely to take place; if the teacher does not hold the student accountable, there is a less likely chance that learning will occur (Tolgfors, 2018).

When students are held accountable by teachers for motor skill performance, they tend to remain engaged with the assigned task. The students' system of accountability allows them to perceive the teacher's task instruction, monitoring, and rewards/consequences system, and then they adjust their behavior accordingly (Welk, Corbin, & Dale, 2000). Thus, teacher monitoring is related to student behavior. As accountability grows, the student develops a greater focus for the task. It is effective teaching that creates an accountability system, which translates into good performance (Rink & Hall, 2008). When there is no accountability, or when it is ineffective, task accomplishment may be incomplete, or the task may not make sense to the student. Examples of what teachers can use to hold students accountable could be task sheets or exit slips, as well as skill tests and cognitive quizzes.

Feedback. Feedback is defined as the information teachers provide to learners regarding their performance (Rink, 2020) and modifying the next action (Siedentop, 2000). Feedback may be a factor connected with student learning and achievement. It has been related to learning and achievement in various degrees (Pitt, Bearman, & Esterhazy, 2020; Wisniewski, Zierer & Hattie, 2020). Feedback may be critical and may have an important place in learning a motor skill (Anderson, Magill, Mayo, & Steel, 2020).

Feedback messages also come in many different forms and can be categorized as either general, supportive statements, but not containing task-relevant information ("way to go," "good job"), or as specific, containing information relevant to the task ("great pass, just the right height"). It can

be further classified as positive ("good move"), negative ("bad move"), or prescriptive (corrective - "keep that position longer" or descriptive – "your position is incorrect") (Potdevin et al., 2018). Magill and Anderson (2021) and Rink (2020) have discussed that teachers should give feedback that is specific, congruent, and corrective, so that on the subsequent trial students would be able to perform movements more correctly. Teachers most often used this type of feedback for motor skill improvement (Kyriakides, Tsangaridou, Charalambous, & Kyriakides, 2018). Meaningful teacher feedback is important in learning motor skills, because it can improve students' understanding, focus of performance, self-concept, and increase the rate of on-task behavior. Feedback, especially specific feedback, helps the motor learner focus on the task as consistent information is relayed about the learner's practice trials and goals (Ma, 2021).

More recent studies have found that feedback is not as important for motor skill learning as was once thought. Anderson et al. (2020) believed that the role of feedback in motor learning was a lesser one, and the involvement of teacher feedback in motor learning was overstated. Teacher feedback only has a small, if any, role, in skill learning (Curran & Standage, 2017). Magill and Anderson (2021) posit that feedback may be necessary for learning some skills in some situations, but perhaps not others. Lee (2021) has concluded that although many teachers do feel that feedback is very important to student achievement, results from research do not support it as a critical variable for learning.

Conclusion

In this chapter, the factors that teachers need to consider when striving for motor skill equity have been outlined. Equity often is not considered until it is apparent that one does not have it. What does it feel like not to be able to do something? It may not seem like much, but what if that something is a life skill, such as physical movement? It may have profound consequences. Perhaps, the physical education class that the child or adolescence took seemed irrelevant and not important at the time. Yet, now, in the future, those very skills that they were meant to learn and did not, do not allow them to participate in activities with friends, in the gym, or in sporting events, because they feel uncomfortable doing the motor skills that were not taught correctly.

Physical education teachers can be instrumental in helping students at all skill levels to maximize their abilities. Teaching progressions should be designed so that students may develop their skills in a progressive manner. After specific skills have been attained, students can achieve motor skill equity throughout their lives. The variables discussed here, time and practice, level of difficulty and skill progression, and class structure (clarity of teaching episodes, accountability to focus on the motor skill, and feedback related to achievement), rely on instructional effectiveness, so students can participate, increase motor skills, and achieve success and motor skill equity.

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eL CaMiNo De piEFcitos: United for a Healthy and Sustainable Physical Education

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Abstract

eL CaMiNo De piEFcitos: united by a healthy and sustainable Physical Education project is an annual and cooperative project in which you can get symbolic kilometers by doing actions related to physical activity, healthy food, reading, resting and sustainability to virtually tour the beautiful Spanish geography, both insular and peninsular, and the two Autonomous Cities of Ceuta and Melilla. It was firstly implemented in the 2019-2020 school year, and a new edition is being developed in the current 2021- 2022 school year, with a thematic based on The Olympics and with SDG (Sustainable Development Goals) as cross axis to the entire project. In addition to this, during the school year some campaigns are carried out related to ephemeris linked to the 5 Healt Axes of the project and the values we want to convey as empathy, solidarity, equiality, respect, fellowship. In the project are involved more than 200 schools with different features and educational levels from all over Spain, 4 international educational centers (Cambodia, Luxembourg and two centers in Colombia), in addition to a care center for the elderly in Malaga and more than 50000 students and their families take part. The project counts also with a bank of more than 100 ambassadors who are people related to sport (many of them Olympics and Paralympics) that through short videos support and motivate students and their families to keep getting healthy kilometers.

Key words: Childhood obesity; Healthy lifestyle habits; SDG, Physical activity, Healthy food, Reading, Resting, Sustainability.

The **project eL CaMiNo De piEFcitos (**figure 1) is an annual and cooperative project in which through the ***practice of physical activity, healthy eating, reading and sustainable development actions*** will allow us to **obtain symbolic kilometers**, taking us to travel through each and every one of the provinces in which the Spanish geography is divided, including the two archipelagos and autonomous cities, which complete the beauty of which our country is composed.

Figure 1 Project logo and QR code to the explanation in less than 2 minutes of its development

1. Introduction and contextualization of the proposal

The project was born from the latest studies carried out by entities working on health, such as the **PASOS study** whose objective is to evaluate physical activity, sedentary lifestyles, lifestyles and obesity in Spanish children and adolescents aged 8 to 16 years by the Gasol Foundation and the report on **The State of the World's Children 2019: Food and Nutrition** by UNICEF, or, more recently, the **ALADINO 2019 study** (Food, Physical Activity, Childhood Development and Obesity in Spain) of the Spanish Agency for Food Safety and Nutrition (AESAN), which indicate the increase in childhood obesity. Faced with this situation we have devised this project a group of 380 teachers, reaching 48,872 students and their families in 200 educational centers of different stages throughout Spain (Figure 2), which puts in value the personal actions of each of the students, their families, teachers and own center, since from education, and especially, Physical Education, we can develop actions that incorporate these physical-healthy routines in their lives, reducing these bad data and returning the lost health. All these actions will be rewarded with the sum of "healthy kilometres" for the centres and students who carry out different actions of a motor nature, favouring recycling, reading or eating habits in search of a comprehensive education that influences their personality as an active and reflective citizen (**Márquez Vargas, J., 2017**).

Figure 2 Images of several teachers participating in the project and QR code to the virtual tour

2. Narrative

The game is learning, since above all it is emotion and curiosity as **González de la Fuente** (**2015**) or **Mora Teruel** (**2022**) say, therefore, taking the words of **Pérez** (**2020**), what better way to teach while playing! starting point to choose gamification as an active methodology for the project. Based on the structure of the Camino de Santiago, we decided to shape it so that the students could get to know the Spanish geography in a fun way through "virtual" kilometers in a healthy way through four axes: physical activity, healthy eating, sustainable development and reading. Each group of walkers has a passport with all the schools they have to visit on their way (figure 3). When they symbolically arrive at each one of them, they will be given a "provinciala" as a stamp, as proof of their passage, they will also receive a video of the students of that centre explaining cultural curiosities, gastronomy, legends,... related to the province, with the aim of having completed the whole route in the month of June.

Figure 3 Images of the map and the passport created for the Project

To ensure that all the schools manage to complete the healthy passport, a solidarity bank has been created with donations of kilometres. The whole project follows an active methodological line, promoting the development of active and healthy schools and playgrounds, carrying out common actions between centres such as the challenge of jumping against obesity on the World Day against Obesity, the San Silvestre de piEFcitos, the celebration of the Day of Disability or the climate summit with the initiative of Zero Waste Playgrounds. In addition, it has a marked interdisciplinary character, with project-based work in schools (Figure 4).

Figure 4 Images of some common actions between centres

Although the project is born in the area of Physical Education, it **is a project that seeks interdisciplinarity**, such as working on content such as measurements and distances **in the area of Mathematics**, knowing the different names and toponymy **in the area of Spanish Language and Literature**, understanding the distribution of the Spanish geography **in the area of Social Sciences**, discovering the natural landscapes, climatology, flora, fauna... **in the area of Natural Sciences** or, for example, **in the area of Values** with the exchange between students from different places about their daily life to see the similarities and differences with respect to others, creating a network of twinning that can be the beginning of a lasting friendship and quality.

The project is developed with the dedication of the teachers who make up this initiative, investing our time and passion to achieve the goal of generating change.

It should also be noted that it **is a project that promotes inclusion** from different perspectives:

- Participation of schools from different educational stages and with different characteristics, such as Special Education centres or Grouped Rural Centres.
- Adaptation of the materials created to students with specific educational support needs, for example, through pictograms.
- Videos of disabled and Paralympic ambassadors.
- Celebration of Disability Day on December 3.

3. Mechanics, dynamics, scoring, ranking, strategies to generate curiosity

The project **begins on October 1st and ends on June 5th**, the day on which World Environment Day is celebrated with the Recyclalympics, as the culmination of a year full of different actions related to changing the lifestyle of our students and their families.

All actions to add up kilometres are checked by sending photographs to the email created by each coordinator in their centre, where they receive this evidence as justification for adding up the kilometres:

- Inside the centre: direct observation and anecdotal records.
- Outside the centre: sending photographs, videos,... by email to the coordinator of your centre.

Most of the actions carried out in schools based on the 4 axes will last over time and in the following school years, such as: the use of recycling bins, ecological patrols for waste collection, more healthy lunches in the cafeterias of schools, conducting the I San Silvestre de piEFcitos...

The possibilities can be flexible depending on the characteristics of the context of each of the centres (Figure 5).

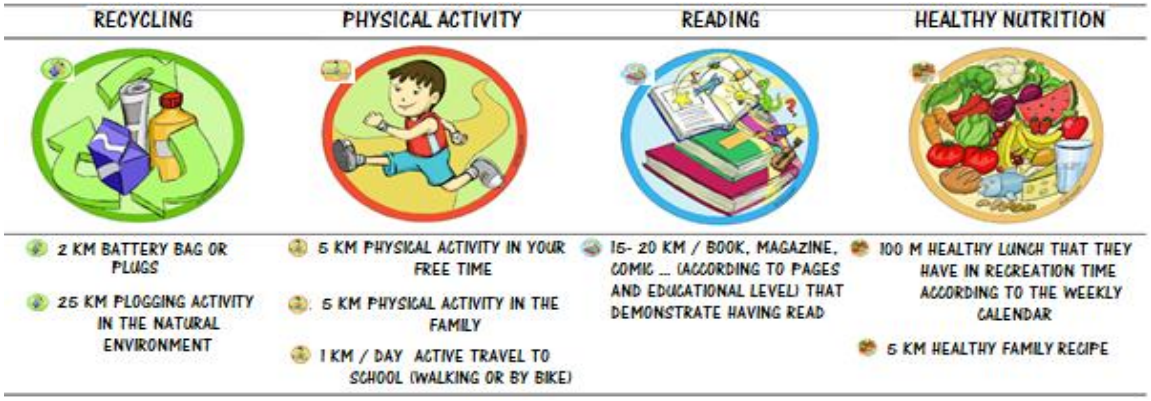

Figure 5 Explanation of how to get kilometers on the axes that make up the project

In the same way, each group of walkers will achieve one of the 5 levels of health consecrated and established according to the kilometers obtained. Attributing a *bagde* or *badge* that will identify them as a participant in this educational adventure and care of their health (Figure 6), with a reward at each level:

1. First level -> Tourist, with visit to 5 provinces. Choose a game during the class.
2. Second level -> Backpacker, 13 provinces. One day of free play.
3. Third level -> Mountain guide, 24 provinces. A bracelet or notebook of the project.
4. Fourth level -> Mountaineer, 37 provinces. Participate in the Recyclalympics.
5. Fifth level -> Sherpa, 52 provinces. A t-shirt of the project.

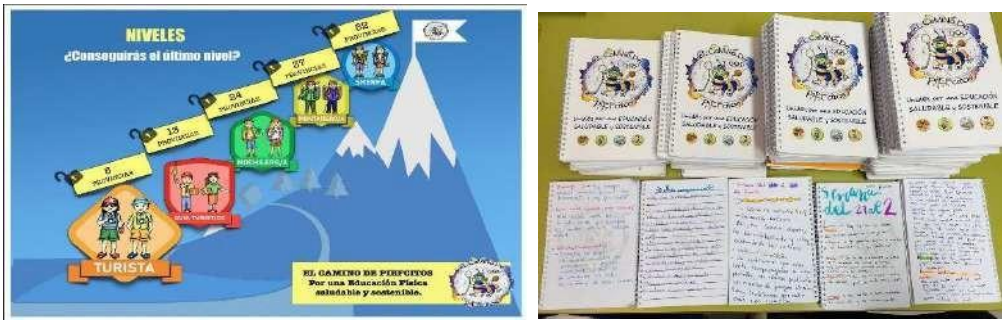

Figure 6 Infographic of health levels along with some of the rewards received

Finally, in an interdisciplinary way, different campaigns have been created to raise awareness about caring for the environment, healthy eating to overcome childhood obesity, the inclusion of all people who live together in society,... making them coincide with the celebration of their days in the school calendar or events worldwide, as has happened with the World Day of Childhood Obesity (November 12), the International Day of Persons with Disabilities (December 3) or the World Day of Environmental Education (January 26), bringing to our schools different awareness actions by the entire educational community.

Figure 7 Posters of different campaigns carried out to add up healthy kilometres

4. Results, evaluation and complementary aspects of the project

The most visible results are the increase of healthy lunches during recess time, as well as the reduction of waste due to the incorporation of cloth bags or the use of *tuppers* that have replaced the aluminum foil wrappers that we were used to take lunch to school from home.

We can not forget the existing motivation among students and families to reach new provinces, discovering through the videos of each school, the curiosities and secrets that encompass the immediate environment, knowing the details of each province to see differences and similarities with the place where we live each.

In addition, we have the collaboration of several associations and groups with whom we work to achieve common goals such as:

- **Educational centres sector:** 200 educational centres of different characteristics and stages sharing experiences, carrying out common actions and celebrations, establishing agreements, providing feedback every day and creating a large inter-centre network.
- **University sector:** with the INEF of Catalonia, producing posters and motivational videos, in addition to the aforementioned universities of Oviedo and Murcia. On the other hand, we have also collaborated with the University Alcalá de Henares, carrying out different statistical studies and infographics on the data collected in the different educational centres. Finally, we have carried out a Service Learning together with the Ramón Llull University of Barcelona, in which for the International Day of Physical Activity and Health, celebrated on April 6th, we proposed activities so that the prisoners of the prisons would add up kilometres that they would then donate to the students of the rest of Spain.
- **Sector associations-organizations** with collaboration in different fields:

a. *Teachers for Future Spain*, through the campaign Recreos residuo cero.
b. *Educo-NGO*, through its Lunchroom Grants program, whose aim is to ensure that no student goes without at least one healthy meal a day.
c. *Aladina Foundation,* carrying out different campaigns to raise funds in order to donate them to families who are suffering from a case of childhood cancer.

d. *LOGRA Association,* through activities to raise awareness and bring disability and inclusive sport closer to schools.
e. *PGR NGO*, to promote women's sport through rugby in different countries of the world.

- **Sector ambassadors** (figure 8): from the fields of sport, culture, health and cooking, who created motivational videos for students to add kilometres to this adventure, such as Lydia Valentín, Sandra Sánchez, Javier Fernández, Maverick Viñales, among others.

Figure 8 Image with several ambassadors

The evaluation of the project is being done on a daily basis and continues due to the receipt of emails from students and their families to add kilometers, showing that they perform actions within the four axes around which the project revolves. Rubrics have been generated in order to know attitudinal aspects and the students motivational activities, without forgetting that each educational centre produced a video and a *Kahoot* with questions related to the content of their video.

5. Conclusions and final considerations

Note that the sum of kilometers for each group of walkers is done from the cooperative point of view, moving away from the competition between groups, since what is pursued is that the members of each team encourage each other to achieve activities that they approach all the points of Spain and not see which group gets more kilometers. In addition, we have the resource of the solidarity kilometer bank, in which the contributions that are donated by the rest of the Educational Community for those teams that go few kilometers are accumulated.

If we had to summarize the innovative and original aspects of the project they would be:

- Participation of more than 200 centers and almost 50,000 students from all over Spain.
- Involvement and active participation of the entire educational community.
- Use of gamification to motivate, involve and attract the educational community and achieve the objectives.
- Simulation of the Camino de Santiago with El camino de piEFcitos, united by a healthy and sustainable education.
- Specific and personalized materials: healthy passport, province cards, badges, videos, maps, infographics,...

• Team of ambassadors and ambassadors (world champions, Paralympians, prominent personalities from the world of nutrition, sports psychology,...) who show their support for the project and motivate the students to continue adding kilometers through videos or face-to-face performances in the centers.
• Actions and common celebrations in the different educational centers that are part of the project.
• Use and development of ICT and innovative educational applications such as video editing, sending images, promotional trailers, ambassador videos...
• Transversal nature: promotion of solidarity (actions and solidarity races, solidarity bank of kilometers, collaboration with NGOs,...), road safety education, environmental conservation, disability awareness,...
• Knowledge and learning of cultural and significant aspects of the different provinces of Spain in a playful, innovative and motivating way for students.
• Dissemination through social networks and media: radio, press, television,...

This made me think that we are not naïve. To achieve modifications at the level of values and civic actions is not the task of a course. The scale of individual values is hidden in the ethical essence of the person and there you only get there by filtering, drop by drop, but in a repeated and tireless way, small doses of peace, respect, solidarity, altruism? That is why this project must be maintained over time, prolonging its action for many years, allowing these values to consolidate, to become as commonplace as a child's smile.

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Innovation in Physical Activity to Health Life Styles through the Mile´s Schools Program: A Mexican Experience

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Abstract

In 2000´s, the England community implemented a special program denominated "Mile´s Schools" for elementary schools. The program consists in walk or run one mile, before the scholar sessions. Mexico has a regrettable problem with the corporality of their population and occupies the first places of obesity in the world. Our country, as the world, require a new method to battle the obesity and inactivity, and it´s necessary the early intervention. The purpose of this study is to determine the impact in scholar population of México the experience of the "Mile School Program". Participated 2,017 scholars from seven to eleven years old, (male 60%, female 40%), who was studied in six different schools of the Municipality of León, México. This City is in the center of the country, and its population is representative of the Mexico. All the socio-economic class were represented in a proportional basis. According with the 6 month program, scholars and their teachers, manifested their satisfaction and they considering, that the school is an ideal place to promote healthy lifestyle for several reasons: Children spend a large part of the day at school; they think that generate a great impact in the future; it is implemented in ideal environment to acquiring knowledge and habits of healthy living; educating in a healthy lifestyle is part of the school curriculum that establishes the contents to work in the classroom, and it was a better way to inspires physical activity among students in a fun way. To evaluate the effectiveness of the program, it was measuring the body mass index, which it was reduced from 26±2 to 21±1 (Kg/m2). The program left satisfied parents and teachers. Main benefits observed were: Improves the physical, social and emotional health and the well-being of the students; helps to improve performance, mood and concentration; reduces states of anxiety and stress; it was a fun and social activity that promotes fellow the adherence; it's not a race or a competition, but it was a way to have fun interacting with class mates outdoors; allows them to create new friendships and develop existing ones; tt is not discriminatory or exclusive, all students are invited to participate. All the benefits and advantages that this program brings to the students, have a positive impact on their parents and teachers.

Key Words: Mile´s School, Scholar´s early intervention, Scholar Obesity

Introduction

According to the World Health Organization, childhood obesity and overweight are one of the most serious global public health problems of the 21st century (WHO, 2014). Mexico occupies the first places de childhood obesity in the world. The life expectancy of this generation may be less than that of their parents, a situation that would occur for the first time in history.

Inadequate nutrition and physical activity are a key factor in the development of childhood obesity. A sedentary lifestyle has become a risk for children and young people, who spend more hours sitting in front of the computer or smartphone than playing or doing extracurricular activities outdoors.

The consequences of childhood overweight and obesity go far beyond aesthetics, and can lead to medical, psychological and emotional complications in the short and medium term. Diabetes, is already currently a serious public health problem in our country, published through the National Survey of Health and Nutrition carried out by the Mexican Government (ENSANUT, 2018).

In 2000, the Commonwealth of England implemented a program called "Mille's Schools for Elementary Schools". The program consists of walking or running one mile, before the academic sessions daily. Benefits recognized by the basic and secondary school included decreased overweight and obesity. In the educational process, it was also notable that the learning process, concentration in class sessions and better execution of school tasks had improved (Slawson, 2015; Harding, 2015). The simplicity of the execution of physical activity through walking and its replicability has attracted the attention of different countries and in Mexico, by the ministries of education and health.

The purpose of this work was to determine the impact on the school population of a representative central zone of Mexico through the application of activities related to the methodology of the "Mile schools" developed in England.

Methods

Participants were to 2,017 elementary school students from seven to eleven years-old (60% males, 40% females), who belonged to six different schools in the Municipality of León, Mexico. This city is in the center of the country, and its population is representative of the Mexico, due to its geographical location, economy, level education and their industry. It is considered the 5th most important city in the nation. In this study, all socio-economic classes were chosen, represented in a proportional basis.

The procedures, benefits and contraindications of the study were explained to parents, students, school officials and teachers. The principles of the Declaration of Helsinki were observed and the Mexican regulations on human research, particularly with the age of the students participating in

the study and approved by the ethics committee of the University of Guanajuato, and Mexican Federation of Sports Medicine.

The program consisted of walking or running a mile, daily, before each class. The scholars participated five days a week, according to the schedule of national study program. In Mexico, the academic system takes place five days a week, and its usual academic activity is usual for 6 hours a day.

A medical history and anthropometric measurements of height (meters) and weight (kilograms) were obtained, and the body mass index was calculated (weight (Kg)/height $(m)^2$). The data were recorded every week in students and teachers to know their program perception through a Likert scale, with 10 items and graduated on a scale of 5 degrees (from disagree to totally agree). The weight (Kg) and height (m2) were obtained, to evaluate the body mass index (weight (kg) / height (m2)).

Parents opinion was obtained at the beginning and the end of the program through direct interviews.

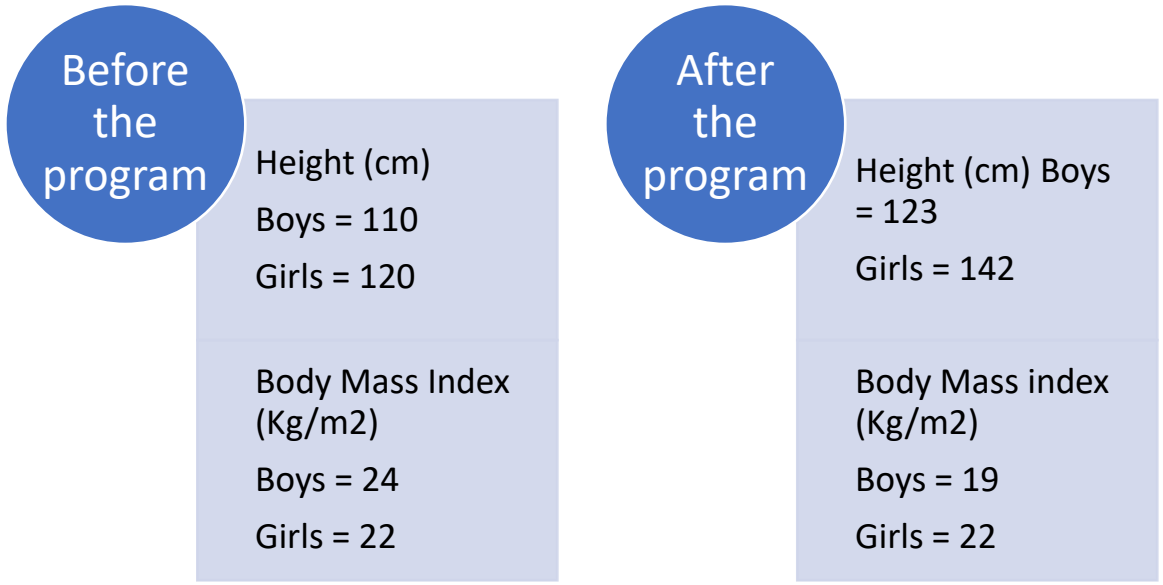
The perception data were analyzed by qualitative techniques in a matrix that contained a comment vs. the evolution of the time of the program. t paired test and Kruskall-Wallys test to non-parametric variables was performed to analyze the changes before and after program. Distribution of normality was obtained in all data. In all cases, the significance level was fixed at alfa of 95%. The data was analyzed in SPSS (v. 20.0).

Results

According to the 6-month program, the students and their teachers expressed their approval and consider the school an ideal place to promote a healthy lifestyle and to avoid risky behavior for several reasons: Children spend much of the day in the school and require a time to do physical activities and this fact has long term impact on the lives of students; the school environments are an ideal space for acquire knowledge and healthy life habits; the program is a way to educate in a healthy lifestyle which is part of the educational program in schoolchildren and is consistent with the contents to work in the classroom; represents a complementary way of action to promote physical activity among students in a fun way, not competitive; promote companionship among schoolchildren with lower hereditary biological capacities, as well as different economic or cultural conditions of the family. The distribution participants scholars' participants studied is showed in table 1.

Table 1Distribution of participants by the sex and socioeconomic income. (Absolut values)

Total Girls (#)	**Low (#)**	**Middle (#)**	**High (#)**	**Total Boys (#)**	**Low (#)**	**Middle (#)**	**High (#)**
483	**290**	**145**	**48**	**724**	**434**	**217**	**73**



The figure 1 shows the changes in mean values in the height and the body mass index during the program.

The participants increased their height by of 3.2 cm in the period of the study, attributed to their natural growth and natural development according to the reference values of Mexican infants (ENSANUT, 2018). There was no significant difference ($p > 0.05$) between boy and girls. Long term studies in this population will make it possible to characterize the impact of this type of program coupled with adequate nutrition. The body mass index of the participants changed significatively, attributed to age-specific growth and development, and feeding could be a non-controlled variable in this study, but must be considering in a future studies, to assess the impact of the program on the corporality of scholars, the body mass index is a good indicator. This was reduced from 26 ± 2 to 21 ± 1 (Kg/m2) ($p<0.05$).

Discussion

Walking a mile each day brings a lot of benefits to students, not only in school children, but also to parents and teachers. In this study, we showed some of the main observations detected in the program that were considered the most important and transcendent. Data were coincident between schoolchildren, parents, school officials and teachers: Improvement in physical, social and emotional health and well-being of students; helps to improve the academic performance, mood and concentration; reduces anxiety and stress; it is a fun social activity that promotes solidarity and camaraderie among schoolchildren; this activity is not competitive and represents a way to have fun interacting with the classroom mates; allows them to create new friendships and develop existing ones; it isn´t discriminatory and not exclusive to students who have a better hereditary and/or socio-cultural and family conditions and abilities; all schoolchildren can participate.

The program doesn't require a physical space. It can be done around the school, or in sports areas within the school. The 15 to 30 minutes used contribute to achieving the recommended daily minimum of 60 minutes of physical activity of moderate to vigorous intensity in children, which is good option knowledge, habits int pediatric knowledge, habits and attitudes for school health in the pediatric (Hatch, 2021).

Walking a mile or multiples of in younger children facilitate the development of a wide variety of physical activity, and socialization. The program also has a big impact in the adoption of health habits to combat a sedentary lifestyle. In this work, schoolchildren have an inherent interest in the playful participation of activities based on games that are reinforced by having fun and enjoying living together with their classmates. The "Miles School" program addresses childhood obesity in a fun, simple, and effective way. It is to encourage the whole class to walking a daily mile together with their classmates. This methodology additionally helps teachers to improve student attention and obtain better learning, as has been shown in various studies (Slawson, 2015). Walking one mile (1,609 meters) can be done in a short time and does not substantially take away time for school activity. The program favors the quality of learning, by having students with better levels of attention in daily scholar activities (Morris, 2021).

We were able to identify ten basic principles about the benefits of this program: 1 FUN: Students should know that it is not a competition, but an opportunity to have fun and enjoy a little outside with their classmates; 2 THE CLIMATE was not a barrier in our experience, and the sessions can be recovered; 3. THE GROUND to exercise can be developed in the same school yard or in a nearby park. Just calculate how many laps are needed to complete a mile: 4 THE CLOTHING, is not a factor that affects the implementation of the program, since they need special clothing or warmth before the activity; 5 IT'S SAFE as it takes place within or near school facilities, children are not at risk; 6 IT IS SIMPLE, since it does not require complex instructions; 7 IT'S FREE, students should be free to complete the mile at their own pace (especially at the beginning) and no additional investment is required; 8 IS FLEXIBLE, you can take the routine to walk the mile always at the same time or choose a different time each day either before the start of the school day, between classes; during recess, among other periods; 9 IT'S FAST, it doesn't take a lot of time; 10 ALL WIN, schoolchildren, parents, officials and teachers (Morris 2021).

Conclusions

Although measures to increase physical activity should be encouraged, the initiatives should ensure that the activity is fun, attractive to all, varied and improve the formulation and implementation of new methodologies and innovation to be applied in physical education through the development of skills, coordination and confidence. When additional time is available, structured play is a complementary activity that will favor greater synergy in the activities of this important topic. More studies are needs to evaluate the impact of this kind of this complementary scholar activities.

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An International Review of the Contributions of School-based Physical Activity, Physical Education, and School Sport to the Promotion of Health-enhancing Physical Activity

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Abstract

This chapter presents a summary of findings of a series of reviews of the scientific literature on the current evidence of the contributions of different school-based settings on the promotion of health-enhancing physical activity. The objectives of this review are: to review evidence from the last ten years of the contributions of school-based physical activity, physical education, and school sport on the promotion of health-enhancing physical activity; and to consider the role of certain transversal factors in supporting the promotion of health-enhancing physical activity. The settings embrace: Physical Activity (Active Breaks; Active Learning; Active Recess; Active Transport; Active Homework); Physical Education (Curriculum Physical Education Lessons; Teacher Education/Workforce); and School Sport. Findings highlight the strong evidence for a positive association of Active Breaks, Active Learning, Active Transport, Physical Education, and School Sport with the promotion of school-based health-enhancing physical activity. These findings are critically discussed in relation to the implemented educational policies.

Key words: Active schools, Physical activity, Physical education, School sport, Literature review

Introduction

Schools are expected to fulfil many different roles and functions, but most would probably agree that two ambitions are central: the development of students' well-being, and the knowledge, skills, attitudes, and values that are likely to encourage a happy and successful life (Kristjánsson, 2019). Curriculum content has developed to support the constitutive elements of these ambitions, and among them, physical education (PE), sport, and other forms of physical activity (PA) have been recruited to play a role. Traditionally, however, these activities have held relatively low prestige, often justified as a break from the real business of schooling, namely academic work (McNamee & Bailey, 2009). This situation changed significantly in recent years as falling levels of PA have led international agencies, such as WHO and UNESCO, as well as national governments and agencies, to sound calls of alarm about rising incidents of non-communicable diseases, like Type 2 diabetes, coronary heart diseases, and obesity.

Although regular PA is near-universally acknowledged to be an important part of children's and young people's healthy functioning and well-being, there is compelling and alarming evidence that large numbers of youth are inactive to the extent that they are compromising their well-being, both now and in later life (Kohl, Craig, Lambert, et al, 2012). The trend toward sedentary lifestyles across almost every developed country, and increasingly across the developing world is a source of considerable concern (Hallal, Andersen, Bull, et al, 2012). The causes of this trend are complex, but there is little doubt that an important factor is the compound effects of industrial, automotive and information technology innovations, which have resulted in radical changes to how people carry out their daily tasks. Modern societies tend to be WEIRD (Henrich, Heine, & Norenzayan, 2010): **W**estern; **E**ducated; **I**ndustrialised; **R**ich; **D**emocratic. WEIRD societies have become organised in ways that are incompatible with human's evolved biology, and they are paying the price. The effects of some of these developments, such as computers and trains, have a direct impact on PA levels, whilst others, such as televisions, computers and electronic entertainment have indirect and more ambiguous effects (Bailey, 2018). The emergence and ready availability of new technologies has exaggerated these changes on physical labour and human energy expenditure. The consequences of living in WEIRD societies can be considerable, including reduction to the quality and length of lives, as well as considerable economic and health costs.

There have been other factors influencing the changing state and status of PA in schools. In some countries, for example, the lure of sporting success has motivated increased investment. In others, sporting activities have been promoted as vehicles for developing stronger social connectedness (Hellison, 2011). However, there seems little doubt that the main international concern that has driven discussions on children's and young people's PA promotion related to the health and economic consequences of an "inactivity pandemic" (Kohl et al., 2012).

In this context, schools hold a unique role. Public health strategies require access to the largest possible population, and schools are the only societal institutions in which a very large proportion of youth can be reached. In addition, schools have an established role in communicating vital

messages, whilst connecting with an extended network of parents, families, and communities. Schools also deal with people at an early stage, when their behaviours and values are still being shaped (Aston, 2018). Compulsory schooling coincides with a window of opportunity for affecting the knowledge, skills, attitudes, and values associated with PA. It makes sense, therefore, that their remit to support students' well-being will be expected to respond to the increasing alarm about physical inactivity.

European engagement with coordinated, school-based health promotion can be traced to the 1980s, when the WHO, European Commission, and Council of Europe developed the concept of the health-promoting school, based on the principles and strategies of the Ottawa Charter for Health Promotion (WHO, 1986). Central to this initiative was the notion that schools serve as effective settings to promote health and well-being of all people in the communities associated with school life (Viig & Wold, 2005). This collaboration led to the establishment of the European Network of Health Promoting Schools, partnership that continues to this day.

While specialist agencies have called on schools to create cultures of health where youth have opportunities to engage in and learn about healthy lifestyles, implementing this culture in practice has often proved a challenge for various reasons (Centeio, Barcelona, Kaszeta, & McCaughtry, 2018). Subsequent research suggests that whole-school, multi-component interventions are most effective when key stakeholders are empowered to make the interventions sustainable (Langford, et al, 2015). Many of the models of healthy schools build on the groundwork laid down by the WHO's Health Promoting School framework (2020), and its aim of "a whole-school approach, and focuses on reorienting school systems toward health promotion through embedding health and well-being in the curriculum, creating healthy social and physical environments and engaging with parents and the wider community" (Bartelink, et al, 2019, p. 2). The US 'Whole School, Whole Community, Whole Child' (WSCC) model is, perhaps, the most widely disseminated approach, highlighting the dynamic relationship between intrapersonal, interpersonal, and community levels. It highlights the importance of evidence-based school policies and practices, and explicitly identifies 10 components of an effective school-based health-promotion strategy (including PE's response to the increasing alarm about inactivity and PA, Nutrition environment and services, Social and emotional school climate, and Community involvement) (ASCD & CDC, 2014). These components reiterate findings from other studies demonstrating the importance of the inclusion of specific activities and practices that can act as focal points for leveraging the promotion of healthy and active lifestyles in schools (Storey et al., 2016).

Healthy and Active Schools

There have been numerous models promoting healthy schools as hubs of health promotion, in general, and PA, in particular (Daly-Smith et al., 2020; Webster & Nesbitt, 2017). Many of these models build on the groundwork laid down by the WHO's Health Promoting School framework (2020), and its aim of "a whole-school approach, and focuses on reorienting school systems toward health promotion through embedding health and well-being in the curriculum, creating healthy

social and physical environments and engaging with parents and the wider community" (Bartelink et al., 2019, p. 2). The common theme of these developments is a claim that health promotion can and should be delivered through a school-wide approach, in which different elements are integrated into a synergistic whole. The model presented below highlights the multiple opportunities for PA at or connected with school and thus the interconnectedness of an effective Active School (Figure 1).

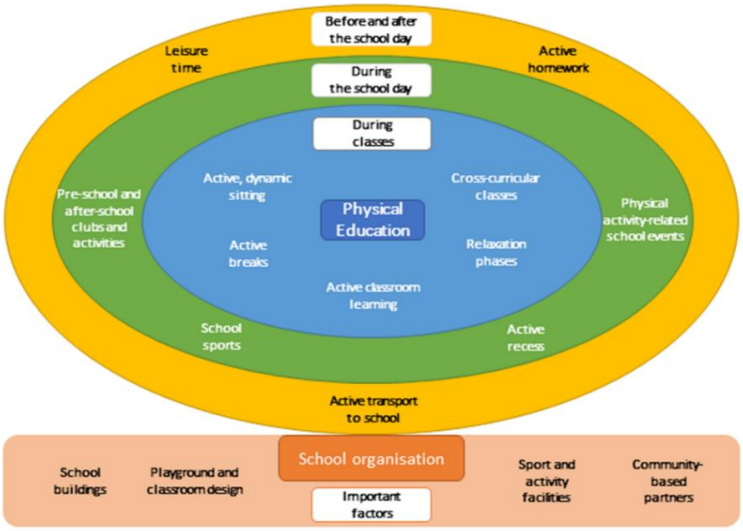

Figure 1 A model of PA opportunities at school (Scheuer & Bailey, 2021, p. 174)

School-related PA is generally fragmented and varies greatly between systems. PE has typically been relied upon to provide PA and curricular instruction for students (Kohl & Cook, 2013). However, doubts have been raised about whether PE alone is capable of providing enough PA to fulfil guidelines (Scheuer, 2019). Even curricula that prioritise PE's role in the promotion of PA include a host of educational outcomes related to psychological, intellectual, and development, and at least some of this curriculum content is likely to be well-suited to students seeking to maintain moderate-to-vigorous PA (MVPA) levels. A problem with equating PE and PA is that, even if teachers manage to create lessons in which all students are active during every lesson, total PA accrued would not come close to reaching the hour-a-day target because daily PE is extremely rare. Most educational systems allocate 90-120 minutes a week at primary and secondary levels, and research shows that in less than half of PE lessons students reach MVPA. More importantly, there is a major difference between promoting students' PA and laying the foundations for lifelong PA. By most accounts, lifelong PA is likely to occur when an individual acquires and practices a broad range of knowledge, skills, attitudes, and values (Kohl & Murray, 2012), so (s)he is motivated to make informed decisions about the multitude of PA opportunities available at each stage of the life-course.

Probably the most important of these competences from the perspective of lifelong PA is the development of mature motor skills (De Meester et al., 2018). These skills seem to be a necessary condition of sustained PA, since they supply the competences to engage in PA in the first place.

Basic movement skills are precursors to more specialized and specialist skills that are prerequisite for participation in the culture of human movement that connects with many aspects of daily life (Herrmann et al., 2015). This is mainly the case as students' progress from spontaneous PA play to activities that dependent on rules, roles, and specialised skills (Donnelly, Mueller, & Gallahue, 2016).

Merely making students more active is a relatively simple matter. Schools could, for example, begin each day with synchronised callisthenics, as some Asian schools do, or replace traditional desks with standing desks (Daly-Smith et al., 2020), fit each desk with an exercise standing bicycle, so students cycle during classroom lessons (Fedewa, Abel, & Erwin, 2017). Alternatively, schools could initiate a Daily Mile, which was first introduced in Scotland, and is spreading across Europe. The basic idea is that each day, during class time, pupils run or walk outside for 15 min (~1 mile) at a self-selected pace (Chesham et al., 2018). Each of these strategies is likely to increase students' daily PA levels, and perhaps they deserve consideration for that reason alone. However, the extent to which they will act as a motivator of PA outside of school time, and act as the bases for sustained PA in later life is unclear. It may be the case that substantially increasing levels of activity through compulsory activities that do not cognitively engage individuals' (as would happen during skill learning and problem-solving tasks) risks some sort of compensation whereby voluntary PA during free time is reduced (Ridgers, et al., 2018). An old proverb seems apposite here: *G*ive someone a fish, and they are fed for one day; teach that person to fish, and they are fed for the rest of their life!

The concept of the Active School, therefore, is a radical departure from traditional approaches to PA promotion. It seeks to reconcile the evident potential of the school as a unique setting for the promotion of PA, with the barriers presented by conventional approaches.

In this approach, all of a school's resources operate in a coordinated and dynamic manner to provide access, encouragement, and programmes that enable all students to engage in vigorous PA (VPA) or MVPA at least 60 minutes every day. A whole-of-school approach encompasses all segments of the school day, including travel to and from school, school-sponsored before- and after-school activities, recess and lunchtime breaks, PE, and classroom instructional time. Beyond the resources devoted to quality PE for all students, other school resources, such as classroom teachers, administrators, and aspects of the physical environment, are oriented toward PA. Extra-curricular sport and other PA are made available to all who wish to participate, active transport is used by substantial numbers of children to move from home to school and back again, recess and other types of breaks offer additional opportunities for PA, and lesson plans integrate PA as an experiential approach to teaching. Importantly, they are framed within contextual or socio-ecological perspectives that acknowledge the need for the engagement of all school stakeholders (such as students, teachers, parents and the wider community) (Storey, et al, 2016). The support of parents seems to be particularly important (Rivard, Deslandes & Collet, 2010).

A whole-school approach encompasses all people involved in the day-to-day functioning of the school, including students, teachers, and parents. It creates an atmosphere in which PA is appreciated and encouraged by all these groups. School buildings, outdoor grounds and playgrounds, indoor and outdoor equipment, and streets and pathways leading to the school from the surrounding neighbourhood encourage and enable all persons to be more physically active. Moreover, the school is part of a larger system encompassing community partnerships.

The reviews reported here used a methodological framework based on rapid reviews, which follow most of the protocols of the standard approaches, such as systematic reviewing, but with greater flexibility and speed. The chapter is prefaced by discussions of the contemporary importance of PA for children, young people and society. It also considers the relevance of schools as a setting for the promotion of PA.

The objectives of this rapid literature review are the following: To review evidence from the last ten years of the contributions of school-based PA, PE, and school sport on the promotion of PA; To consider the role of certain transversal factors in supporting the promotion of health-enhancing PA. The selected settings are PA (Active Breaks, Active Learning, Active Recess, Active Transport, Active Homework), PE (Curriculum PE lessons, Teacher Education / Workforce) and School sport. The transversal categories are: Inclusion and Diversity; Continuous Professional Development; Facilities, Equipment and Resources; Community Partnerships; School Events, Project Weeks, Camps. The meanings of these terms are explained as they arise in the text.

Methods

The following sections present a series of reviews of the scientific literature in support of the objective of this study: "To review evidence from the last ten years of the contributions of school-based PA, PE, and school sport to the promotion of health-enhancing PA". Evidence for these reviews was gathered using a methodology called rapid reviewing, which is "a streamlined approach to synthesizing evidence in a timely manner" (Khangura, Konnyu, Cushman, Grimshaw, & Moher, 2012, p. 1). It follows many of the strategies used by more established approaches, adapted for a faster and more variegated response. Systematic reviewing, generally accepted as the 'gold standard' of methods of summarising and analysing research findings (Munn, Stern, Aromataris, Lockwood, & Jordan, 2018), requires a considerable amount of time and investment in human resourcing, and narrowly focuses on a specific question, whereas rapid reviewing allows quicker results and a more diverse coverage of subject-matter. For these reasons, the faster, more flexible approach is often used by policymakers, decision makers, stakeholders and other knowledge users. By adopting a rapid reviewing methodology, it was expected to realise some of the virtues of systematic reviewing, without becoming overcome by its inherent restrictions.

Searches were undertaken through a range of specialist academic databases (PsycARTICLES, PsycINFO, SPORTdiscus, CINAHL Complete), Google Scholar, as well as the academic social

networking sites (i.e., ResearchGate and Academia.edu). The following criteria were used to keep searches focused:

- Published from 1st January 2010 to 30th May 2020;
- Study conducted in either primary or secondary schools;
- Study investigated PA outcomes either as the sole or substantial focus;
- Empirical study, systematic review, or conceptual discussion.

Initial searches were carried out in English, followed by German, French, Spanish and Czech searches. A set of broad MeSH terms (Medical Subject Headings)[1] was used to capture the most current studies and reviews (e.g., "recess" AND "physical activity" AND "children"). Data on each context of interest were extracted, and the findings were validated with reference to other gathered data and published reviews. The reviews were limited by focusing on school-setting and school-aged children and young people. Three main contexts and seven activity-settings in schools are discussed in the following text:

- *PA* settings at school: Active Breaks; Active Homework; Active Learning; Active Recess; and Active Transport.
- *PE* as a Setting: Curriculum PE Lessons; and Teacher Education & Workforce.
- Sport as a setting: School Sport.

The general approach followed an earlier set of PA reviews by Public Health England (Chalkley, Milton, & Foster, 2015). As such, it involved a purposive search, integration and translation of relevant literature related to contexts for Active Schools. Both reviews of literature and empirical studies are included in this analysis. Once the different reviews had been completed, members of the research team independently evaluated the weight of evidence related to the findings of each activity setting. Discrepancies were discussed, and a consensus was agreed for each area. A simple coding system was used to indicate the weight of evidence, presented in Table 1.

Table 1 Weight of evidence

Weight of evidence	Description
Weak	Outcomes where there was not enough evidence to make any statements regarding potential associations with school-based PA.
Moderate	Outcomes that did not have a strong evidence base; either because the evidence came from a small number of studies, the studies were of poor quality, or the evidence was equivocal (i.e., studies showed mixed/contradictory results).
Strong	Outcomes that reflected a body of research with strong or at least sufficient evidence for a positive association with school-based PA.

[1] https://www.nlm.nih.gov/mesh/meshhome.html

Summary of findings

Active Breaks are relatively brief bouts of PA, usually led by a teacher during classroom lessons. Evidence shows Active Breaks increase students' PA levels, as well as contributing to healthier weight status, improved behaviour, enhanced cognition and greater enjoyment. The number and quality of studies in this area suggest that the evidence in favour of Active Breaks is STRONG.
Active Homework, in which students carry out PA-related practices after school, is a potentially useful way of increasing PA. The small number of identified studies report positive outcomes from Active Homework for both girls and boys, although effects tended to be relatively small across the school week. Due to the small number of studies and limited methodologies used, the evidence for Active Homework is rated as WEAK.

Active Learning refers to the strategy of integrating PA into classroom lessons, across the school curriculum. The findings reported here demonstrate that Active Learning is a cost-effective, enjoyable, motivating strategy to increase students' daily PA at school without undermining other educational goals. On the contrary, the available evidence suggests Active Learning often enhances other educational outcomes. Assuming proactive leadership, teacher support, and teacher efficacy, the case for Active Learning is STRONG.

Active Recess, promoting PA during the non-curricular time allocated by schools between lessons, promises to add a significant amount of activity to all European schools. Effective Active Recess strategies have been found to provide up to 40% of students recommended daily PA, with greater benefits going to younger children and boys. There is a growing high-quality scientific literature on Active Recess, although this research is of variable quality. There has been no European-level evaluation of the concept. The evidence for Active Recess is rated as MODERATE.

Active *T*ransport to and from school, such as walking or cycling, has been proposed as an important source of daily PA. Research demonstrates that walking and cycling to and from school are associated with increased MVPA, and Active Transport interventions are effective. Due to the quality and number of the scientific papers informing this domain, Active Transport is judged to be STRONG.

PE has a unique position in school-based PA promotion as the only protected, regular, supervised setting for PA during the school day. Students are more active during PE lessons than in any other context, but generally fail to reach a target of 50% of lessons at MVPA. Due to the relatively large number of reviews and empirical studies in this area, publication quality, and consistency if findings, PE is rated STRONG.

PE Teacher Education and Workforce training are vital elements in the implementation of effective practice, and this may be especially the case when innovations are introduced. However, no directly relevant reviews or empirical studies were identified to inform discussion of this topic, and the only indirectly related article reported limited impact of professional training in health-enhancing

PA promotion. In light of the poor evidence base, Teacher Education and Workforce is rated WEAK.

School *S*port, especially after school, has been a popular setting of PA, despite cautious support from policy-makers. The studies reviewed in this section suggest that sporting activities, both competitive and non-competitive, can increase both MVPA and VPA, especially if played multiple times during the week. However, attention needs to be paid to the needs of girls and overweight/obese students, who are heightened risk of exclusion. There have been numerous studies of the relationship between school sport, including some of high quality, and their findings are relatively consistent, leading to the rating of STRONG.

Conclusion

By way of summary, a model is suggested that captures the evidence and issues discussed in this review, and the relationships between them. The skeleton of the model is based on the framework presented by the Healthy and Physically Active Schools (HEPAS) partnership, as well as published research (e.g., Daly-Smith et al., 2020). While the different elements represent an excellent account of the key aspects of activity-promoting schools, the list is not final. Details can be added or removed as more evidence emerges, or a more clear or logical structure is proposed. This model is merely suggested as a useful starting point for discussion.

There are four key parts of the model, with some parts containing constituent elements:

1. *Policy D*rivers: External influencers; and Internal Influencers.
2. *Active School Settings*: Active breaks; Active learning; Active recess; Active transport; Active homework; Curriculum PE lessons; Teacher education / Workforce; and School sport.
3. Transversal Categories: Inclusion and diversity; Continuous professional development; Facilities, equipment and resources; Community partnerships; School events, project weeks, and camps.
4. School Context.

Each of these parts and elements can be discussed separately, but the real significance is as part of a synergistic whole. This means that the relationships between the different parts and elements might be as important as the parts and elements themselves. Since it was not a part of the remit of the reviews, the relationships between the parts of the Active School concept have not been discussed in detail. However, this would be a worthwhile activity as there is evidence that changing practices are much more likely when there is a whole-school approach. And this requires shared values and priorities, underpinned by on-going communication. And shared commitments can become worthless unless they are promoted by relevantly trained teachers and other staff, take place in appropriate facilities and spaces, and are ensured sufficient time in and out of the timetable. Research into educational policy supports the idea that the whole of an effective initiative or concept is greater than the sum of its parts (e.g., Jie, 2016). Studies of policy development have shown that policy-makers, local government officials, school leaders, and teachers, are all affected

by the context within which they live and work. Context is shaped by political change or ideology, by history and culture, and the process of policy-making—how issues get on to policy agendas, and how they fare once there—is affected by stakeholders, their influence, values and expectations. And, of course, the content of initiatives reflects some or all of these dimensions. Therefore, while the suggested model might be useful for helping us to systematically think about all the different factors that might affect Active Schools, it is a map that shows the broad themes until further detail is added.

'Policy drivers' are the aims, targets or statements that are considered to be desirable by the various stakeholders for schools. Many of these drivers are external to the school, but their expectations shape the day-to-day activities of teachers and students. For example, all European countries have some sort of national framework for education, and this sets statutory requirements for all schools. Some countries have a national curriculum that articulates detailed schemes of work, and because they are legally binding, they carry great weight among school administrators and leaders. Some external influences carry no legal power, but the wide-scale acceptance of the guidance means that they have a "soft law". An example of this is the guidance of the WHO, and its recommendation that every child and young person be physically active for at least one hour a day. School leaders and teachers have to struggle to meet this wide range of expectations and usually end up prioritising some over others. So, some school curricular areas are generally considered to have a higher status than others, and unfortunately, PE has traditionally been a low-status subject even when it is technically equal to other subjects. This privileging of some subject areas over others reflects a range of forces, both external and internal to the school, such as history, tradition and culture, assessment regimes, national and local politics, and personal interests and backgrounds. There is no doubt that influences from within the school play a significant role in shaping and managing the different expectations presented to them. Principles/headteachers are particularly influential in forming the values and goals of the school, and are the primary factors in determining what takes place within the school, how, and why.

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The Use of Speed Agility Training Aids for Developing Physical Fitness

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Abstract

Sports organizations or schools should constantly update and generate new innovative ideas in order to develop physical fitness among students and athletes. In other words, innovation impacts and helps to the improvement of physical fitness. To date, innovations related to physical fitness have received little scientific attention. As this study will demonstrate, innovations in physical fitness are important for increasing speed and agility and consequently improving sports performance among students and athletes. In addition, by using the latest innovation will also motivate them to continue to practice actively in sports. Physical fitness leads to better athletic performance, and consistent training is usually sufficient to improve physical fitness. To succeed in sports, athletes need to excel in physical fitness as well as speed and agility on the court or field. Players need quickness and agility to react and get the badminton or ball. The purpose of this study is to develop a physical fitness innovation tool set known as "Speed Agility Training Aids" (SATAS) that builds on the development of Revolution 4.0 by adding more variations and innovations to training to build maximum physical fitness. As a result, sports science must pay special attention on SATAS, which is an innovative tool that can help for enhancing physical fitness performance.

Key words: Physical fitness, Innovation, Speed, Agility, Techniques

Introduction

Physical fitness is one of the most crucial conditions for good health. Physical fitness is defined as a person's capacity to meet the ordinary and unusual needs of daily living without becoming weary, while yet having energy left over for leisure and recreational activities. This fitness refers to your body's ability to collaborate properly in order for you to be healthy and do daily tasks. Being efficient includes carrying out daily tasks with the least amount of effort possible. Physical fitness can also benefit patients who already have cardiovascular disease (Warburton, 2006). It also promotes health and well-being, helps to avoid a variety of health problems, reduces the risk of certain diseases such as high blood pressure, diabetes, cancer, and others, and improves general quality of life (Owen et al., 2010; Lavie et al., 2019; Jiménez-Pavón et al., 2019). Total and cardiovascular mortality have been linked to physical fitness (Blair et al., 1996; Meyers et al., 2002), and even small gains in fitness may result in lower mortality (Erikssen et al., 1998).

Physical fitness also lowers the likelihood of stress, tension, and depression while also helping you feel better. We can't see somebody being healthy if they aren't physically fit. As a consequence, physical fitness but the whole of must be valued. The common perception of physical fitness is the absence of illness. Chronic diseases are major causes of death in the modern era. A lack of physical activity is the root cause of the majority of chronic diseases (Terjung et al., 2018). The lack of any obvious sickness, such as depression or anxiety, is characterised as an individual's physical fitness. Physical activity, according to Schuch (2018), has the ability to protect against depression.

Sports require a high level of physical fitness.The first step for a great athlete who wants to accomplish fantastic performances and reach the summit of world sports fitness is to develop a solid foundation in physical fitness. Physical fitness is an important aspect that influences movement level progress (Schuch, 2018). Physical fitness is divided into various component categories that change on a regular basis. Athletes can be trained in these areas of physical fitness to improve specific skills or performance in sports. Building on specific components can lead to potential fitness, mental health, and lifestyle goals.

Physical fitness can be classified into two categories namely health-related fitness and skills-related fitness. The health-related components are cardiovascular fitness, muscular strength, muscular endurance, body composition and flexibility. While agility, speed, power, balance, coordination, and reaction time are the six components of skill-related fitness. These skill-related components are movements that an individual must perform in ability to successfully demonstrate a variety of motor skills and movement patterns. Sports necessarily require a high level of physical fitness. Athletes or students who really are physically fit cannot only increase their speed and agility, but also reduce the effects of incidents and deaths caused by movement (B. Xu, 2015).

Speed and Agility

The training focuses on agility elements while also improving physical fitness components based on motor behaviour such as speed, power, reaction time, coordination, and balance (Kraemer et al., 2001; Mackenzie, 2000). Speed is an important fitness component in many sports. Speed is defined as the capacity to move fast. Speed is defined as the distance travelled in the smallest amount of time. Athletes who concentrate on their foot speed can sprint rapidly, whereas athletes who concentrate on their hand speed can throw or strike the ball quickly. Speed training is a set of progressive exercises and teaching aimed at improving fundamental motor abilities and increasing an athlete's ability to operate at faster speeds and with greater precision (Azmi et al., 2018).

Speed is divided into two, namely general and specific speed. General speed is the ability to perform any movement (motor reaction) with speed, usually over a short distance of 5–10 meters, while specific speed is the ability to perform certain movements at a specified time. Athletes with the ability to outpace their opponents have an advantage. A speedier athlete, for example, may be able to get to the ball faster than a rival or even outrun a pursuer. If a player has good speed, the athlete will move across the court quickly and be able to control the court well (Chen, 2014).

Agility is defined as the capacity to quickly alter body position, stop and start movements, and control and direct whole-body movement. Verstegen et al. (2001) define agility as a physical talent in which players can slow down, reverse direction, or accelerate in response to a task-relevant cue such as an opponent or a teammate's pass. Agility, according to Sheppard et al. (2006), is a quick whole-body movement with a change in velocity or direction in response to a stimulus. Agility necessitates a high level of movement speed in order to confuse or escape the opponent. It is the foundation of motor behaviour that emphasizes high performance in sports.

Agility is one of the most significant components that should be developed and frequently employed in team sports athletes' strength and conditioning programmes (Paul et al., 2016; Wisloff et al., 2004). Agility, according to Frederick (2014), is a valuable talent in a variety of field sports. Consider sports that necessitate agility. In team sports such as football, basketball, hockey, volleyball, and rugby, players must react swiftly to their colleagues' and the ball's movement patterns. According to Krolo et al. (2020) stated that reactive agility and change of direction speed are important determinants of success in football. Training factors have a significant impact on a person's dexterity. Because each sport necessitates a different level of agility, training for agility formation can be tailored to the specifics of the game or activity. Every coach must be knowledgeable about proper training techniques for assisting athletes in improving their agility and motivating athletes (Nazarudin, Waridi, & Saad, 2017). Epley (2004), also stated that any coach needs an effective training approach to help players improve their agility and motivation. The training emphasizes agility while also improving physical fitness components based on motor behavior.

Speed Agility Training Aids Set (SATAS)

The application of scientific knowledge study findings in the process of training players may bring more ease. The advancement of technology, particularly in sport, is an unavoidable component of improving an athlete's achievement performance in the twenty-first century (Jian-she, 2018). Technology advancements have also offered specialised groups with the opportunity to simply provide solutions to ensure that young athletes' performance continues to improve in order to make Malaysia famous all over the world. The introduction of innovative physical fitness training tools acknowledges the use of creative ways for sports skill training in order to increase performance and discovered that physical fitness and sports training can be completed more swiftly and efficiently. Sport governing organisations, universities, research institutes, and enterprises, according to Marinho et al. (2018), should be encouraged and coordinated to spend more effort to studies, development strategies, and policies for technological innovations that benefit both students and athletes.

The main issue with developing this innovation is a lack of up-to-date tools and methods for training athletes in Malaysia. The majority of them continue to use traditional methods to train young athletes at the school. Most physical education teachers or coaches only employ traditional training methods. Coaches of badminton players, for example, only show the directions to players with badminton rackets and without additional tools. The player will move in the direction indicated by the coach, but the player will not be heading in the proper area or in the direction desired by the coach due to the lack of a tracking device. Furthermore, there are no training aids that make it easier for coaches to monitor or record player performance.

The Fourth Industrial Revolution (4IR) is a term used to describe the blurring of the physical, digital, and biological worlds. It is the result of advancements in artificial intelligence (AI), robotics, the Internet of Things (IoT), 3D printing, genetic engineering, quantum computing, and other technologies. The skills of the Fourth Industrial Revolution (4IR) were applied to the Speed Agility Training Aids Set (SATAS) (Figure 1). The researcher expressed innovative thinking, original ideas, problem-solving skills, ideation, analysis, critical analysis, and interpersonal skills. These are some of the most critical 4IR-driven areas of expertise required to be successful in the evolving sport industry work environment.

Figure 1 Speed Agility Training Aids Set (SATAS)

The innovation of the Speed Agility Training Aids Set (Figure 1) makes it possible athletes to train on their own without the guidance of a teacher or coach in the training grounds due to it being portable and simple to use. Those who also can enhance their own speed and agility using the laptops and sensors built into the boards. Athletes will be able to accelerate by touching the sound sensor on the board. When the sensor detects a sound, it sends a number count to a computer for recording via the UNO output. Besides that, the use of SATAS can increase athletes' motivation to train harder. It can calculate the number of targets that an athlete can complete in a given period of time (Timer). Teachers and coaches can monitor the performance of their athletes by observing the results on the laptop. Teachers' and coaches' effectiveness and savings in time could be enhanced, and athletes can keep a record of one 's record keeping in the laptop for reference in the future.

This innovation, which uses high-quality sensors to detect sound, can improve an athlete's ability to change direction and run quickly toward the right target in a set period of time. SATAS Iimplementation procedures are shown in Figure 2. In the front of touch board 1 (Figure 3), the athlete takes a ready position. The game begins with a buzzer (Figure 4) and a timer (which also will countdown timer) (Figure 5). The athlete run to the touch board 2 direction (Figure 6). The presence of both the player is detected by 2 ultrasonic sensors. Sprint from one touch board to the other and back. That is 1 repetition. Sensors (Figure 7) placed just on board that detect player movement would then indicate an entry into the Arduino UNO R3 Advance Beginner Learning Sensor Starter Kit V5 (Figure 8) . An adding functional to The UNO board (Figure 9) board is provided by a sensor can detect the player's touch on the board. The exit signal from the UNO board (Figure 8) will be sent to Display 1 to add a value of COUNT (Figure 9) depending on how often the sensor detects the player's touch on the board. After the timer runs out (Figure 5) and the Buzzer sounds (Figure 4), the final Count value will be displayed (Figure 5).

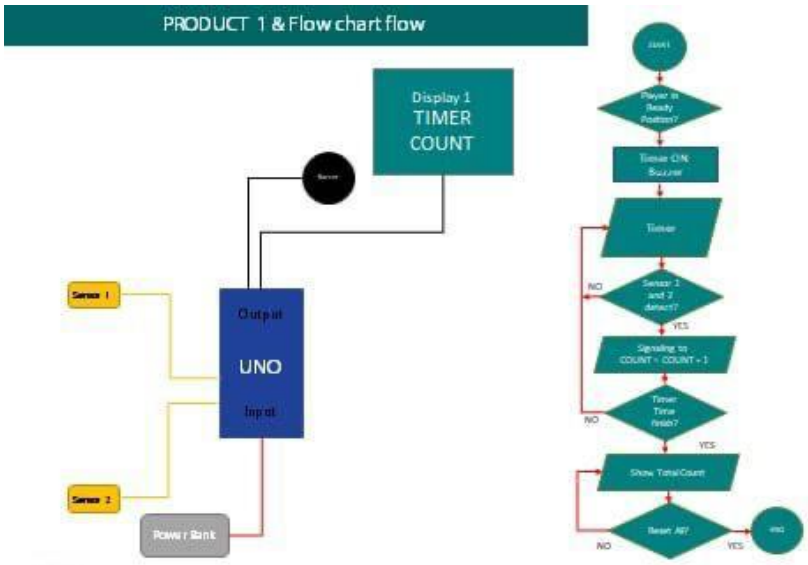

Figure 2 SATAS Flow Chart

Figure 3 Touch board 1

Figure 4 Buzzer

Figure 5 Laptop

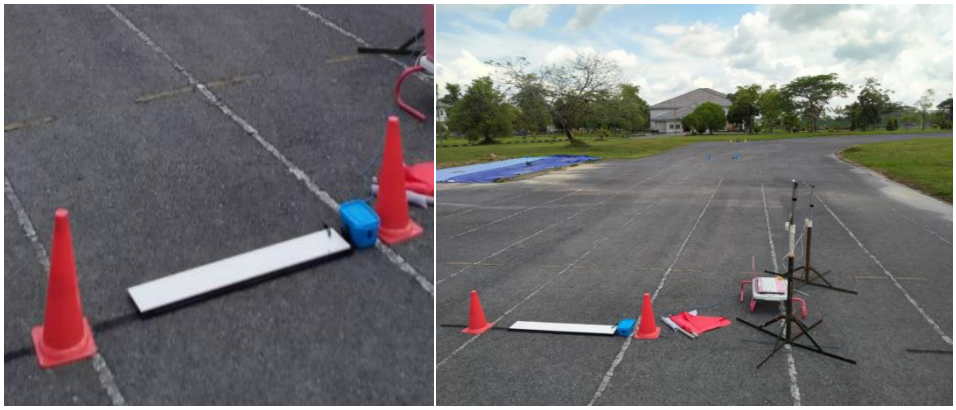

Figure 6: Touch board 2

Figure 7 Ultrasonic Sensor

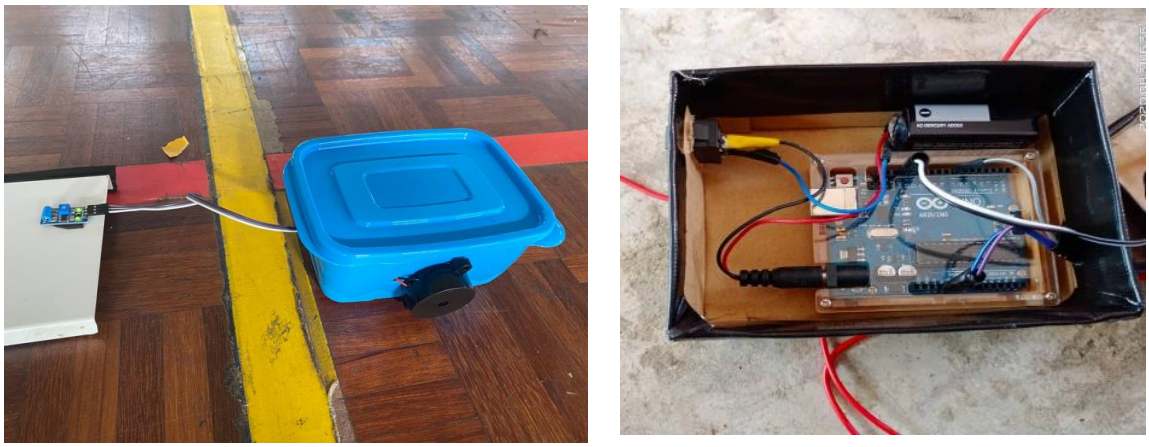

Figure 8 Arduino UNO R3

Figure 9 Numeric Display

Discussion

Sports innovation is a new topic for researchers that combines sport and different types of experiences and practises. Technological innovations, tools, and equipment, as well as innovative methods and coaching, consumer products and services, digital content and venues, are all examples of sport innovations. Sport innovation research is still constrained by social, institutional, and organisational constraints. These perspectives on the innovative phenomena should be addressed in the future of research on sports innovations. While emerging innovations, sport equipment, and product lines are important and contribute to the advancement of modern sport, research on topics such as sport innovation issues and challenges, social innovations in sport, and efficient management and leadership of sport innovation will be required.

This Speed Agility Training Aids Set (SATAS) is based on the characteristics of badminton and is specifically designed to see how well a player's body can navigate in a sideways, forward, and backward motion. Athletes or students, who use the SATAS can improve their physical fitness. Their physical fitness was shown to be significantly improved by using this special innovation training aids set. Furthermore, the SATAS adds variety, excitement, and pleasure to the coaching and learning process, and it exhilarates the knowledge of sports concepts. It is also relevant to all sports.

Conclusion

Speed is determined not only by how fast an individual can run (or cycle, swim, etc.) but also by their own velocity (how quickly they can accelerate from a static position), maximum possible speed of movement, and speed maintenance (minimizing deceleration). Speed necessitates good strength and power, but excess body weight and air resistance can also stymie performance.

SATAS is designed to make training more engaging and manageable in the absence of a coach. SATAS is also expected to increase players' interest in and motivation to practise speed and agility. SATAS has revolutionised existing traditional speed and agility training tools, in line with the modern 4.0 industrial revolution.

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Situation

Exploring the Efficacy of an International Immersion Program towards Building Cultural Competence for Health and Physical Education Teachers: Australia and Samoa

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Abstract

This situation-based chapter will explore the notion of international immersion programs within Health and Physical Education Teacher Education (H)PETE) aimed at addressing multiple international stake holder driven outcomes. Focusing firstly on an Australian regional based university, this chapter will examine the contributing factors behind the adoption of an immersion program (known as the Samoa Sports Outreach Program, SSOP) as a way to develop increased levels of cultural competency, unpacking the perceived benefits of utilising such an approach. The chapter will also consider what is required for sustainable continuation of such immersion programs in the future including the exploration of the need to develop authentic partnerships not only benefit the Australian participants but also provide meaning and benefits for the host nation. To help understand the impact of a program such as the SSOP the chapter will draw on the work of Health and Physical Education (HPE) academics from Samoa, to provide an increased understanding of the regional issues impacting the population of the Island nation justifying the choice of Samoa to base such an immersion program. The chapter will then look to the future to present some potential HPE theoretical models and a specific target population group based on the presented situational analysis (increased female participation) that could be adopted to support future programs cognisant of the needs of both the Australian and Samoan stakeholders.

Key words: Cultural competence, Physical education, Partnerships International immersion, Teacher training

Introduction

There has been an identified need for graduating teachers in Australia to demonstrate a range of professional competencies including an increased focus on cultural understanding and inclusion. This need has impacts on such discipline Key Learning Areas (KLA) as Physical Education (PE), which is referred to as Health and Physical Education (HPE) at an Australian national level. Whilst there is no one-agreed way to integrate this need into the training curriculum of pre-service HPE teachers, immersion programs have been identified as one possible way to address the issue. This chapter will unpack why the notion of cultural competence is important in the Australian context and also how this has been integrated into the graduate teaching standards that Australian pre-service teachers are expected to demonstrate as they exit their teacher training. It will also provide an explanation to align the need for cultural competence in teachers within the discipline area of Health and Physical Education (HPE) and explore how an international cultural immersion program has been shown to be effective in helping to develop that competency. Importantly, the chapter will also unpack the need for authentic partnerships to be established that have the capacity to support both the development of cultural competency of Australian HPE students participating in the program and provide benefit for schools and academic staff in the host country. Finally, the chapter will explore why Samoa is an appropriate site as a setting for such an immersion program.

Questions guiding this chapter include:

1. Why is the development of Cultural Competence important in countries such as Australia – particularly for Health and Physical Educators?
2. How might international experiences help to support development of Cultural Competence in Health and Physical Educators?
3. How can universities better partner with host countries to develop mutually beneficial outcomes through international partnership programs?
4. Can such partnerships strategically align with significant world and regional issues (such as obesity and diabetes, female participation) that may be present in the host country leading to more meaningful and sustainable impact on physical activity?

The need for cultural competence in Teacher Education (Graduate standards)

In countries such as Australia there has been an increased focus for graduate teachers to not only have knowledge of but be able to demonstrate their understanding of the impact of culture and cultural identity on the educational outcomes of their students (AITSL, 2012). As such, cultural competence has become an integral component of exit requirements for all Pre-Service teachers (PSTs) as represented in the graduate professional standards. For Australian Health and Physical Education (HPE) teacher education students, there is a balance throughout their training of PE with a clear focus on increasing student participation and Health education inclusive of the impacts of cultural influences on the participation of young people in physical activity. It is therefore important for universities to consider ways to bring these elements together that not only increases

student understanding, but provides genuine opportunities to demonstrate that understanding and international immersion programs have been shown as one way to provide that opportunity to Australian students (Maakrun, 2020; Roose, 2001)

Culture and links to Health and Physical Education

Exploring syllabus documentation aligned with the curriculum area of HPE in Australia, with reference to a New South Wales (NSW) perspective where the CSU university campus is located, provides significant support and context as to why a dedicated cultural competence platform is important to embed within teacher training courses. The term 'Culture' is referred to over 120 times in the NSW 7-10 HPE syllabus and as such, carries a significant weighting in the document and consequently in the development, of effective HPE teachers. However, there are limited opportunities for students to authentically engage in situations to support building of this capacity across the structure of many HPE pre-service teacher training programs, whereas immersion programs provide that opportunity (Winslade, 2016). Exit requirements for all Australian teacher education students are aligned with Graduate Level Teacher Professional Standards (AITSL, 2019) and since 2011 the notion of cultural competency has been woven into those standards. The proposed program aligned to this study presents an authentic opportunity for students to demonstrate their understanding through practice (Perso, 2012) and is designed to challenge students to explore their values and belief systems in order to effectively plan and deliver learning experiences that meet the needs of others.

The value of international immersion as a way to build Cultural Competence.

Cultural immersion supported through platforms such as international programs, has been identified as one way to engage preservice teachers with the process of building cultural competence (Lee, 2011, Suttichujit, 2009; Ryan, 2010; Walters et al., 2009). Whilst it is not without its challenges and criticism (Karaman & Tochron, 2010), the notion of cultural immersion has been shown to be an effective way to engage pre-service teachers into a reflective program designed to challenge their existing values/beliefs and increase their frame of cultural reference. Webber (2005), proffers that the impact of an immersion is the opportunity to learn through experience in order to work effectively with other cultural groups and to reconstruct an individual's understanding of the notion of culture. Further, Hart and Moore (2005) argue that through immersion the opportunity exists to challenge student's established understandings about culture and identity and in doing so, enhance more inclusive alternatives into their practice. This is underpinned by the notion of viewing the profession from a different lens or perspective to what they would experience in a placement situated in an environment more reflective of the dominant cultural norms experienced in the student teacher's everyday life (Smolcic & Katunich, 2017). An immersion experience requires the student to step outside of their own cultural norms and values and requires the student to experience conditions such as 'culture shock' and engage in critical reflection in order to design and develop learning experiences reflective of the needs of the community and the students they are working with (Jones & Bond, 2019). In Australia, it has been

suggested that teaching as a profession tends to draw from limited cultural diversity and as such is often at risk of reinforcing dominant cultural stereotypes aligned with perceived middleclass cultural capital (Koh et al., 2020). This is further reinforced in specific discipline areas such as HPE where according to Spittle et al., (2012), argue there is a stereotypical image of the dominant representation of physical educators as fit, masculine, male, Caucasian, physically aggressive, and that this stereotyping has helped traditionally shaped both the dominant culture in regard to teacher training and student/teacher demographic profile. However, Spittle et al., (2012) also proffer that there has been considerable thought in regard to the self-perception of physical educators and a growing social consciousness which is challenging those stereotypical perceptions in the discipline. Therefore, the addition of immersion programs such as the SSOP provide a perfect opportunity for pre-service PE teachers to step outside of their own established values and beliefs systems supported through scaffolded reflection, to realign their self-perception of the role and nature of a Physical Educator.

Universities Australia (2011) apply an appropriate theoretical lens on the concept of cultural competence emphasis a focus on the knowledge, skills, values, and attributes of the professional reinforcing that competencies can be considered a measurable capability demonstrated through performance and behaviours displayed in the work setting. Further, Universities Australia (referring back to the seminal definition of cultural competence by Cross et al., (1989) argue that in relation to a professional context there are a number of what they refer to as key elements (aligned with knowledge, skills, and values as a way to quantify understanding) that impact on the perceived effectiveness of increasing cultural competence and understanding, these include:

- Knowledge of other cultures
- Individuals' personal qualities such as openness, flexibility, tolerance of ambiguity and sense of humour
- Behavioural skills - communication competencies, culturally appropriate role behaviours and ability to relate to the others
- Self-awareness - particularly with respect to their own values and beliefs
- Technical skills - including the ability to complete a task in a new cultural setting (Universities Australia, 2011, P.43)

It is also important to consider for many Australian students, particularly in regional locations (such as where CSU is located), that equity can be a concern and as such programs such as the NCP provide solutions that can allow increased access to participate in international programs. Further, it has been shown that an international program with a specific focus (such as sport) not only acts as a catalyst for engagement, but also provide the opportunity to situate pre-service teaching students as a cultural minority, a significant first for the majority (Winslade, 2015). This can be seen in the case of CSU where prior to the sport focused SSOP program not one HPE student had previously enrolled in any form of student mobility program, however since inception each SSOP program has run at full capacity.

In order to mitigate criticisms that have been levelled at international programs (such as Edu tourism) it is important that programs integrate appropriate training (and valid assessment) for both students and supervising staff. Ensuring that both theory and the realities of authentic work-based requirements are structured into the program, avoiding what Webber (2005) describes as merely dropping students of in a foreign country and expecting them to learn through osmosis.

To understand the need for programs to build cultural competency in physical educators it is helpful to understand the context from which the educators are coming from. Regional University (RU) CSU is an Australian multi-campus, regionally located university catering predominantly for domestic students in the teacher education field. While there is a significant portion of rural students enrolled, there are less than four per cent of students identifying as being either Indigenous or from non-English speaking backgrounds which offers limited diversity. This less-than-ideal diverse student population has led to limited interaction with multicultural students and programmes, especially in the HPE discipline. This demographic profile supports the need identified in the graduate standards (cultural competence) to exposure of situations that challenge their individual values and belief systems, in order to increase their understanding of cultural contexts and work effectively with students from diverse cultural backgrounds (Winslade, 2015). In recognition of the need for Australian students to develop a wider frame of cultural reference, RU has aligned with international (referred to as student mobility) programs to immerse students into programs based designed to build cultural awareness with the development of cultural competency for HPE teacher education students has been seen as a key outcome.

RU has delivered four HPE focused immersion programs to the nation of Samoa, located in the South Pacific. These programs have hosted between 12-20 students per cohort for a three-week immersion program delivering a range of health focused programs in various iterations, from dedicated individual school programs through to multiple sport-based clinics. The programs have proved beneficial for the participants involved and the knowledge and skills developed have helped to shape the growth of the Australian based students with numerous measured outcomes being reported on.

The Samoa Sports Outreach Program (SSOP)

One of the key drivers behind the creation of the SSOP was the provision of an authentic opportunity to engage pre-service teachers in a cultural immersion program that would firstly capture their interest, to sign on and then immerse them in a trans-cultural setting that was both challenging and rewarding. The program was underpinned by the notion of participants experiencing what it was like to live and work in another culture as a way to examine their own beliefs and value systems.

Findings from previous iterations of the CSU SSOP designed to help support teacher education students, particularly Health and Physical education, have shown that as a method the use of immersive international programs have had positive impact. Drawing on Winslade (2016) it can

be seen that previous iterations of the program have had a range of impacts on pre-service teachers including noted changes in their perception of culture resulting from being involved in the immersion experience. Across the programs it was noted that participants expressed an increased awareness of both culture and diversity along with the need to be cognisant of the impact that this awareness has on their professional practice and ability to operate effectively as a teacher. Through the use of semi structured interviews of SSOP participants and thematically coded through the lens of pre-service HPE teachers' knowledge, values and skills participants expressed an increased understanding cultural competence & the awareness of other people and cultures, both personal and professional growth, as well as clear links to motivation for further study and consolidation of their identity in regards to employment in the teaching profession. Of interest to this chapter, is that participants indicated that an important component of the program was that the structure and process supported them to increase their awareness of both the needs and learning styles of the students they were working with requiring them to adjust their teaching strategies accordingly if they were to be effective (Winslade, 2015). As the SSOP was the first of its kind for the education faculty it was modelled on previous nursing programs, and it is important to note that the findings form the research underpinning with the early iterations the program aligned with the work of Harrison & Malone (2004) and Lee (2011) who disseminated similar results from pre-service nursing international immersion programs. Both studies found that despite the perceived barriers that can be associated with international immersion programs such as language constraints and participant engagement, that students overall responded positively to the experience and that following the program there were notable improvements to their professional practice with particular impact in the area of effective communication strategies.

Looking to the future

It must be noted that whilst each SSOP iteration has been underpinned by a partnered school approach, there is scope to build new and larger partnerships with Samoan researchers to explore the potential beneficial for the host nation. This will provide the opportunity to design and deliver a cultural immersion program that will not only benefit the development of cultural competence of Australian pre-service teachers but also strategically target the physical education and physical activity of students and the wider community in Samoa.

Why is Samoa an appropriate setting for a targeted Physical education focused immersion program? How can such a program be beneficial towards the health and physical education needs of the host country?

The existing relationship between RU and Samoa developed was established in 2012. The program was aligned initially with the Pacific in Union (PiU) initiative in recognition of the fact that it was built on a sport platform (Rugby Union) with a focused intervention approach supported by both the Australian (ARU) and Samoa (SRU) Rugby Unions (ARU, 2013). A key driver of the first program was the notion of utilising sport as a catalyst to engage Samoan school students into health focused lessons across a range of schools and community settings. Additionally, the focus

on sport was also a key driver for the recruitment of university-based students to join the program and commit to a month abroad to engage with and deliver the health-based program. In partnership with both the ARU and SRU, the program was established to help address curriculum challenges (as identified by Schuster, Tufue and Rasmussen, 2021), in recognition of emerging health concerns on the island, with a series of health focused curriculum material developed and delivered over a month-long period. When viewed through an equity lens, it becomes apparent that programs such as the SSOP have traditionally privileged male participants both from the Australian perspective and subsequently form host student participation perspective. Subsequently, there has been an identified need to adopt a more inclusive approach from Australian student recruitment, including through the choice of more gender inclusive supporting sports based. This will assist immersion programs such as the SSOP to help meet perceived needs such as in this case the identified need for increased participation of girls in sport and physical activity. Which addresses Schuster and Schoeffel's (2019, p. 119-121) finding that most sport and physical activity programmes in Samoa align with male participation due to cultural protocols impeding sports access equity. As will be shown later, this move towards the increased participation of females aligns with a growing international movement (for example see sportanddev.org as an appropriate platform) to promote the physical activity habits of girls in recognition of the role this can play in promoting gender equality. As such, the alignment to a host country such as Samoa with both its young population and increasing negative health trends associated with females in terms of body weight and associated conditions such as diabetes could provide a setting where an international immersion program such as the SSOP could support those in country to develop sustainable and impactful partnerships. This approach will assist in the Government's agenda to increase female participation through outreach programmes, sports and the HPE curriculum (Schuster and Schoeffel, 2019, p 122), whilst still addressing the need to develop the cultural competency of Australian pre-service teacher participants.

Is Samoa still an appropriate setting for a health and physical education focused intervention?

Identifying the needs of the host nation

Pulling together the needs of two separate national partners is a complex issue, particularly in relation to the needs of the hist nation, in this case Samoa. Exploring both the work of Samoa-based academics and unpacking current available trend data, provides an opportunity to investigate the complex connections that currently exist in relation to population health, wellbeing and the associated challenges underpinning education and curriculum design. When considering current health statistics and trends (see below), as a Pacific regional location (and regional neighbour of Australia, an important consideration of the NCP), Samoa can be considered an appropriate and potentially effective setting for future iterations of any physical activity/health focused intervention programs of the SSOP. However, in moving forward and following the recommendations of key stakeholders such as Schuster (NUS), the underpinning narrative of any potential future program must be cognisant of the need to consider the establishment of genuine

and sustainable research partnerships as part of that process with Samoan institutions. This partnership would directly address the findings from Schuster, 2019, confirming that the NUS HPE Bachelor programme needs preservice training in HPE curriculum and delivery.

Health related trend data reveals that Samoa has a population just in excess of 190,000 and that during the time frame from 1978 to 2013 there was a significant noted increase in concerning health trends, including diabetes and obesity across all demographic's population groups across of the country. For males this figure rose from 1.2% to 19.6%, whilst for women this figure was 2.2% to 19.5 %, further across this same period, it was noted that obesity levels also rose dramatically, for males from 27.7% to 53.1% and of importance to this future partnership project (that will be established in this chapter) from 44.4% to 76.7% in women. In 2020, it was noted that this health trend has continued with obesity levels estimated at approximately 59% in men and rising to 81% in women (Lin et al., 2017). This trend data provides a clear red flag of the need for partnerships (in this case educational) and interventions that may provide some form of assistance in an authentic and sustainable manner. Further, Schuster et al, (2021) identify that in relation to the overall population of Samoa, that demographically under 30-year-old represents approximately 80% of the population highlighting a significantly large youth sub population. This further provides evidence that aligned with increasing obesity and diabetes, that a health initiative aimed at education and participation for young people is an appropriate focus for the SSOP to have increased impact for the host nation. Further, media sources within the pacific identify that the region has some has some of the highest rates of domestic violence in the world with a recent United Nations (UN) 2021 report showed that in some regions of the pacific this number can be as high as 70% - 100%. Unfortunately, there are also well documented media reported cases that have also linked sport (and sporting personality's) negatively in the region with domestic violence. As such, any program that is designed to educate, include, and empower the female population through sport provides a potential opportunity to assist to mitigate and bring awareness to such issues.

Significantly, whilst there are numerous links to websites, awareness campaigns and media /news stories, it is apparent that there is still the need for supporting evidence-based approaches to the situation and programs that align to a research agenda that can advocate a strength-based approach, driven through a genuine partnership model. Studies on health-based partnerships report the importance of collecting data, including baseline data to allow for measurable objectives and outcomes to be both set and evaluated (Estacio et al., 2017)

Schuster et al., (2021) identify a number of links to curriculum and educational opportunities aligned with the current Samoan educational context that could provide a catalyst for thought in regard to any future program. Use of Sport Organizations and National Federations has been found to one effective pathway to engage and deliver parts of the HPE curriculum both in skill and in health outcomes (Schuster, 2020). This is critical in order to have tangible links to the work being currently undertaken in regard to curriculum implementation and reform in Samoa. Schuster et al., (2021) articulate a range of challenges that exist in Samoa impacting on the acceptance and

potential impact that could be achieved with acknowledgement of (Health) Physical Education curriculum, which can be considered relatively new in the Samoan educational landscape and is still in a somewhat infancy mode, particularly in regards to what Schuster refers to as *firm roots* of teaching styles that are underpinned by inclusive, generalist, holistic and significantly participatory pedagogy. Although in its infancy, Schuster, 2020, confirms that local partnerships with National Federations have benefited pre-service HPE teacher trainees and that "teacher trainees will need to be exposed to various methods to increase their confidence in delivering effective HPE lessons". By throwing the net wider and building transnational partnerships, preservice teacher trainees as well as novice HPE teachers in Samoa will provide the critical relationships, experiences and networks needed.

Of importance to the reimagining of immersion programs such as the SSOP, is that there have been a number of recently released global initiatives aligned with UN Sustainable Development aspirations, including those designed to provide increased levels of support in order for impacted communities and target populations groups to *recover, rebound* and *reimagine* post COVID-19 (UNICEF). These programs provide a catalyst to create authentic links to schools and educational programs under a partnered approach. With this in mind, the proposed program proffered by CSU incorporates a three-to-four-week targeted (H)PE program utilising a range of Australian third-year HPE teacher education and exercise science students (prior to entering their final year of study) to work closely with schools and teachers to develop a series of opportunities to promote physical activity opportunities for female students and community members. The benefits can be considered twofold, firstly for CSU (as previously indicated) and as a support mechanism for Samoan stakeholders as a way to provide an additional voice to support those educators and programs currently in situ. The UN (United Nations Office on Sport and Development for Peace, UNOSDP) has advocated for a focus on empowering young people in such spaces as physical activity and mental health through the notion of partnering, while UNICEF identify that a key consideration for the future is finding tangible ways to strengthen mental health services for children, adolescents, parents, and frontline workers. Further, UNICEF identify those adolescents in particular girls, those with disabilities, and LGBTIQ are especially vulnerable to mental health stressors and that there is a genuine need to explore opportunities that privilege these populations through such platforms as exercise, sport, and education. Building on this, sport has been identified as an important enabler of sustainable development by the UN and through its global reach and appeal, is a tool that should be embraced as a platform to engage young people (UNOSDP).

The big picture - Why are a partnered approach?

Aligning programs such as the SSOP with a broader international agenda

There is a growing field of literature supporting the field of health-based partnerships. Schriger et al., 2021 argues that despite the growth in such partnerships there is still a lingering focus on the benefits for the organisation involved, as opposed to acting as a catalyst for greater societal good,

with an aim to improve health outcomes and reduce health inequalities. At a community level, Estacio et al., 2017 proffer that there are a number of key elements that are required if a community-based health promotion initiative is to be effective and navigate potential tensions and challenges that arise. They argue that such partnerships have the opportunity to support both successful implementation and importantly maintenance of any community-based work. Partnerships also help to ensure the adoption of a more holistic approach to any initiative ensuring that there is increased clarity and consideration of social, economic, cultural, and environmental determinants that may need to be addressed with consideration of the setting. Further, Estacio et al., (2017) elaborate those partnerships are most successful when there is a clear goal for the partnership to achieve and that partners are cognisant of that vision and of each other's perspective.

It is also important to note that there are a range of risks and threats to the sustainability of partnerships aligned to such aspects as funding, staff, and policy changes, in addition to other issues such as potential political influence. Estacio et al., (2017) highlight the need to ensure that there is a high level of organisational commitment to any partnership, and that a shared vision captured into documentation and policy can help to mitigate such risks.

For programs such as the SSOP to be sustainable they need to partner with a range of relevant stakeholders to help reach intended goals and outcomes. For example the SSOP partners with such agencies as New South Wales Netball, the Australian Royal Lifesaving Society, various Samoan Sports Association, the Samoan Ministry for Education, Sports and Culture (MESC) and mor recently the National University of Samoa (NUS), Faculty of Education in order to co-create and design the project and research agenda To provide a further level of support and as a way to help mitigate possible policy and political risk the SSOP also partners with the Government agencies such as the NSW Office of Sport along with the MESC.

Importantly, moving forward the SSOP program aligns with a number of international objectives including the World Health Organisation's (WHO) focus on Gender Equality, particularly in regions of the world such as the Indo-Pacific. This is in recognition of high rates of domestic violence, obesity and diabetes that as indicated is estimated to affect 1 in 3 adults (Bollars, Sorensen, de Vries & Meertens, 2019). A key facet underpinning the program is the alignment with UN Sustainable Development Goals, reflected in the 2030 Agenda for Sustainable Development, *Sport for Development and Peace* which advocates that through sport and physical activity, women and girls can be empowered and benefit from the positive impact that sport has on health and psychosocial conditions (Lemke, 2016). The program will specifically align with Goals 3,4, and 5: (Goal 3: Ensure healthy lives and promote well-being for all at all ages); (Goal 4: Ensure inclusive and quality education for all and promote lifelong learning); (Goal 5: Achieve gender equality and empower all women and girls); with additional alignment to Goal 17 which is underpinned by the strengthening of partnerships including, encouraging, and promoting effective public, private and civil partnerships, building on the experience and resourcing strategies of those partnerships (United Nations, Department of economic and Social Affairs.) The final element to

consider with the proposed SSOP is the alignment with an appropriate environment to put the initiative in place to support the notion of individual development, and for this given the nature of the SSOP schools are an obvious setting. Schools are recognised environments that can support positive behaviour changes. Culturally, in Samoa, schools are a natural environment to implement policy (on sport and PA participation) affect behavior change but must garner village and community support (Schuster and Schoeffel, 2018, p 122). Balderson and Sharpe (2005) identify that through schools not only provide access to students but also access to teachers and parents who may play a vital role in the advocacy and identification and remediation of undesirable behaviours and the promotion of positive social interaction. Samoa has 141 primary schools and 40 plus secondary schools, in addition to a university that supports teacher education preparation, and it is through this network that SSOP can assist in adding value and assistance in addressing the noted challenges to acceptance and legitimacy of HPE design and development in the curriculum as identified by Schuster et al., 2021). There are noted beneficial links between PE programs underpinned by a social interactive paradigm and both academic performance and perceived levels of competence and confidence, particularly for girls (D'Anna, Forte & Paloma, 2019; Bracco, Lodewyk & Morrison, 2019).

There has been increasing investment into improving girls' participation and engagement with PE aligned to awareness of the need for integration of social and environmental considerations. Literature suggests that there has been an international decline in physical activity participation of girls particularly in adolescence and that interventions aimed at improving the participation rates could help to remove perceived barriers to success (Goodyear & Casey, 2015). Contextually, Schuster and Schoeffel (2018) identify that despite a range of policies in place that specific focus on the participation of girls in sport in Samoa there are there is a notable absence of female participation in all levels of recreation and competitive sport in the country, particularly when compared to their male counterparts as a result of perceived barriers aligned to culture class and location. Further, McCarthy et al., (2021) proffer that successfully engaging women in higher levels of sport including within international teams should align with an understanding of the impacts of creating the appropriate culture that includes notions of care and respect.

Exploring potential frameworks to support the needs of both Australian pre-service teachers and increased physical activity of Samoan students.

Further, the adoption of appropriate learning platforms and strategies is crucial to the success of any engagement driven initiative. Contextualizing these learning platforms for the Samoan learner and sport environment will be addressed for effective intervention. Examples: modesty, clothing, resources, venues, cultural protocols of female and male based activities, time, space and relational issues. As such, there are two approaches that could potentially underpin a program such as the SSOP in the future to become a targeted PE intervention aimed at increasing female participation, cognisant of social and environmental design. These are the Sport Education model (SEM) and the Teaching Games for Understanding (TGfU) Model. Both approaches are grounded in social constructs and have proven demonstrated impact across a range of social domains (Smith et al.,

2021). SEM has a strong alignment with the development of social skills and competence fostered through a collaborative learning (Goodyear, 2016) PE setting providing motivation links to engagement with physical activity outside of the classroom (Hastie & Mesquite, 2016; Siedentop, Hastie & van der Mars, 2004). Dyson and Casey (2016) proffer that with increased confidence and perceived competence individuals are more likely to participate in recreational physical activity more. In a similar way the TGfU Model provides a student-based approach that builds both physical and social skills through a cooperative learning design (Kirk & MacPhail, 2022). TGfU is underpinned by notions of group success demonstrated through tactics and skill execution with skills learnt being able to be transferred to other social and sporting contexts. Importantly for this project as a platform TGfU develops a strong sense of social interaction and cohesion meaning that whilst individuals are participating, they are also part of an increasing larger collective helping to establish a critical mass required for an ongoing and sustainable engagement environment.

Research by Chepyator-Thomson and Ennis (1997) and Siedentop and Tannehill, (2000) suggest that gender bias is nearly always present in physical education classes. Within PE classes, it is claimed that girls frequently devalue their contribution and suffer from stereotypical expectations regarding their performance. Characteristically, this results in girls not overly exerting themselves or being noticeably energetic. Although circumstantial, PE teachers tend to frequently make comments referring to how girls do not always participate as fully as boys do. Slade (2006) conducted a research project teaching novices field hockey using a TGfU instructional method. The results indicated that in stage 1 of the project, 86% of the female students were sure that they would not enjoy playing hockey. By the final stage, post the TGFU instruction, 100% of the female participants stated they either probably or definitely did enjoy playing hockey. These responses were an important indicator that the TGFU method of instruction can be used as motivation for females to likely persevere in continuing with hockey and to a larger extent, continued participation in physical activity. However, it needs to be noted that models such as TGfU are yet to be fully researched in regard to the level of relevance, cultural appropriateness, and sustainable teaching practice in Samoa for sports and PE and as such we advocate that through such programs as the SSOP a research agenda be integrated in order to address this gap in the current field of literature.

Conclusion

As shown in this chapter, international immersion programs have been shown to be an effective way to assist Australian pre-service HPE teachers to actively engage with the development cultural competence. However, it has also been shown that any international program is cognisant of the potential needs and context of the host country and as such university sponsored immersion programs need to be underpinned by authentic partnerships that provide real impact for all stakeholders. In addition, the chapter has also discussed how underpinning Health and Physical theoretical frameworks such as TGfU which are present in many Australian programs may prove to be an effective vehicle to support such partnership approaches in the future. Whilst there are multiple perspectives at play here (Australian needs, Samoan needs, theoretical framework), the aim of this chapter has been to bring these various elements and needs together in order to develop

a more sustainable health and physical education focused international immersion initiative aimed at imparting effective support to both educators and students.

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The Professional Identity of the Physical Education Teacher

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Abstract

The intention of this work was to resolve a concern that we were able to identify in the observation of the practice of the Physical Education teachers, their comments and the conversations held with various colleagues regarding how new teachers are graduating from the training schools and that apparently - due to some deficiencies within the curriculum - and the application of the current physical education program in basic education, they have not formed a strong identity as physical education professionals; And, if you add to this that within schools they are not recognized or valued professionally. On the contrary, they are considered as technicians or simple "entertainers" of children and who do not contribute anything to the training of students, then, this aggravates the social perception and that they themselves have of their profession. Likewise, the social perception is that Physical Education is the kind of "*Sports*" where only children are played and entertained; In addition, there is a tendency in several countries to reduce the number of PE classes per week, while other groups have tried to delete or eliminate it or at least change its name to concepts such as physical activity sciences, motor skills, corporeity, motor praxiology, sports sciences and many others that it would be idle to mention here. Therefore, documentary research was carried out that would allow us to have a broad vision of the conception that colleagues have of this issue of professional identity, as well as the problems that they could identify, as well as the conclusions they reached, to enrich our work and make our own contributions.

Key words: Professional identity, Physical education

Introduction

The intention of this article is to rescue some conceptual elements and our own educational practice that allow us to reaffirm our identity as professionals of Physical Education, since lately this has been questioned due to various influences and interests of different groups to discredit and even disappear it from the field of formal education.

Development

From a time to date, it has been mentioned by some people that Physical how can Physical Education loose its professional identity and this has led us to review how much of this is true and the reason of this is because it has happened or if it has really done so.

Based on the above, we ask ourselves the following question:

What is, or how has the Professional identity of the Physical Education teacher been constructed?

From the previous question is that we started our reflection and, at the time of writing this article, we found that many other colleagues have asked themselves the same or a similar question; such is the case of Navarrete (2008), write four questions about this and research and trying to find the problem and that´s why we reproduced here, trying to adapt it to our professional field:

What are the traits that have been constituting the identity of the physical educator?
What identity of physical educator are we talking about?
What is the identity of the physical educator?
How has this identity come to be represented, how is it expressed today?

In terms of Noble (2020), "*Some of the most frequent discussions today tend to problematize the place of physical education (PE) in the current educational scenario, while others focus on the professional demands that society demands for graduates in this training."* To which this problem is added or extended to the professional role or function of the physical educator himself, which implies the question of *which is -professional identity- and what is the function of the physical education teacher*? a matter that touches the main theme of this work and that will be addressed throughout it, seeking to answer all these doubts and thus provide a little clarity about it.

We will begin with this work starting from defining what is meant by Identity and professional identity.

The word Identity comes from the Latin *identĭtas, -ātis*. Which means "*the same, the same*" or equal to my fellow man, in this case, to those of my profession and to the acts I perform within it. Therefore, it is understood that identity *is the set of characteristics, traits, or conceptions of an individual or a community that allow us to distinguish ourselves from the rest or in relation to others*.

According to Perez, J. and Gardey, A. (2009), Identity is also the *awareness* that a person has regarding himself and that makes him someone different from others. Although many of the traits that form the identity are hereditary or innate, the environment exerts a great influence on the conformation of the specificity of each subject.

From the perspective of personal and subjective identity, on the level of the individual, the idea of identity is associated with "*something of my own that distinguishes me from others.*"

In this sense, it is affirmed that identity is formed, shaped and enriched.

Therefore, we *consider that identity refers to the ability to recognize myself and to differentiate or distinguish myself from others, since I am unique and thanks to that, I want distance myself from others; however, we need others to be able to recognize ourselves.*

Personal identity is individual, dynamic and covers different dimensions of the person and allows on the one hand individualization or differentiation from other people and on the other hand offers the possibility of belonging to a group or collective.

For García (2013), *the teaching identity is understood not as "something with which one is born", but rather, that it is acquired and shaped throughout life, through relationships with parents, friends, students, siblings, teachers, institutions, etc.* That is, it is something that we build in the passage of time and the actions we do during it in a certain space.

This same author points out the following: *identity is not a fixed attribute in a person, but it is a process that is built, from the interpretation we make about ourselves and from the recognition that others make of us and our work as teachers, in a certain context.*

Therefore, we as teachers, define or project ourselves, from the various roles we perform in educational spaces. On the other hand, García (2013) points out that biography plays a crucial role in understanding how we build our identity and our practice in the classroom and for which he cites Crow (2004), who suggests that *the origins of our teaching identity are found in the teaching models we had as students in our previous educational experiences, in childhood memories about learning, educational activities, and family models*

In this way, García (2013) concludes by saying that *without a doubt, looking at our past and reflecting on our experience as school and / or university students, is an effective way to begin to understand ourselves and be aware of how we make part of our teaching identity and be ourselves, aware and protagonists of this process that is formulated and reformulated throughout life.*

On the other hand, González-Calvo, G., Hortigüela-Alcalá, D. and Barba-Martín, R (2018), consider body stereotypes as a point to be taken into account in the construction of the professional identity of the physical educator, given the image they show to other teachers and

their own students, as well as in what corresponds to their own body image, as they are perceived, so these authors conclude that *body stereotypes have a certain influence on the construction of one's own bodily and professional identity.*

It is González-Calvo himself (2013) who in the summary of his doctoral thesis on the "*Evolution of the professional identity of a novice teacher of physical education,* expresses the following:

Among the most relevant conclusions of the research, the following stand out:

(1) In the field of education, the worlds of the personal and the professional cannot be separated from each other.

2) Professional identity is strongly imbued with internal factors (the way of being and doing in the profession, self-concept and self-esteem, mainly) and external factors (the prestige of the profession, professional recognition and interactions with students, families and peers).

3) What we have experienced as a student is a central element in the process of constructing the professional identity of teachers.

4) Systematically questioning one's own teaching is a way to improve teaching, to maintain interest in the profession and to open oneself to the path of new ideas.

The foregoing comes to reaffirm what is related to the fact that a professional identity is the result of a process of construction derived from both subjective aspects such as the perception that the physical educator has of himself and the opinion that his fellow teachers, the students and the community where he works have about him; while from the objective point of view, this is reinforced through studies relating to the definition of professional identity.

According to Navarrete (2008), "*the subject constructs his identity from the assumption of different positions, roles or identity poles: a person throughout his life history can be a pedagogue, father of a family, atheist, politician, footballer, etc. and, in this sense, identity is constantly reconstructed by the acquisition of new positions and by the resignifications that each subject makes of them.* ". And the latter is one of the aspects that we wish to emphasize, in the sense that professional identity is something unfinished, product of professional practice, of the experience of the teacher in front of the group; but also, of their initial and permanent formation, because that allows us to "rebuild" ourselves every day according to what we are experiencing and learning in that practice.

In this way Navarrete (2008) offers a definition of professional identity, which is exposed with the intention of adapting it to the field of physical education, which in the end, is very similar to what the author establishes:

"Professional identity is the way in which the subject appropriates a professional-institutional project, corresponding to a disciplinary field, and what that project and that field imply as a space and means of constitution-training. In the case of this work, the professional identity of the pedagogue depends on the type of relationship and experiences of the pedagogue with the institution in which he is trained, the discipline and working life in a specific time and context"

In this case, Navarrete (2008) states that the formation of the professional identity is the result of a project that she calls professional-institutional and that would correspond, in one hand, to the initial training process of the professional. At another one, to his performance in the exercise of his work / professional activity, highlighting that during this process certain features or characteristics were identified that were delineating or profiling that professional identity.

Being on the one hand, those related to the historical evolution of the training school itself and on the other, the features of professional practice directly in the workplace itself and within which it is possible to include what some authors call as an entry profile or vocational traits.

This is a very important issue, particularly in the case of physical education, where on many occasions the aspirants to enter the training schools manifest their idea that they want to teach or learn sports, which is one of the most common mistakes or situations derived from the general ignorance of what Physical Education is and that definitively affects this entire identity process.

In accordance with what is established by Pulido, S. Bores, N. and Moreno, A. (2009) and quoting Barbier (1996), who emphasizes *identity* in two ways, one built by another, that is, the constructions or representations that others make of a subject, and two, the constructions that an actor makes about himself, therefore built by itself. On the other hand, it alludes to the characteristics attributed to a person or group of people who seek to be related.

The philosopher Mead makes a reflection that allows us to understand identity as a *process of interaction*, where the subject is built from free recognition and in the search for it that is established with others (by right or by social estimation). For Mead (1990) the "I" is the organized set of attitudes of others that is constitutive of the self. The "I" is the individual's response or reaction to the attitudes of others.

As proposed by Benilde Vázquez, (cited by Pulido (2009), *the basis of identity is self-concept* ..."the concept of sports identity is determined by the relationship that a person has with sport. Brock & Kleiber (1994) and Wiechman & Williams (1997) propose the following definition: "Sports identity is the degree to which people identify with the role of athlete".

The construction of the sports identity is a reference for the understanding of the conditions that lead to the formative choice in the area of Physical Education... The sports identity is the result of very similar socialization/subjectivation processes, which are prior to the occurrence of performing and the choice of Physical Education and Sports studies. In other words, the trajectories and life stories of these people in contexts in which the link with physical activity prevails, end up crystallizing in these predispositions.

As can be seen, what Pulido et al. quote. (2009), makes direct reference to the sports identity, but that can well be extrapolated to the issue of identity in general and the professional identity of the physical educator in very similar terms and that is why we quote it here.

It is interesting to highlight the fact that, according to the various research reviewed and made by us, it has been possible to verify that the concept or idea of professional identity -as already mentioned-, is in a constant transformation, which is dynamic as initial training and professional practice have been evolving or transforming over time, what enriches it and also sometimes as it was said at the beginning, this can affect that same appropriation or identification with the profession itself.

In that same order of ideas, we find that professional identity is a set of ideas, values and beliefs about physical education, based on the experience lived as teachers of that specialty, which is a fundamental element in that construction. This is how Saucedo (2021) points out from a study with students who will be PE teachers in a brief future: *By recognizing a set of activities that delimit the work of the physical educator, students build their professional identity by evaluating what they should and should not do as professionals.* And he goes on to say *that identity attributes certain practices, rituals, dynamics, behavior and behaviors that define a teacher, that is, that express a teaching professional while allowing him to be considered part of a social group that shares the same characteristics. This identity is built in the professional practice as well as in the school practices of preparation for teaching*.

On this same topic, Benger (1998, quoted by Saucedo, 2021), states the following:

The conceptualization of professional identity undertaken in the text of Batista Graça and Queirós (2014) is recovered for our purpose. Professional identity, notes Batista (2014), includes:

1. Legitimate participation in the professio;.
2. An occupation in the role of the professional with the ability to control their practices, a language, as well as tools and resources associated with that role;
3. Ideas, values and beliefs that lead teachers to continue in the profession;
4. Result of experiences that influence your career decisions;
5. Representation of oneself as a professional who projects both for oneself and for others.

Based on the above, we define that the identity of the EF is composed of multiple elements such as traditions, customs, acts, values and beliefs characteristic of the EF. Likewise, the identity of the EF is one that gives us an identity feeling at the individual or collective level based on belonging to a group or profession. The identity of the EF is a set of thoughts and feelings that allow us to identify with our profession. The construction of the identity of PE is based on basic psychological processes and social factors.

The professional identity allows on the one hand the individualization or differentiation from the rest of people of other professions and on the other, it offers the possibility of developing a sense of belonging to a group or collective.

To paraphrase Coreth (1991), professional identity comes from ourselves as professionals who daily experience our teaching practices and this is how we can understand our professional identity

when exercising it daily, from our concrete situation; which arises from the concrete "*precompression*" that is an indispensable condition to identify our professional identity. This "precompression" refers to the fact that we start from a first notion product of our experience and from which we can reflect and conceptualize our teaching work. To do this, it is approached -from the methodological point of view- from the study or analysis of a phenomenon (in this case, the teaching of physical education understood as our teaching task), so that from this, we are able to experience and understand our professional practice and in this way, it is how we can understand and understand ourselves as professionals of physical education and thus transcend ourselves and be in possibility of define or explain what the professional identity of the physical educator is.

For his part, González-Calvo (2013), concludes:

Therefore, when the educator imparts his teaching he is expressing his way of understanding the world and education. This process of construction of the teaching identity is complex and heterogeneous, precisely because it is configured around personal, professional and institutional experiences. In this way, personal and professional life complement and influence each other, ... the experiences that are forged in the day to day of the classrooms (the playground for the Physical Education teacher), as a student first and as a teacher later, the behaviors of themselves and their classmates, the reality of the classrooms and the centers, are shaping their own identity ... to the extent that the educator goes (re)knowing himself, understanding the meaning of what he does and how he does it, remembering what he has lived and how he has lived it, defining his educational ideals based on his past and present experiences, outlining the type of relationships he wants to establish with the rest of the educational community, of how he sees others and what he expects of them in relation to oneself, teaching connects with what the educator is, feels and wants.

In relation to the elements of teaching identity provided by the current school, Zayago, Z., Chacón, M. and Rojas, M. (2008), point out that *the teaching identity can be seen that the criterion of the majority of students agrees that this institution has ceased to be a place where identity values are fully unified*... Therefore, *identity is an individual device that is transformed on the basis of personal experiences, product of interactions between subjects; taking as some of the strategies for its achievement the fact of affirmation and search, through which their sense of commitment to the career and their willingness to constitute themselves as professionals fully identified with teaching is ratified. (during the initial formation process) . Another strategy can be inferred as approval and projection, since the ideas expressed indicate that students feel driven by a logic of promotion and social mobility*.

Conclusions

Among the findings or conclusions that have been found throughout this study, it is possible to point out or identify a series of traits that characterize the professional identity of the physical educator, among which the following stand out:

- In the vast majority, at present, physical education teachers graduate from normal schools and / or university careers, that is, they have a well-defined professional training, however, as there is a diversity of related careers, this sometimes confronts them with a situation of

loss of identity by not knowing if they are physical education teachers, recreologists, sports coaches, graduates in physical activity or physical culture, physical instructors, etc., which pays for the loss of professional identity

- Hybrid vocational training, in the sense of the changes in the curricula of the training schools and the various approaches that the profession has had throughout its history, which has changed on several occasions the orientation of the profession itself towards objectives such as hygienic, military, sports, pedagogical, etc.
- Multifunctional professional, where at first his exclusive function was teaching, to which he currently expands or diversifies his field of work, ceasing to be exclusively the school his field of work, to develop another series of functions of an administrative type, oriented to health, sport and even to the rehabilitation or activity of promotion in work centers or in sports-recreational centers, in attention to vulnerable groups or addictions, social reintegration and many others such as promoters of physical activity for leisure time, recruiters of sports talents, entertainers of parties or in activities of summer courses and many others.
- Trainer of trainers in the training institutions themselves
- Researchers, for the production of new knowledge, or to rethink their own educational practice
- Train for other activities outside their primary function that was teaching in schools, thus having other areas of intervention such as sports journalism or other functions, such as those of leaders or administrators, specialists in educational policies in their professional area, historians or ideologues of their profession.

However, ***the best way to find our professional identity is in practice itself, when we realize what we are doing and achieving with our students, seeing their joy, the development of their skills and that they are able to do things that they did not do before and that these sensations and observations we share with our colleagues and make us feel good, satisfied to know that we are contributing to the formation of our students and the aggrandizement of our profession as a result of our work, obtaining satisfaction, a sense of belonging and pride in what has been achieved.***

In this way, Dubar, 2002, p. 256, cited by González-Calvo (2013), concludes that identity, whether personal or professional, "*is never just acquired, always in search of itself and always exposed to changes and questions*"

This is how our professional identity and that of Physical Education itself is formed.

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Motor Education in Primary Schools in Italy, the Role of the Teacher of Motor Science is State Law

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Abstract

This study proposes the importance of teachers with a degree in motor science in primary school movement as a fundamental tool for the development of the whole person, and as a facilitating tool for the acquisition of motor and socio-relational skills. The data in our owner highlighted many problems on the hours of physical education in the school and the absence of adequate sports facilities and equipment in Italy.The Italian Chamber of Deputies definitively approved the Budget Law which, for 2022, "With the law of the Italian State, more than 900 million are destined for schools and with over 17 billion with the National Recovery and Resilience Plan which allow The immediate resolution of physical education in primary school will be entrusted to the teacher with a degree in motor science from the school year 2022/2023 we start with the fifth classes, in 2023/2024 with the fourth classes a real revolution for the Italian school .

Key words: Physical Education, Italian Primary School, Critical Pedagogy, Teacher Training, Motor Education, Italian Primary School, Critical Pedagogy, Teacher Training

The Chamber of Deputies definitively approved the Budget Law which, for 2022, "With the law of the Italian State, more than 900 million are destined for schools and with over 17 billion with the National Recovery and Resilience Plan which allow immediate resolution of the health emergency and the enhancement of school staff. The law finally after 40 years considers the importance of physical education in primary school and will be entrusted to the teacher with a degree in motor science from the school year 2022/2023 we start with the fifth classes, in 2023/2024 with the fourth classes a real and its own revolution for the Italian school. The primary school program is based on learning skills and basic motor patterns, orientation to sport and the dissemination of healthy lifestyles and proper nutrition. to further increase the active time of children by spreading the culture of movement and psychophysical well-being. Ensuring the presence of an exercise science teacher in the primary school staff can educate the little ones to regular physical practice and can represent a safe investment for the relaunch of the country, to run together towards the future and overcome the current pandemic crisis together. ". In order to achieve the objectives of the National Recovery and Resilience Plan and to promote in young people, starting from primary school, the adoption of behaviors and lifestyles functional to harmonious growth, health, psycho-physical well-being and full development of the person, recognizing motor education as an expression of a personal right and cognitive learning tool, pending an overall revision of the teaching of motor education in primary school.

Physical education in schools is one of the most effective tools not only to improve the physical fitness and health of pupils, but also helps them to carry out physical activity while understanding its importance and positive repercussions for life taking into account of the European Treaty of Lisbon of 2009 provided the legal basis for the development of sport and its promotion at European level. The set of motor activities that each individual develops in an individual or organized form generically referred to as "sport" is unanimously considered, after family and school, the most important training agency through which young people can be guaranteed a balanced development in a highly socializing context and oriented towards the permanent acquisition of healthy lifestyles and in general bringing benefits that can be found throughout the life span and also taking into account the recommendations that have long been disclosed by the scientific community on the subject (crf to the European Union White Paper on Sport and the WHO Toronto Charter) At the international level it is now recognized that overweight and obesity are a risk factor for the onset of chronic degenerative diseases and a priority challenge for public health. In particular, obesity and overweight in childhood have direct implications on the health of the child and represent a risk factor for the development of serious diseases in adulthood. To understand the dimension of the phenomenon in Italian children and the associated behaviors, starting from 2007, the Ministry of Health has promoted the development and implementation over time of the surveillance system called OKkio alla SALUTE, coordinated by the National Epidemiology Center, Health Surveillance and Promotion of the Istituto Superiore di Sanità and conducted in collaboration with the Regions and the Ministry of Education, University and Research. Surveillance is the basis of the Italian strategies in the field of prevention and health promotion, such as the Government Program "Gaining health" and the National Prevention Plan and, internationally, it adheres to the project "Childhood Obesity Surveillance Initiative (COSI) of the Region European Union of the World Health Organization.

The data from OKkio to HEALTH, which has a two-year periodicity of data collection, describe the geographical variability and evolution over time of the weight status, eating habits, physical exercise habits of children in the third primary class and school activities promoting healthy nutrition and physical education. The frequency of overweight and obesity in children observed at national level, in the survey, albeit slightly lower than in previous collections, confirms worrying levels of excess weight: 22.2% of children are overweight and 10.6% obese, with higher percentages in the central and southern regions. The widespread diffusion among children of incorrect eating habits that can promote weight gain, especially if concomitant, is also confirmed; in fact, 9% of children skip breakfast and 31% eat an inadequate breakfast (ie unbalanced in terms of carbohydrates and proteins); 65% have an abundant mid-morning snack, while 22% of parents declare that their children do not consume fruit and / or vegetables every day and 44% habitually consume sugary and / or carbonated drinks. Even the values of physical inactivity and sedentary behaviors, although showing an improvement compared to the past, remain high: 18% of children practice sports for no more than an hour a week, 17% did not do physical activity on the day prior to the survey, 44% have a TV in their room, 36% watch TV and / or play video games for more than 2 hours a day and only one in 4 children walk or cycle to school, Positive changes are also found in the significant decrease in children defined as "physically inactive" which go from 21.9% in 2008 to 14.7% in 2010 and drop to 12.0% in the last survey. Also with regard to adequate eating habits, there was an improvement that went from 11.2% in 2008 to 27.7% in the last survey.

The data are also favorable for the decrease in children defined as "sedentary" (who spend more than two hours in front of the screen a day) who go from 37.8% in 2008 to 33.0%. It is from the need to provide both children, families and schools with elements of clarity and homogeneity of action that the proposal for a development project for the promotion of school sports culture is born, with specific reference to physical education in primary school. , which falls within the right and duty to study and health and, as such, responds to educational, sporting, preventive, cultural and social purposes. All school sport represents an essential source of experience for children, is capable of building a permanent "lifestyle", promotes greater social and intercultural integration and, through learning and the development of common rules, contributes to training of an ethics of citizenship. Through physical and sports education it is possible to achieve very high educational objectives, acquire essential skills for the training and growth of young people, such as self-control, a sense of solidarity, the ability to collaborate for a common purpose, the enhancement of the role of everyone and respect for the role of each. Access to the teaching of physical education in primary school is achieved following the passing of specific qualifying competition procedures. The physical education teacher engaged in primary school is equated, in terms of legal and economic status, with teachers of the same level of education. The staffing of physical education teachers is determined on the basis of at least two hours of teaching per week for each class of primary schools in addition to the timetable referred to in art. 4 of the decree of the President of the Republic March 20, 2009, n. 89 only for classes that do not adopt the full-time model. Without prejudice to the responsibility of both teachers, for classes that adopt full time, during the two hours per week of physical education, co-presence is possible ". "In order to achieve the objectives of the National Recovery and Resilience Plan and to promote in young people, starting from primary school, the adoption of behaviors and lifestyles functional to

harmonious growth, health, psycho-physical well-being and full development of the person, recognizing motor education as an expression of a personal right and cognitive learning tool, pending an overall revision of motor education teaching in primary school, curricular teaching of motor education is introduced in school primary in the fourth and fifth classes by teachers with suitable qualifications and the related competition class "Motor and sports sciences in primary school" to root physical education in primary school as a natural and fundamental element for subjects in developmental age, establishing for it some parameters through which the correct development of the body is favored, motor coordination is encouraged and the habit of constant physical activity is established as a fundamental premise for disease prevention, discomfort and self-perception. Also pay attention to the relational - social area, in particular and Accept anyone as a playmate; also Strengthen the sense of solidarity, cooperation and sharing; Develop the ability to positively interact with the "surrounding world", Collaborate with others in the construction of games and paths; Respect individual diversity; Spreading a culture of peace and respect among people, including foreigners; Raise awareness of the positive dimension of the conflict; Accept the first simple rules and the results of a game; Increase the sense of responsibility through the understanding of social rules; Develop different forms of verbal and non-verbal communication. Pay attention to the emotional area, Know yourself; Recognize and accept one's limitations and weaknesses; Recognize, express, control their feelings and impulsiveness Develop autonomy and education in the responsibility of their actions; Increase self-confidence, also calling for autonomy, self-evaluation, self-control; Develop a sense of empathy. Develop motor skills, Develop and enhance their motor skills, sense-perceptive skills; basic motor patterns (postural and dynamic); general dynamic coordination; Progressively orient towards sporting practice in compliance with a subjective psychophysical maturation process. Recognize one's body as a mediator of achievements; Recognize movement as a source of sensory-motor pleasure; To intuit and plan an effective motor strategy during the activities. Implement and support adult training actions

In action, improve communication through the following training contents The training action at primary school level focuses on the different areas considered to be inherent to the relational area, the emotional area, the development of motor skills. support materials for teachers interested in traveling with their section or class, itineraries of knowledge and in-depth study on the topic. Training hours are planned at regional or provincial level for all professional figures in order to learn together to combine the activities carried out in the school world with the technical specificities of motor science in order to create a "common language" of shared planning intervention .

Families The aim is also to involve families and to promote their participation, by providing a series of thematic meetings, of an "interactive" nature in relation to emerging needs, with the help of experts necessary to work so that parents too can increase their social and educational skills
In using the methodology, it must be pointed out that Physical Education fits into the areas of intervention of general education, alongside the emotional, intellectual and social ones. If we consider the personality as an integrated whole, neglecting only one aspect of it damages the general development of the individual. This is why there can be no education if space and

importance are not given to physical-motor education. not practicing it means not knowing the dynamics of the personality, the areas, its dimensions, its aspects, how they interact and influence each other.

However, it is not intended to affirm that the motor approach is suitable for tackling any development problem thanks to the simple mediation of the body, but rather to highlight the importance of motor skills in the development of the child's behavior and abilities. In carrying out the planned activities, particular attention is paid to the communicative - relational dimension, both on the child - adult level and on the child and child level.

Each work situation takes place in a serene and fun atmosphere which, in addition to favoring the "pleasure of." doing ", urges the" pleasure of doing together with others "thus stimulating cooperation and support and making sure that differences can be integrated and valued. In primary school, physical education is normally practiced above all to support the psychophysical development of the child. Particular emphasis is given to the acquisition of the body scheme: the body can in fact be experienced as a sort of border between the internal world and the external world and, if these borders are damaged, the discomfort can also manifest itself through somatic symptoms. Through motor education you have the opportunity to establish a more direct relationship with your body; it is therefore possible to learn to perceive the sensations stimulated in it by movement. This helps the child to feel and therefore helps him to get an idea of himself tto in the first years of primary school then, physical education represents the opportunity to be able to get rid of the energy accumulated in the hours of study.

At primary school the ability to emotionally evaluate events begins to be acquired. While remaining in a phase of self-centeredness, the child begins to discover the world around him and understands that he must relate to other people, acquiring the rules of group life. The activities that are carried out during the workshops proposed for the pupils, even with the necessary differences due to the peculiarities of the age being treated, take into account some fundamental indicators: the alternation of activities the progression of the proposals consistency with the guiding thread alternation of the activities is important to allow the child to experience himself completely at 360 ° alternating games of movement and not, games of skill, coordination and sports with expressive games. But the alternation concerns not only the playful aspect, also motor-sports activities and games will be identified in preparation for the development of the listed areas: socio-relational, emotional and motor; the relationship with reference adults outside the family, the comparison with the on the other hand, having to relate to reference adults who are not parents, gives the child the opportunity to be able to experiment outside the family. Through play and physical education, the child explores the world around him and learns through rules to share the spaces around him and himself with others. Through physical education, almost always practiced in a group, it is possible to re-establish contact with the environment and with other people, providing the child with the way to express himself and overcome communication difficulties. Physical education, centered on the dimension of the body, favors the encounter of the other through physical contact, mutual perception, the paths of communication and relationships. Through the experience of experiencing movement together with others, the child

realizes that there is a dimension of himself that can be in tune with them, experiencing an infinity of emotions that are linked to this. Sport for children is a space for growth, where you learn to be together with others, but also, and above all, together with yourself. The sensory-motor pleasure therefore, in addition to facilitating the desire to communicate and enter into relationship with companions and the pleasure of being together, also gives the possibility of self-discovery and personal resources. So that physical education, games and recreational activities aimed at the inclusion of everyone, no one excluded, become a moment of conquering personal autonomy and gratification that can contribute to improving self-esteem. As mentioned so far, it must therefore be strengthened that physical education is a highly effective educational tool, especially if it does not neglect its playful aspect. Sports education for children should not be considered as that of adults, separating it from its dimension of play and spontaneity, but we must always remember the pleasure and joy that children feel in moving, running, jumping.

Children need to move to play. For children, play represents an instinctive approach to the world; through this they learn to confront themselves, with their potential and with their limits. Through play - which is always confrontation with the other - children have a chance ssibility of: expressing oneself, communicating, entering into conflict, experiencing frustration, facing fears, competing, cooperating ... Furthermore, play is a great means of socialization and civil coexistence, it is characterized by a unifying spirit, beyond all ethnic differences , cultural and religious. Children of different cultural backgrounds can therefore enter into dialogue through play, get to know each other and establish relationships. It is by playing that even the most complex concepts reach the hearts and minds of children. Through the sharing of rules and the concentration of efforts, the community is realized. When you start playing with someone, the serene acceptance of this is implied. For the improvement of psychophysical well-being, self-esteem has been identified in the developmental age as one of the factors most capable of defining the success of a person's growth path. A good level of self-esteem corresponds to better outcomes in terms of well-being and quality of life in developmental age. in the way of cases of bullying unfortunately spreading like wildfire, see the groups of baby gangs "youth gangs today a phenomenon of organized petty crime, widespread in urban contexts where minors have deviant behavior towards other people" consequently becomes a "protective factor" with respect to the possibility of later becoming a "victim": Children who evaluate themselves negatively for their abilities, consequently, are targets of bullies. Conversely, low self-esteem is one of the factors often implicated in the genesis of some childhood disorders such as attention deficit, cognitive and learning deficits, phobias, etc. and adolescence such as drug abuse, antisocial behaviors, etc .: developing a healthy concept of self at an early age certainly provides the child with fundamental tools to deal with the various difficulties in his growth stages as in cooperative motor games.

Many researches attest that it is not always true that performance increases when trying to outdo someone. On the contrary, the highly competitive environment generates stress and reduces the right quality of life; but, if the competition one against the other is replaced by collaboration, safer and more continuous results are obtained. In the competitive spirit, the motivation rests more on the consequences of the action (winning over the opponent) than on the task to be faced. When it is based on cooperation, the task is faced collectively: in team sports the result depends on

common efforts, the success of one belongs to all. The social value that team games can allow individuals to contribute to everyone's work, thus bringing their own personal benefit. The desire for adventure and exploration and the development of personal creativity and imagination as well as the need for contacts and collaboration and sociality, the need for movement. It is undeniable that among the motivations that push to practice sports education there is also self-affirmation which takes the form of: - overcoming obstacles, distinguishing oneself from others, emerging, fulfilling oneself, achieving success or the main motivations of competition . But you need to know how to manage the competitive spirit, knowing that in no game you play your life, self-esteem but that every opportunity to confront an opponent is a chance to work on yourself, discovering your own possibilities and limits, you can to say that there are two competitive styles: task-centered (focus on your performance to hit a goal) and victory-centered. Adopting a competitive style rather than another depends on personal tendencies, but also affects the development of the personality itself. It has been verified that having the ability to know how to concentrate on the task to be performed, in daily life, in study, in sport, leads to better face the anxiety of a possible failure, to overcome the disappointment of a failure, to recharge quickly to pursue the action, to realistically evaluate their process. When, on the other hand, one only pursues victory, the more easily one falls prey to profound disappointment, making excuses outside of one's responsibility. An unsatisfactory performance, in the long run, creates a sense of desire esteem in one's abilities and undermines one's sense of self-efficacy.

Participating in physical and sports activities means sharing group experiences with other people, promoting the inclusion of students with various forms of diversity and enhancing the value of cooperation and teamwork. In fact, play and sport are mediators and facilitators of relationships and "encounters". Sports education promotes the value of respecting agreed and shared rules and the ethical values that are the basis of civil coexistence. Physical education teachers are committed to transmitting and making children live the principles of a sporting culture that brings respect for oneself and for the opponent, loyalty, a sense of belonging and responsibility, control of aggression, denial of any form of violence. The motor experience must be characterized as a "positive experience" (knowing how to be), highlighting the pupil's ability to do, making him constantly the protagonist and progressively aware of the motor skills gradually acquired. This is why the school should play an important role in a positive sense, helping the child to have a good confidence, which involves his appreciation and appreciation of personal positive qualities. Security is strengthened and built in a relational context that offers the opportunity to express oneself and one's abilities.

Enhancement helps the child to have confidence in himself by allowing him to overcome obstacles, failures, frustrations both in the victim and in the alleged bully without fear and aggression. It is not possible to achieve results through abstract and generalized messages and rules, nor through a path that acts mainly on the cognitive level; a path of affective and cognitive development must be hypothesized with the aim of achieving, involving the values and motivations of children and adolescents, a deep and substantial consensus to the proposed message, that is, that the pupil decides to make it his own. In recent years, a disorder characterized clinically by inattention, impulsivity and hyperactivity (ADHD) has aroused increasing interest in

the psychological and pedagogical field, which has presented an increase in incidence in the infant population and has led to an ever greater increase in research. Hyperactive children are not lacking in goodwill, but constant inattention creates learning difficulties for them, although these do not depend on an intellectual deficit. One of the ways to be able to intervene on hyperkinetic children is to allow them to do physical activity, even better in the open air, so as to stimulate them to introject both respect for the rules and the freedom to move. The progressive transformation of Italy into a country of strong immigration brings to general attention and, in particular to the world of education, the need to redefine contexts and methods of intervention in compliance with the plurality of citizenships and cultures to be combined for a course of social growth. There is talk of the totality of diversities. Plurality offers the possibility of educating, of enriching knowledge, of filling gaps and filling them, without becoming rigid in pre-established identities.

As regards the topic of motor activity, master's graduates class LM-67 Sciences and techniques of preventive and adaptive motor activities "or in class LM-68" Sciences and techniques of sport or in the class LM-68 can participate in the competition for professorship in elementary schools. competition class LM-47 Organization and management of services for sport and motor activities or qualifications equivalent to the aforementioned master's degrees pursuant to the decree of the Minister of Education, University and Research July 9, 2009, published in the Official Journal Official 7 October 2009, n. 233, who have also obtained 24 CFU / CFA, acquired in curricular, additional or extra curricular form in anthropo-psycho-pedagogical disciplines and in teaching methodologies and technologies. In the event that the competition rankings are not yet approved in time for the recruitment of teachers in the role of the school year 2022/2023, the Ministry of Education may also assign substitutes to subjects placed in the provincial rankings for substitutes for referred to in article 4, paragraph 6-bis, of law no. 124 in the classes of competition A048 - Motor and sports sciences n he secondary education institutes of II degree and A049 - Motor and sports sciences in the secondary school of I degree.

The work is structured in possible cases, the number of working classes per year of the course was obtained by scrolling forward in the following years of the course the classes active in the school year. 2020/21; where, due to the lack of a real number of reference classes, it was not possible to calculate the number of classes as in the previous point, it is assumed that the number of classes per year of course remains unchanged compared to that recorded for the corresponding year of course in the academic year An additional staff of physical education teachers has been estimated for the normal-time classes and for the full-time classes according to the two hours per week, as per the table below. In detail, it appears that: for the academic year 2022/23, 1,647 (= 1,408 for ordinary classes + 239 for multi-classes) will be needed more staff for primary school, for normal time. For full-time classes 917 units will be needed (= 834 for ordinary classes + 83 for multi-classes). Total places 2,564 and for the academic year 2023/24, it will take 2,881 (= 2,642 for ordinary classes + 239 for multi-classes) additional staff for primary school, for normal time. For full-time classes, 1,836 units will be needed (= 1,753 for ordinary classes + 83 for multi-classes). Total places 4,717.

Conclusions

In conclusion, this research aimed to raise awareness of the importance of expert teachers graduated in motor science in primary school, considering Motor Education an indispensable tool for psychophysical development in the developmental age.

With the art. 329 of the economic maneuver of the budget law aims to enhance the skills related to motor and sports activity in primary school and to promote in young people the adoption of behaviors and lifestyles functional to harmonious growth, health, psycho well-being -physical and to the full development of the person, consolidating the initiatives to promote physical activity aimed at primary school children.Scientific research confirms that regular physical activity in primary school is very important for the psycho-physical development of the child and in order to prevent pathologies. Within the contexts in which he lives, the educational role of movement must emerge, the awareness that motor practice can positively influence the acquisition of healthy and active lifestyles. A sore point that today we spend little time learning about our body in motion and the changes that motor activity entails on it, which is essential for the process of consciously acquiring health and well-being behaviors. School activity should program regular physical activity, the action of the main physiological functions aimed at movement, leading the child to develop all areas: affective, social, cognitive and motor; through which he will have the skills to be able to make the right choice, the healthiest one. This growth will take place in a gradual, natural, balanced way, as children are taught to eat, they can be shown how to feel good, how to feel healthy, playing and having fun. The practical exercises, proposed as much as possible in a playful form, are then accompanied by continuous reflections on the benefits of motor activity in the daily life of each individual. This focus must aim at transforming the lifestyle tending to a sedentary lifestyle into one surrounded by healthy habits, and which includes movement activities several times a day. in this way, children will have the opportunity to choose their own lifestyle, from which in the future they will orient themselves to gain experiences for their own well-being and good health as adults and the elderly

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Issues of Outdoor Physical Education in Bibliographic Databases

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Abstract

The issue of physical education lessons carried out in an open natural space barely penetrates the consciousness of all its participants, which is determined by nowadays growing sedentary tendencies. Grounded on assumptions, this type of classes can be implemented based on traditionally acquired knowledge, although the importance of electronic sources of support in the sense of scientific information databases increased significantly. The aim of this study, which took the form of a Literature query available on the Internet, was to analyze the availability of materials on outdoor physical education lessons. The results of this review are unequivocally positive regarding the advisability of this form of youth activities. At the same time, the relatively small number of sources referring directly to physical education in the form of extracurricular activities indicates the need to promote it both in articles' publication as well as in school practice.

Key words: Outdoor physical education, Electronic databases of scientific information

Introduction

The outdoor physical education lessons in the form of health training are not new in many countries and are a response to the traditional, in-school model of physical education (Brusseau et al., 2015; Fjørtoft, 2001). Students are expected to spend long hours in enclosed spaces, with increased temperature, low humidity, artificial lighting, excessive dustiness and often increased noise levels, where the condition of the air in enclosed spaces and their thermal conditions are particularly limiting factors (Mendell, 2005). Therefore, the inspiration to avoid these restrictions is contact with open space, even during short breaks between classes (Tran et al., 2013).

Significant values of nature visited by physically active children are the colors of nature, trees, water areas, meadows and varied terrain, creating opportunities for climbing, which in its entirety is of greater value than the traditional playgrounds that are offered to them (Titman, 1994). Children exercising outdoors feel better than those exercising in the classroom (Thomson Coon et al., 2011) and are more likely to exercise in coeducational groups (Baranovski et al., 1993). Unfortunately, in recent decades, the outdoors physical development opportunities of children and adolescents have been gradually reduced, which hinders their proper psychomotor development (Esbensen, 1990). The health of the human body is increasingly being carried out outside of its ecological conditioning, in the absence of awareness that nature is the inorganic human body and that the human body is part of the organic order of nature (Pawłucki 1994).

The organization of school physical education still faces numerous difficulties. The main concerns are regarding social conditions related to pupils and organizational conditions related to school facilities. The current model of sedentary lifestyle in families proves that their physical activity in open space or even frequent outdoor activities are very limited. In addition, during their stay at school, children take physical education classes in corridors or in small rooms that are intended for only corrective gymnastics. It is not uncommon for a student to enter the gym for the first time only after completing the pre-school or early grades of elementary school. Then, students take these classes in numerous groups, sometimes even together with upper or lower classmates. The escape from this reality, according to still too many teachers, is possible only in short-term periods of the beginning and end of the school year (Pasek et al., 2020). On the one hand, these factors are not conducive to the formation of positive attitudes towards culture of being physically active, including attitudes towards the physical education classes (Lisicki, 1990). On the other hand, considering this phenomenon, the same factors should signal the need for development of an innovative formula for contact between the pupil and nature in the course of their physical activity.

The achievement of the technological age creates, compared to the reality of the last century, many additional opportunities to exchange information on the methodology of outdoor physical activity on all levels of primary and secondary education. To a large extent, this is facilitated by electronic scientific databases, which can be a source of inspiration not only for teachers and students, but also for administrative staff influencing the formulation of guidelines for the education cycle. Until recently, the lack of this type of support was the reason for only intuitive searches for better techniques for organizing physical education classes in open space.

The scientific literature in the world is growing so quickly that even researchers representing very narrow specialities are not able to orient themselves in everything that has been published on a given topic. In 1970, 799 new journals defined as scientific began to appear, in 1990 2227 such periodicals arrived, and already in 2010 – 38901 (Drabek, 2014). This exponential increase in the number of scientific publications has meant that sources that facilitate the search for literature on a given topic are becoming more and more important, but also play the role of a sieve, by collecting only valuable scientific publications. This means that the seeker of information can quickly and efficiently find the data he or she needs. Such a role is played by bibliographic databases in modern science. The very idea of preparing metainformation on published scientific papers is not new, and the history of creating bibliographic lists dates to the eighteenth century. However, the development of informational technology has made it possible to transfer these lists into a virtual space and, thanks to new functionalities, has given them a new meaning and new possibilities. Of course, not every database is suitable as a source for all possible research. Additionnaly, how the information collected in the databases can be used is determined by the selection of sources and the detail of the description. The selection of sources is very important, especially in the context of thematic databases, as well as international interdisciplinary databases. International interdisciplinary databases (e.g., Scopus database or Web of Science Core Collection) primarily care about indexing high-quality publications and this depends on the publishers' decisions, focusing on calculating special indicators for evaluating journals (e.g., Impact factor, CiteScore) and appointing expert teams that thoroughly consider the scientific level of the journal. These indicators are based on citations, because the creators of the databases assume that good quality works are often cited (referred to in the annex literature). Considering the growing importance of bibliographic databases in recent years – far beyond their original function, i.e., information retrieval – one can notice a much greater interest in these important sources of scientific information in the scientific community. The increase in the popularity of search engines has certainly contributed to this, because many authors and publishers have understood that it is worth appearing in a database in which search results are visible in the first places, e.g., in Google Scholar (Drabek, 2014). The well-known and widely searched scientific databases, in addition to the above, include for example Biological Abstracts, CEEOL – Central and Eastern Europe Online Library, CEJSH – The Central European Journal of Social Sciences and Humanities, DOAJ Directory of Open Access Journals, EMBASE published by Elseviewer or JSTOR . They are only a part of the available sources, and it is worth emphasizing the fact that many other databases are only domestic in nature, and therefore their descriptions are edited in the languages of individual countries.

The aim of the research was to confront the content related to the issue of outdoor physical education, located in six selected databases of scientific journals: ERIC, Mendeley, Ebsco, PubMed, ResearchGate and Scientific Research. Due to the limited volume of work in editorial requirements, only the first fifty records were analyzed in each of the databases.

Research methodology

In six scientific databases updated as of February 20, 2022, 27 publications were found under *the slogan outdoor physical education*, including 23 articles in scientific journals and 4 monographs. The

method of research used was to query (from the Latin Quaero - I'm looking for) literature, i.e., to collect available information on a given topic. Usually, it involves the analysis of reports, books, articles, websites and other publications, i.e., the so-called existing data on issues of interest to the reader. Nowadays, it is increasingly replacing the traditional library query. Thanks to Internet-based search engines, we obtain the most complete knowledge about the problem or theory, in which we are interested. The result of such action is a report with a bibliography, containing a summary of information relevant to the course of our research. There are at least two types of queries, depending on the topic of the work and the level of its specificity. Therefore, we can talk about more general queries, in which the key term is not sharply specified, and about detailed queries, i.e., created for one key password, which was used in this study.

Results

The first of the publish databases analyzed was ERIC (Educational Resource Information Center). This database contains about one and a half million records and links to hundreds of thousands of full-text documents dating back to 1966. The thematic scope includes the issues of education, pedagogy, and psychology. In this scientific space, the social belief in contact with nature mobilizing for physical activity has been confirmed. The transition from traditional classroom teaching to an outdoor learning environment reduces students' time spent sitting and increases light to moderate physical activity during the school day. Thus, outdoor learning can be an effective complement to traditional teaching that promotes children's physical activity (Romar et al., 2019). Looking for a publication in this database under the phrase *outdoor physical education*, a report on the holistic development of the student under the influence of physically active contact with nature was discovered. Analyzing the effects of an educational program carried out in the open air, accelerated physical development, but also educational and emotional development was proven (Finn, Yan and McInnis, 2018). Similar conclusions were reached by the authors of an educational project that was used in a group of young people from a low-income environment (Peacock et al., 2021). An additional advantage of such lessons is their low cost, which does not require constant readiness of the school infrastructure, as well as the possibility of moving away from specialized equipment in these conditions. Therefore, it is not surprising that physical education classes utilizng the values of the natural environment is a didactic method commonly used by teachers (Gruno & Gibbons, 2020). However, in relation to the part of the teaching staff that avoids ecological initiatives in physical education, it is worth emphasizing the need for permanent professional development. The recently presented results of research with the participation of teachers from English primary schools show that their professional competences were reduced in 2017 compared to 1995 (Prince, 2019). For this reason, enriching the workshop is useful, considering the deepening phenomenon of hypokinesis on a global scale, which also does not bypass children and adolescents (Hall et al., 2020).

Another source of information on outdoor physical education is the Mendeley database. Founded in 2007, it is a free, closed-ended software for managing, organizing, and sharing scientific publications, as well as getting acquainted with scientific statistics and online cooperation. Bearing in mind the previously mentioned gradual reduction of teachers' knowledge, resources useful in

the effective implementation of the assumptions of physical activity in nature, systematic education of teaching staff in this area is recommended. Combining the review of literature with practice, a draft outdoor plan for the organization of games and games with personal support of nature educators has been developed (Hatten, 2018). The desirability of using similar practices is dictated by the observation of decreasing interest in using natural areas for the needs of physical education. While in the Study of British Columbia in the 70s of the last century, the outdoor education was systematically implemented in 55% of schools (Klassen, 1971). Nowadays, in times of increasingly limited natural space near schools, it would be difficult to approach this result. However, then as now, the concept of corridors of learning remains valid, which includes the use by teachers and students of every available part of the outdoor areas (Klassen, 1971). The benefits of outdoor physical activity do not relate only to the space of its implementation. Time is also important in this case, and specifically the length of training units. According to the latest reports, 15 minutes of time actively spent outdoors during the day can guarantee measurable benefits for the psychophysical well-being of a young person. Hence the proposal for necessary adjustments in school curricula to take account of this aspect, addressed to both the teaching staff and school adopters and policy makers (Robillard, 2021). Concepts of this type have so far been implemented only in the conditions of pedagogical experiments (Szark & Pasek, 2017). Their results prove the short-term benefits of field exercises (green exercises) for the physical and emotional sphere, and in the long term – about the possibility of shaping permanently positive attitudes towards physical culture (Szark & Pasek, 2017). According to some, there is still too little convincing evidence that strategies to increase the time spent outside school buildings increase the activity and physical fitness of young people (Schaefer et al., 2014). However, this probability is high, especially considering information about the health benefits of being in open spaces after class. The positive effects of students enjoying nature outside school apply to both the volume of physical activity and cardiopulmonary capacity (Schaefer et al., 2014).

Relatively few publications devoted to outdor physical education were found in the Ebsco database. In fact, it is a database platform where articles from magazines from many countries are recorded. Currently, there is access to several domain databases of data in the field of biology, economics and economy, humanities, social sciences, medicine or health care. These databases record articles from several thousand titles of foreign magazines. Many of them have full-text access. In this database we find information that physical education is sometimes presented as a subject with unique characteristics that can contribute to the achievement of the Sustainable Development Goals, with the teacher playing a key role in this matter. Although a detailed analysis of the awareness of physical education teachers in the field of sustainable development has not yet been carried out, preliminary analyses show that this awareness is reaching a satisfactory level, which applies particularly to women (Baena Morales et al., 2021). However, there are doubts whether the awareness associated with good intentions is a sufficient argument for the need to implement outdoor education programs. As the Singaporean example indicates, young people prepared to take on work assignments as teachers imagine that the goal of outdoor education should be to provide students with a sense of discipline and mitigate the negative health effects associated with urban and prosperous lifestyles. Meanwhile, local researchers are wondering how this vision of future teachers can make a convincing contribution to holistic learning outcomes

(Atencio et al., 2015). Undoubtedly, the idea arises here that the visionary plans of educators must always be supported by logically constructed curricula. Another type of doubt, resulting from different interpretations of the tasks that should be presented to school physical education, we are dealing with an interesting, albeit controversial thesis about the gentle transition of students from total dedication to computer games through games using outdoor values, known as *exergames*, to full integration with the natural environment. This strategy is worth considering during COVID-19, when students in many countries are pursuing school subjects online, which also applies to physical education. However, the question arises whether participating in this form of lesson will not prove to be counter-effective in relation to the goals set for outdoor physical activity (Öhman, Öhman and Sandell, 2016).

The PubMed database is also covered by this review. It is a database that includes articles in the field of medicine and biological sciences. It was founded in 1996 by the National Center for Biotechnology Information (NCBI), part of the National Library of Medicine, part of the National Institutes of Health. PubMed provides free access to articles in the MEDLINE database and to some articles from journals not belonging to it. PubMed, which mainly publishes abstracts of articles, also provides links to the website of the publisher of the journal in which the article appeared, where in some cases its full version is available. The thematic specificity of this database determines the low interest in matters of school physical activity. Nevertheless, the importance of outdoor play as a way to ensure age-appropriate range of mobility has been recognised in this space, making it a priority in childcare programming (Bruijns, Johnson and Tucker, 2020). However, the problem may be the fact that the lack of availability of outdoor school infrastructure for students and other people during extracurricular time is dictated by security reasons. Nevertheless, this benefit does not seem to offset the losses associated with the lack of school advertising and the lack of physical activity of students in extracurricular time (Evenson & McGinn, 2004), as well as the missed opportunity to effectively shape pro-environmental attitudes (Fang, Ng and Chang, 2017).

A very popular source of scientific information has been ResearchGate, founded in 2008, an international, free social networking site, aimed at scientists of all disciplines. The ResearchGate database contains over tens of millions of passwords. Each user creates a private profile where they can publish their own scientific articles, lectures, and papers. ResearchGate also has many features specific to social networking sites, such as the ability to exchange messages on the web, keep in touch with other users on online forums, create a blog and participate in virtual discussion groups. The exchange of insights within this database concerns the already analyzed thread of stimulating movement habits through contact with the external environment of the school (Durna & Svobodová, 2020), integrating physical activity and outdoor learning (Finn, Yan and McInnis, 2018), as well as such activities in the ecopedagogy trend as making the right choices and, as a result, developing self-esteem (Gray, 2018). The scope of this issue is so wide that it is proposed to organize it as part of a guide defining the methodological details of outdoor physical education lessons (Konukman et al., 2013; Nguyen, 2015). The analysis of new methods of increasing the effectiveness of physical education lessons is of great importance. The repeatedly mentioned in the literature reason for this is the lack of progress of students' skills, both physiologically and

mentally. Therefore, the need for pedagogical interventions at all levels of education is indicated. The purpose of the research aimed at better understanding of this problem was to assess the impact of selected individual and environmental conditions such as gender, place of exercise or place of residence on the efficiency and physical fitness of schoolchildren. The International Physical Fitness Test and the Cooper Test were used to test fitness and regeneration. An efficiency index and a regeneration success rate were also determined. Lessons organized in the open field had a positive impact on the speed, jumping, and endurance of children. They also improved the rate of effectiveness of regeneration and an increase in oxygen uptake was observed (Pasek et al., 2016). Contact with nature seems to be an advisable form of human activity, especially in relation to children who are not yet teenagers, for whom it can take the form of adventure education positively evaluated by teachers (Timken & McNamee, 2012).

The last of the analyzed publication databases was Scientific Research Publishing, one of the largest publishers of open-access journals. Currently, it publishes over 200 publicly reviewed online journals from various academic disciplines. In this database, several problematic issues were found. One of them refers to the negligence observed in the preparation of outdoor programs and the training of competent educational staff in the outdoor settings. Meanwhile, the intervention of qualified outdoor educators allows children to have far-reaching independence in accordance with a flexible curriculum, during the implementation of which students experience positive emotions (flow) accompanying overcoming adversity, and thus conducive to self-development (Endo, Aoyagi and Oka, 2017). In result, it promotes their return to nature, which is extremely important due to their audiovisual addictions (Klein, Türk and Roth, 2018). This is a much more difficult task than in the pre-technological era. While today's child, driven by the natural need for movement, can engage in active forms of contact with the natural environment, in a short time after the end of outdoor activity the child regains the status of a member of the community connected to the network. Ultimately, this should force us to implement more regularly outdoor education strategies into current curricula (Wood, Bruce and Baxter, 2012). The trend of using open spaces is beneficial not only for students, but also for teachers, especially young people with professional experience, for whom educational contact with nature can be a useful experience, bridging the gap between formal education and irregular further education (Salmi, Kaasinen and Suomela, 2016).

Summary

Over the past decades, various solutions have been developed and proposed to introduce innovations to school physical education. Modernity was seen in the change in the structure of the program, in the reconstruction of the course of the lesson, in the use of forms and methods, in the development of school infrastructure, in the intellectualization of the physical education process, and finally, in the implementation of classes in the natural environment. Numerous analyzed scientific reports prove the desire to look for a new, better quality of school physical education, which is often perceived as too ineffective. The information contained in electronic resources can be helpful in equipping teachers with the richest possible directional knowledge, but also in developing the ability to communicate with students. Too often, the lack of a noticeable

commitment to systematically supplementing one's own competences leads to professional stagnation. Although the information gathered in this publication seems to convince about the key educational role of outdoor physical education lessons, in the opinion of students, teachers and parents, conducting physical education classes outdoors is usually a necessary evil. For this reason, lessons have been giving up full-scale physical activities carried out in open space for a long time, except for exceptionally favorable weather conditions or in a situation where the lack of appropriate infrastructure inside school buildings forces it. A teacher characterized by a creative approach to his own work should use all available didactic methods, including those in the virtual space, to modify the ways of conducting physical activities, revealing recreational, health and ecological competences. Unfortunately, supporting the development of outdoor physical education lessons by most teachers seems to be a less important task than indoor physical education. The low position of these competences may result from the fact that combining thinking about physical education focusing on outdoor education has an unsustainable tradition in many regions of the world. This was partly reflected in the relatively small amount of information found in scientific databases that would be devoted to outdoor physical education.

The presented results of the research lead to the conclusion about the current need to expand the information database on the outdoor environment stimulating educational impacts at all stages of education. As a result, lessons organized in this mode should be a more effective promotion of a healthy lifestyle, supporting the consolidation of appropriate attitudes towards physical culture, and thus - facilitating the functioning of a person in subsequent stages of his life.

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Students with Special Educational Needs Care within Physical Education Classes while Covid-19 Lockdown in the North of Mexico

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Abstract

Physical education has faced many challenges over the years. Among these challenges are the fact that including students with special needs has been a struggle that some teachers have faced. This is also the case of Mexican physical education classes; however, this issue faces a higher challenge due worldwide pandemic lockdown caused by COVID-19. Since teachers had to understand from a different perspective how to reach and connect with their students through another pedagogical approach, in this case a virtual environment. This was an exploratory study, what this means is that it begins with an interpretative paradigm, in which qualitative analysis techniques were applied with the purpose to identify an existing reality. It also had a phenomenological design, which is congruent when it tries to go in-depth in a specific event coming from the experience of participants. Through a Technical Pedagogical Advisor, we wanted to explore the challenges physical education teachers faced during the lockdown and the prospective return to face-to-face classes. Among the findings of this study for the purposes of space we presented two scenarios: 1) Care to Students with SEN while the Covid-19 lockdown; and 2) Prospective PE classes including students with SEN, after the lockdown, as a way to explain the challenges confronted by PE teachers. As such, it can be said that teachers need to explore different pedagogical strategies and learn new pedagogical skills as a way to include all of their students, at the same time higher education institutions to provide a link between education authorities and teachers in order to create professional development courses to update knowledge within teachers.

Key words: Physical education, Special educational needs, Educational approaches, Mexican teachers.

Introduction

Education is considered a fundamental human right that is inescapable and universal to all populations nationwide, this includes children and youth that show an educative special need (ESN). On one hand, physical education environments are one of the places where the care and attention to children and youth with ESN is placed with empathy and inclusively. It is important to mention that currently there are a series of modifications and changes to the nomenclature used when we are referring to children and youth with disabilities among schools, an example is the term SEN, which is going to change to learning barriers. However, for the Public Education Department (SEP) which is the department that runs Mexican education, the terminology ESN is still valid (SEP, 2017). As such, the objective of this study was to identify the different ways that children with ESN will be included in physical education classes to the new normality among schools of northern Mexico.

Physical activity through dance, recreation, exercise and physical education (PE) contribute to the development of a more integral and complete individual, stimulating the acquisition of new and healthy habits, favoring the development of the body in its different forms (mind, body and spirit) including social and psychological aspects. Therefore, it is recommended to practice at least 1 hour of physical activity daily (WHO, 2021).

Physical education has as an objective to favor the development and implementation of physical activity in the educational sector, using pedagogical strategies with a sports-based approach or a student-centered approach. These aspects most of the times are a response to the social or political contexts involved in each country. Although it is important to mention that despite the fact that is a response to a social or political issue, it is the government responsibility to facilitate and open access to all individuals including children and youth with SEN (FIEP 2000, 2004).

On the other hand, school is the ideal space to promote the acquisition of healthy habits through physical activity, healthy eating, sleeping habits (Brazendale et al., 2017). Although, once the pandemic for Covid-19 hit society, teachers and students were affected in different ways, including their academic performance due the lockdown. It can be estimated that around 40 million of children and youth around the world could not attend their school due the pandemic lockdown, thus, switched to a synchronous and asynchronous learning environments, which stopped or slowed down their physical activity practices on a daily basis, which is a health risk factor (Wang, Zhang, Zhao, Zhang y Jiang, 2020). In Mexico, since March 23rd of 2020, schools shut down indefinitely, having virtual classes (SEP, 2020). Besides this issue it is important to say that in Mexico at least there are 580 289 children and youth around the ages of 5-17 years old with a type of disability or disorder (INEGI, 2020).

Meanwhile, due to the lockdown, PE classes faced different issues that prevented students with SEN to learn what should be expected to their grade and age (Baena-Morales et al., 2020; González-Rivas et al., 2021). This pandemic has represented a challenge to inclusion in education (Parra, Regalado y Poma, 2020) and the return to regular classes contributes to a

bigger challenge, because of the mental, social and motor decrements some students suffered, product of more forced sedentary lifestyle (Chen et al., 2020). The Mexican government has ratified their intention to suggest a voluntary and scaffold back to classes, following all safety protocols established by the Health Department (SEP, 2021). There is a controversy among parents, teachers and students, mostly about teachers' feelings of being prepared and ready to teach a class with the minimum safety requirements among their students and the adequate modifications to attend to the diversity and disabilities within the class. A goal is to promote a better approach to attend to physical, mental and emotional health issues within the PE classes (Chen et al., 2020). As such, teachers should be prepared for a new and more complex reality, to reflect in the content and curriculum planned for the classes in order to offer their students new and better ways of working (Gil-Espinosa, 2020).

The pedagogical strategies used in PE classes include that student used the same equipment, sweat and have physical contact of some sort, which in some ways are opposite to the safety preventions protocols due to the Covid-19 lockdown (COLEF, 2020), however, there are some established protocols specific to each subject that does not consider how to attend students with disabilities and/or SEN. At the same time, the lack of resources, equipment, facilities, curriculum and school organization in the northern part of Mexico face can become a specific issue for this context, thus, teachers must act in a different manner considering specific safety protocols context sensitive and, in some ways, to be a step ahead of what can happen with or without these protocols (González-Rivas et al., 2021).

As such, this research seeks to contribute, from the perspective of the administrative leadership that includes pedagogical technical adviser, the possible modifications for a PE intervention that holds students with disabilities and/or SEN faced in the return to face-to-face classes. To identify and propose different actions that could contribute not only to organization, curriculum, methodologies, approaches, but to comprehend and practice in a different way the purpose of PE.

Methodology

This was an exploratory study, what this means is that it begins with an interpretative paradigm, in which qualitative analysis techniques were applied with the purpose to identify an existing reality (Maldonado, 2018). It had a phenomenological design, which is congruent when it tries to go in-depth in a specific event coming from the experience of participants (Hernández, Fernández, y Baptista, 2014). Also, it was a case study method, and according to Yin (1994), this is a feasible option when a study phenomenon was found in an organic and natural way, without any type of context manipulation.

Participants

It is important to mention that for this study it was only considered one ATP participation, due the fact s/he holds a holistic view of teachers' performance and the reality PE faces within the school district s/he supervises. In this way we seek that this participant could fulfill the following

criteria: 1) more than five years of experience within the educational system; 2) at least three years as ATP; 3) to hold a graduate degree; 4) being a ATP while the Covid-19 lockdown; 5) to have at least 10 PE teachers within his/her school district; and 6) being willing to participate in this study.

In this case study was about a Technical Educational Advisor (ATP) from the state of Chihuahua, Mexico (Border with the U.S.) female, 38 years old, holding a bachelor's degree in Physical education and a graduate degree in physical education and administration. Also has 10 years within the education system, with 5 years as ATP. It is important to mention that she is responsible for 15 PE teachers within her school district.

Instruments

A semi structured questionnaire was designed in order to inquire about the PE classes that included students with SEN while the covid-19 lockdown. It is important to mention that this questionnaire was validated by experts in education research. We present the following proposed questions:

While COVID-19 lockdown

What pedagogy strategies have been implemented by the PE teachers in order to include students with SEN in their classes?

What type barriers had teachers in your supervision found in order to teach students with SEN in their classes?

Within the new normality

From your perspective, would you consider that schools are prepared to begin/initiate face-to-face classes in August 2021?

From your perspective, how would you consider the inclusion of students with SEN in the PE classes within this new normality?

In order to collect the data, we chose a semi structured interview, which is defined as a small chat between two or more individuals with the goal to obtain specific information, the proposed questions provide a starting point, however, it is flexible because the interviewer can ask additional questions in order to obtain more information, also because, if the interviewee has an unclear reference that would like to clarify (Díaz-Bravo, Torruco-García, Martínez-Hernández y Varela-Ruiz, 2013).
For the data analysis we used the qualitative software, Atlas.Ti in its version 7.5, this tool has been useful in diverse education research projects (San Martín, 2014). It is important to mention

that offers a friendly interface and easy to handle to coding process and categorize, however, the analysis and interpretation of the findings are based on the researcher experience (Silva & Carneiro, 2018)

Procedure

First of all, this project was presented and approved by the education department of Chihuahua. Once the questionnaire was designed it was validated by 3 education experts (holding a doctoral degree and working in PE) who made recommendations to improve it, which these recommendations were attended to, in order to complete a final version of the questionnaire.

The research group defined the criteria that should be included in the case study, inquiring with the education authorities an open invitation to ATP was made, but only seven responded to the invitation. Out the seven it was chosen one in order to do this case study. One reason was because of he is the seniority at work and hold a graduate degree. Once the participant agreed and signed the informed consent, his anonymity was guaranteed.

In May 2021, the semi structured interview was conducted through the ZOOM software, it was a total of 35 minutes long, this was recorded and transcribed verbatim, once the translation was completed, this was uploaded to the Atlas.TI for its analysis.

Data analysis

The data analysis was done with an emergent design, according to Glasses (1992) this proposes a series of steps for an open coding process, using a constant comparison a possible idea or theme emerges that researcher's base and use as the different categories.

Findings

Care to Students with SEN while the Covid-19 lockdown

According to the ATP, while the Covid-19 lockdown PE teachers face many problems in order to teach effectively their classes: a) communication problems, since this depended from the intervention of parents and/or classroom teachers; b) from some PE teachers lack of ability to use technology, as well from parents; c) lack or null access to internet; d) grammar typos in writing planning sent to parents via email or text message (e.g. WhatsApp); e) the need to adapt the activity with specific equipment and space at home for students.

"The first barrier that PE teacher faced was that some of them, not all are feeling there are not the same person anymore, since they are learning new abilities to be incorporated into their teaching, the mail barrier was to adapt to the use of technology even though they have not used it to reach students, in this school district there are teachers with over 15 years without using

regularly a computer especially for this type of usage, before Covid they used it to plan in Microsoft Word, other than that their ability was null, but once the COVID reached our region and the lockdown started, distance education and trying to reach their students with or without SEN was very complicated for them"

As it was mentioned teachers were challenged in their pedagogical intervention, placing teachers into a very unique situation. In this way, during the lockdown, the modifications to the PE virtual classes were null that included students with SEN, although it is important to mention that this lack of modifications for some teachers has been a problem even before the COVID lockdown.

"A first issue was to include the pedagogy into the virtual environment, because we need to teach teachers how to use these types of virtual environments… they wanted to keep doing the same as they did before the lockdown, I see this as an important aspect, because they modify a version and considered that adapting or modifying they classes for students with SEN was complicated; this was true because only 2 teachers reached me personally and asked me directly how could they modify their activities to include students with SEN, for instance students with autism"

Prospective PE classes including students with SEN, after the lockdown

According to the ATP, the near return to face-to-face classes was going to be a challenge in itself, because education authorities and PE teachers should be prepared to used equipment and other resources that stopped using due the lockdown. In this way, it can be envisioned that a professional development course is needed and required to build a new pedagogical perspective; on the other hand, to include students with SEN. However, this is an issue because of the lack of proactivity coming from the education authorities in order to update these types of new procedures and pedagogies needed, especially to senior teachers in every school district.

"I do see it as an important aspect to update through professional development courses to teachers, unfortunately, there is a big issue among senior teachers, because some of them refuse to do so…

On other hand, it can be mentioned that including students with SEN is very important, as important as to consider and adapt facilities, and equipment as a way to be inclusive, in order to guarantee that all students have access to a quality education. Lastly, it is fundamental to have clarity in safety and health protocols that should be implemented with the PE classes.
"With this new normality some aspects should be considered, we are talking about certain protocols, protocols that consider the safety and health to access some parts of schools, also to support teachers and parents as a way to prevent issues in face-to-face classes especially in PE classes."

Discussion

The findings of this study indicate that, while the Covid lockdown PE classes were affected in their pedagogy and approaches used directly. These findings are consistent with those found by Baena-Morales et al., 2020 and Mercier, Centeio, Garn, Erwin, Marttinen & Foley, 2021. This implies that teachers could not find and were not prepared to use different pedagogical strategies other than the traditional ones, but also that it took them months to adapt themselves to this new reality teaching virtual classes.

Specifically, within the Mexican context, these findings are related to the ones presented by González-Rivas et al. (2021), identifying that in this country the lack or null access to internet especially in rural areas, was a mayor issue for teacher, students and parents as a way to implement a pedagogical approach. In this way, it is important to visualize that despite the lockdown once we return to face-to-face classes the virtual environment will continue to be a pedagogical strategy that teachers should keep implementing within their classes, however, the education authorities should contemplate that not all students have access to these resources.

The findings of this study show that the care to students with SEN through the virtual environment was almost null. These findings are consistent with those by Castillo-Retamal, Torres-Medina, Herrera-Muñoz & Faúndez-Casanova (2021). This allows us to visualize that the return of face-to face classes, especially to students with SEN, could present higher rates of sedentarism and obesity, as is indicated by López, Martínez, Meza and Teixeira (2022). In this way, before the return to face-to-face classes, teachers should work in a specific way that allow students with different needs to prevent their learning and physical lag, giving more attention to these needs. As such, there is an activities proposal that involves students with SEN by Guamán and Navarro, 2021.

Lastly, it is important to mention that the practical and easier practices of this study are directed to the education authorities in Mexico. PE teachers require a constant professional development course in order to understand the modifications and changes to provide effective classes to students with SEN, also to a more effective way of planning that involves these aspects too.

Conclusion

Physical education classes are right that all children and youth have, teacher should develop the specific skills in order to include all students within their pedagogical approach. In this way, it is recommended that higher education institutions propose adapted physical education courses and pedagogical approaches as a way to create a more inclusive approach to all teachers and students. On the other hand, in-service teachers should be responsible to guarantee their students to be included and being willing to create different strategies to modify and adapt their resources and curriculum. At the same time, to create a link between higher education institutions and educational authorities a constant professional development courses as a way to update these strategies.

Futures lines of research

This was an exploratory study due to the findings, because we cannot generalize that this shows the reality of all PE teachers; but it allows to visualize possible future lines of research: a) inquire about the return to face-to-face classes and professional development courses in adapted physical education; b) analyze teachers pedagogical skill needed for students with SEN; and c) to begin action research projects in order to find different solutions to the issues found in this study.

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The Health Benefits of Physical Activity in People with Alzheimer's Disease - A Short Review

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Abstract

The guide lines published by WHO (2019) sustain the effective role of physical exercise and a healthy lifestyle in preventing/lowering the risk of dementia and cognitive decline in the population, and in opposing the state of fragility in people affected by Alzheimer's disease (AD). The inverse relationship between a physically active lifestyle and cognitive decline is widely documented in the literature (Sofi et al., 2011, Zhao et al., 2018); physical activity is essential for maintaining good blood circulation in the brain, which favours neurogenesis and synaptogenesis that in turn protect against AD and other forms of dementia. The objective of this review is to summarise the results of studies demonstrating the effectiveness and protective and/or compensatory role of multicomponent interventions on cognitive decline in people affected by different forms of dementia (Bacciu, Bossa, Assenza, Foti, 2017).

Key words: Physical activity, Exercise training, Older adults, Dementia, Alzheimer's disease, Mild cognitive impairment, Cognitive function, executive function.

Physical activity and a healthy lifestyle as a strategy for preventing dementia

Alzheimer's disease (AD), one of the most common forms of dementia, falls into the category of primary degenerative dementia. The problem of dementia cannot be dissociated from that of aging, and in particular from cerebral aging in relation to the degenerative forms of dementia (Gale, Acar, & Daffner, 2018). The risk factors correlated with AD are subdivided into modifiable and non-modifiable risk factors (Costa, Sinforani, 2020). The modifiable ones are lifestyle linked, and include diet, obesity, cigarette smoking, excessive alcohol consumption, vitamin deficiency, diabetes, hypercholesterolemia, hypertension, dyslipidemia, a history of cerebral trauma, cardiovascular pathologies, vasculopathies and low levels of physical activity or other recreational activities that engage the subject physically, mentally or socially. Different studies have demonstrated physical inactivity to be one of the most common preventable risk factors associated with the development of AD, and that higher levels of physical activity are associated with a reduced risk of AD (Meng, Lin, & Tzeng, 2020). Considering that non modifiable risk factors, by definition, cannot be altered, it is fundamental to promote the reduction of modifiable risk factors through the adoption of an active and healthy lifestyle. At present, alongside pharmacological research, a fertile area of research focusses on the effects of multicomponent interventions, based on cognitive rehabilitation, motor stimulation and physical activity, in terms of the health and the quality of life of people affected by AD (Costa, Barban, 2017). As regards the interventions based on physical activity, the guidelines published by WHO (2019) support the role of physical activity and a healthy lifestyle as important strategies for the prevention of dementia and the risk of cognitive decline in the general population.

A number of studies have demonstrated that physical exercise, carried out as an integral part of programmes for the prevention and care of AD, improves cognitive-behavioural functions, enhances somatosensorial stimulation, improves performance in daily life tasks, and opposes the fragility that brings about a dramatic and disproportionate change in the state of health of older adults with or without AD; a state of fragility means that elderly individuals pass from a condition of independence to dependence, from mobility to immobility, from postural stability to falls (Clegg, Young, Iliffe, Rikkert, & Rockwood, 2013). These changes, which also occur in people affected by various forms of dementia, expose people to an increased risk of falls – one of the most common causes of disability and death in the elderly population (Bacciu, Bossa, Assenza & Foti, 2017). Therefore, in order to contrast situations of dependency, intervention programmes aimed at maintaining or strengthening daily life motor capacities are required (Sannicandro, 2013).

Over recent years, a great deal of research effort has gone into studies looking at ways of slowing down the processes of cerebral aging by reinforcing the protective factors linked to lifestyle that may decelerate or block the mechanisms of neurodegeneration in AD. Of these, the approach which has received the greatest amount of attention is the increase in physical activity, which has been shown to have the most significant effect, both in terms of slowing down the progression of cognitive degeneration in subjects in the early stages of dementia and even more so in reducing the prevalence of dementia in the elderly population (Erickson et al., 2018).

Multicomponent adapted physical activity interventions: a brief review of the literature

The review was conducted according to the PRISMA guidelines (Liberati et al., 2009), using the Web of Science (WOS), PubMed (Medline) and Scopus databases, and considering articles published from 2010 to 2021. The searches were carried out using the following key words in isolation or combination: exercise, physical activity, exercise training, older adults, dementia, Alzheimer's disease, mild cognitive impairment, cognitive function, executive function.

The inclusion criteria were:

- articles with interventions based on physical activities/exercise, and for which an analytical description of the type, duration, frequency and intensity of the activities used was provided in the study protocol, the aim of which was to assess the effects of the intervention on cognitive decline in healthy elderly subjects or those affected by different forms of dementia;
- the presence of clinically relevant information related to the impact of modifying lifestyle factors on the prevention of the various forms of dementia.
- Following the initial section of articles based on the aforementioned inclusion criteria, replicates retrieved from different databases were identified and eliminated; articles were then excluded that addressed the problem from exclusively the physiological point of view, as well as literature review articles, case reports, and studies written in languages other than English (Faieta et al., 2021).

In the study by Gregory, Parker & Thompson (2012), the results revealed that elderly people performing any form of physical exercise demonstrated better cognitive function compared with those who did not partake in any physical exercise and did not develop dementia. Physical exercise was shown to be efficient not only as a factor able to prevent normal cerebral aging but also as a valid non-pharmacological approach to protecting against Alzheimer's disease. Ngandu et al. (2015) clearly demonstrated that cognitive stimulation techniques and a hypolipidic diet associated with regular physical exercise were able to reduce the progression of dementia over time. Zhang and Zhang (2016) discovered that irisin is secreted by muscles in response to physical activity. This finding is relevant as the hormone is present in minimal qualities in the hippocampus of subjects with AD, and has been shown to have a protective effect on synapses and memory, even in the presence of beta-amyloid plaques. Of consequence, the increase in the levels of irisin in the brain obtained during physical activity may counterpose the processes leading to cognitive decline, as a "barrier" that counteracts against processes already activated. Liu-Ambrose et al. (2010) described the effects of 52 weeks of resistance training to combat cognitive decline in healthy elderly individuals and found that a weight training programme was able to improve selective attention as well as muscle function. The authors suggested that resistance training should be considered a valid adjunct therapy to be recommended alongside pharmacological therapy.

Erickson et al. (2011) analysed the effects of a one-year exercise protocol based on aerobic walking vs stretching on hippocampal perfusion and serum levels of brain-derived neurotrophic factor (BDNF). The results show that aerobic exercise selectively increases the volume of the anterior hippocampus, but they did not demonstrate bigger variations in the serum levels of BDNF with

respect to the stretching only group. The one-year aerobic training protocol resulted in a 2% increase in hippocampal volume and compensated for ageing-related degeneration. These results clearly indicate that aerobic exercise is neuroprotective and that starting an exercise routine later on in life can be effective at improving cognitive function and increasing cerebral volume.

Anderson-Hanley et al., (2012) examined the improvements in executive function following virtual reality cycling exercises ("cybercycle") compared with traditional exercises. They analysed the improvements brought about according to the type of exercise programme as well as rises in BDNF. The experimental group carried out cybercycle activities for three months, while the control group performed pedalling-only exercises on a traditional static bike. At the end of the activities, the authors found significant differences between the experimental and the control group, with a reduction in the risk of the clinical progression of mild cognitive impairment (MCI) and potentiated neuroplasticity in the cybercycle group resulting from/associated with the greater interaction between BDNF values and activity type and duration. The results suggest that for an equal intensity of effort, the experimental group performed better in tests of cognitive function compared with the group performing traditional exercises, indicating that simultaneous cognitive and physical exercise has a greater potential to prevent cognitive decline.

Hagovska & Nagyova (2016) compared the efficacy of cognitive and physical training on cognitive function and its effects upon activities of daily living (ADL). Their sample, composed of older adults with mild cognitive decline, was divided into an experimental group and a control group. Both groups carried out physical training aimed at improving muscle strength in the lower limbs and balance; in addition, the experimental group also performed a cognitive training programme "CogniPlus". The study showed that cognitive training combined with physical training had a greater effect on the majority of cognitive functions and ADL compared with physical training only.

The objective of the study by Müller et al. (2017) was to evaluate whether a dance training programme increased neuroplasticity with respect to conventional fitness activities and whether continuing the training programme for extended periods of time brought about any additional advantages. For 18 months a group of healthy elderly people, randomly assigned to the dance or conventional fitness group, carried out the programmed activities. The subjects in the dance group participated in a programme in which they were constantly required to learn new sequences of movements. The participants in the fitness group completed a conventional resistance and strength training programme. After six months, the authors detected a significant increase in the volume of grey matter in the left precentral gyrus in the dance group which did not occur in the fitness group. This neuroplastic effect could have been mediated by the increase in the plasma levels of BDNF observed in the dance group. Furthermore, an increase in volume was observed in the parahippocampal region after 18 months of dance training. The results suggest that long-term participation in a dance programme that requires constant cognitive and motor learning is better able to induce neuroplasticity in the brains of elderly subjects. Therefore, dance should be considered an appropriate activity for opposing age-related reductions in grey matter.

Yu et al. (2018) evaluated the efficacy and the synergic effects of a "combined cycling and speed of processing training intervention" on cognition in older adults with amnestic mild cognitive impairment. At the end of the study, the authors showed that combined aerobic exercise and cognitive training can have a synergic effect on cognition, reinforcing various neural functions in a complementary manner.

Song & Yu (2019) investigated the effects of a moderate-intensity aerobic exercise programme on cognitive function and quality of life correlated with health in a group of elderly Chinese subjects with mild cognitive degeneration. The experimental group performed an aerobic exercise programme of moderate intensity for 16 weeks, while the control group underwent a health education programme (as attention-placebo control). The authors reported improvements in the experimental group in cognitive function (memory, executive function, attention, language, visual-spatial abilities) and quality of life with respect to the control group.

Casas-Herrero, et al. (2019) examined whether a multicomponent exercise programme called VIVIFRAIL, previously shown to reverse functional decline associated with acute hospitalization in very old patients, produced the same beneficial effects on the functional and cognitive state in pre-frail/frail patients with MCI or dementia. The patients assigned to the control group received normal outpatient care, including physical rehabilitation as necessary. The experimental group participated in a training programme consisting of resistance, cardiovascular, balance and flexibility exercises (VIVIFRAIL). At the end of the study, the authors revealed that the VIVIFRAIL programme designed for frail elderly patients with cognitive deficit was more effective at reducing functional and cognitive degeneration compared with conventional treatments.

The objective of the study by Raichlen et al. (2020) was to evaluate the effects of combined cognitive and aerobic exercise training on dual-task walking performance in healthy older adults. The participants were randomly assigned to one of four parallel interventions: 1) cognitive training (COG), 2) aerobic exercise (EX), 3) combined aerobic exercise and cognitive training (EXCOG), and 4) video-watching control (CON). All the interventions involved three days of training a week for a total of 12 weeks.

The authors reported a significant improvement in the cognitive performance in the EXCOG group after 6 and 12 weeks of training. The participants of the EX group showed a significant improvement in cognitive performance only after 12 weeks of training.

The participants in the COG group also showed a significant improvement after 12 weeks of the intervention, but an effect size less than half that of EXCOG (0.43). The CON group did not show any significant changes in cognitive performance at any of the time points. The results of this study suggest that a 12-week intervention that combines multiple cognitive tasks with aerobic exercise in healthy older people can improve their cognitive performance. On the basis of these results, the authors recommend the employment of activities that require the use of dual tasks (cognitive and motor) as part of the therapeutic pathway in patients with various forms of dementia.

Yu, Salisbury & Mathiason (2021) examined the inter-individual differences in aerobic capacity and cognitive responses after an intervention involving 6 months of aerobic exercises in older adults with mild and/or moderate AD. The seniors in the experimental group carried out 3 lessons a week for 6 months; each session included a 5-minute warm-up and cool-down before and after moderate to vigorous cycling and stretching exercises. The duration of the lessons was gradually increased from 30 to 60 minutes. The control group carried out stretching exercises only. The authors show that the experimental group recorded bigger changes with respect to the control group at the end of the 6-month intervention; inter-individual differences were recorded in both the fitness and cognitive components. According to the authors, true inter-individual differences in aerobic capacity and in the cognitive responses to aerobic exercise exist in older adults with mild-to-moderate dementia due to AD, but that a better understanding of these differences requires further research.

Conclusions

Over recent years research activities directed at analysing and describing the combined effects of cognitive and physical exercise on the prevention and treatment of the various forms of dementia has grown greatly. This review presented just some of the articles reporting the most advanced research in the field of adapted physical activity, awareness of which will be important for the construction of inter-disciplinary approaches that aim to reduce excess disabilities resulting from cognitive alterations and to support and oppose deficits in executive function, memory, spatial-temporal disorientation, perceptions and language, all of which may become compromised in dementia.

Some research studies demonstrate that the combination of cognitive and physical exercises can be more efficacious than single interventions. Exergaming is a typical example that combines physical exercise with interactive virtual reality, thereby supplying cognitive stimulation while taking part in physical activity such as, for example, exercises carried out on a stationary bike equipped with virtual reality tours (Meng, Yang, Ji, Xuewen, Ran, 2018). Physical and cognitive activities performed simultaneously have a greater potential to improve global cognition (working memory, episodic memory and executive function) and enhance frontal cognitive functions, walking gait and neuroplasticity; while aerobic or resistance training, although unable to improve episodic memory, by improving cardiorespiratory fitness they sustain cerebral function, attenuate age-related changes to the myelinated axons in the corpus callosum and support white matter integrity (Meng, Yang, Ji, Xuewen, Ran, 2018).

Higher levels of aerobic fitness reduce hippocampal decay, increase hippocampal volume and, by consequence, result in better spatial memory performance (Meng, Yang, Ji, Xuewen, Ran, 2018). A particular current day problem with the potentially significant implications is represented by cognitive decline, and forecasts for the medium and long term indicate that the number of people with dementia will continue to grow, in particular in very old people and in industrialized countries (WHO, 2012). These numbers have pushed researchers into investigating the causes underlying the onset of the different types of dementia and to study strategies useful for preventing their onset or

to oppose their damaging effects on health. In addition to advances made in early diagnosis, pharmacological treatments and the development of new research techniques, the area presently enjoying increased research attention is that of lifestyle changes; increasing physical activity as a "non-pharmacological therapy" is of particular interest due to its ability to slow down the progression of cognitive impairments in subjects with early symptoms of dementia, and because of its capacity to reduce the incidence rate of dementia in the elderly population (Erickson, et al., 2018).

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Physical Literacy as a Health Option for Children: Overweight and Obesity a Rising Problem

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Abstract

Currently, Mexico presents high rates of childhood overweight and obesity; and several risk factors that affect the development of non-communicable diseases have been observed from early ages. Furthermore, a lack of physical activity is a global issue that is especially prevalent in Mexican children. One of the primary aid initiatives is to adopt physical literacy, which aids in the improvement of motor skills such as conditional physical abilities and coordination abilities in schoolchildren, as well as the rise of physical activity levels and health indicators. A healthy lifestyle from early age permits an impact on the adult age, especially since children who present obesity or sedentary behavior are more likely to stay with obesity and develop other comorbidities in their adult life. One of the main reasons for taking awareness over a healthy lifestyle in the childhood period is through physical education classes. The physical education pedagogical approach represents an ideal space for physical literacy application in order to help minimize issues such as public health that includes overweight and obesity; however, there are issues to consider for proper implementation. This chapter examines the fundamental aspects of physical literacy as well as recommendations for incorporating it into physical education, highlighting benefits and possible strategies for achieving optimal outcomes.

Key words: Physical education, Physical literacy, Overweight, Obesity, Pedagogical approach

Physical Literacy as a health option in schools: against overweight and obesity

The concept of health should not be seen only as a conceptual term, but rather as a right for all individuals, in which, this concept can be seen from a political perspective, and as an indicator of the country's development. That is why governments and public policies must take different actions that benefit their community, which have an impact on preventive strategies that allow raising the quality of life of their population. It is important to take into account the main health problems of the Mexican population, since, during the report presented by the National Institute of Public Health, it mentions that more than 35% of all deaths in Mexico are attributed to preventable diseases, such as heart diseases and diabetes (ENSANUT, 2018).

Overweight and obesity in Mexico are a problem that can be presented from early childhood, so there are currently two conditions that begin to overtake within society, which are fatness and sedentary lifestyle, where both complement each other to develop a disease and potentiate other ones with high mortality rates, where children can become more vulnerable due to the social, economic, health, and other factors.

The most recent data from the National Survey of Health and Nutrition, 2018 (ENSANUT) indicate that 22.2% of the population age 0 to 4 is identified being at risk of being heavy, while the prevalence of overweight and obesity in the population from 5 to 11 years of age has 35.6% with an increase as the years go by related to this prevalence. Obesity among children and adolescents has become one of the most serious public health problems of the 21st century. The global prevalence of childhood weight problems has increased rapidly over the past 3 decades (Di Cesare, Sorić, Bovet, Miranda, Bhutta, Stevens, & Bentham, 2019). On the other hand, overweight, obesity and abdominal obesity in early stages are risk factors for the future that are associated with an increase in chronic diseases such as type 2 diabetes mellitus, arterial hypertension, dyslipidemia, cardiovascular diseases, breast cancer, osteoarthritis, and even depression (Muñoz & Arango, 2017; Chacín, Carrillo, Rodríguez, Salazar, Rojas, Añez & Bermudez, 2019), an alarming situation for the school stage.

An aid to this great problem would be the increase in hours of physical activity in schools, where actions are carried out to develop physical literacy, a term used that, based on the facts, could help combat this problem, since from physical literacy it is possible to develop conditional physical abilities and coordination abilities of schoolchildren in order to achieve children to be more active and a better health, eradicating the problems of sedentary lifestyle and obesity. Some prevention alternatives could be the promotion of comprehensive educational activities as well as knowledge of eating plans and physical activity, which society may adopt through teaching in schools.

The new paradigm lies in understanding that the advantage of preventing a disease or its complications is greater than that obtained by treating it, even care is timely and appropriate. Prevention is always better than treatment and the benefit of education by and for health will have to show, in the medium and long term, important benefits and impacts on the population. In short,

the challenges to be met are multiple, however, they are identifiable and there are low-cost, high-impact solutions (Córdova-Villalobos, 2009).

Physical activity as a way to develop physical capacities in physical education

Through physical literacy within the physical education classes, it is possible to develop coordinative capacities, which are determined by the ability to capture and process information by the analyzers involved in the movement. Therefore, they fundamentally depend on the central nervous system such as coordination, coupling, orientation, balance, change, rhythm, laterality, and relaxation. In fact, conditional physical abilities are those that are limited by the efficiency of energy metabolism, strength, endurance, speed, and flexibility. There are some other limiting factors of the conditional capacities, which depend on the energy of the muscles and on the mechanisms that regulate their supply, capacities that we will work on at the primary and secondary levels together with the coordinative ones.

The main physical abilities, which can be developed through physical literacy, both coordinative and conditional, are described below:

Strength: It is the motor capacity to overcome resistance through the opposition exerted by muscular tension (Castañer and Camerino, 1993). It is the ability to apply an impulse. It is the neuromuscular ability to overcome external and internal resistance (Bompa, 2002). Muscular strength: the maximum amount of force that can be generated by a muscle or muscle group (Howley and Powers, 2000).

When it comes to working on strength, during the stage of physical literacy, it must be done globally and through motor skills, since girls and boys are in full growth, every time must be taken into account the level of complexity of the contents being progressive and always adapted to the possibilities and limitations of the students. Some activities to propose the development of strength in classes would be: pushing, pulling, climbing, jumping, throwing, quadrupeds, etc. In all of them, it is necessary to emphasize the importance of adopting a good body posture.

Power: they are dynamic exercises in which the most important muscles simultaneously manifest relatively significant force and speed of contraction, that is, great power (Platonov and Bulatova, 2019). The ability of the neuromuscular system to develop a maximum increase in force after the start of the contraction. It is the greatest development of force per unit of time (Samulski, Menzel, and Prado, 2013).

Aerobic resistance: It is the ability to withstand the state of progressive fatigue that occurs in long-term work (Castañer and Camerino, 1993).

Endurance work should focus on developing aerobic endurance at low and medium intensities in a global and playful way, or with high-intensity interval training (HIIT). For the evaluation of this,

there are different tests, such as the linear load functional cooper test, the Course Navette test progressive functional test, and it is important to adapt to the characteristics of the students with whom we work.

The benefits of resistance are: increased respiratory capacity, reduction of fatty tissue, improvement of capillarization and vascularization of the muscle, helps prevent coronary diseases in adulthood, and compensates for stress.

Speed: set of functional properties that allow motor actions to be executed in a minimum time. Speed is the basic physical ability that allows us to make one or more movements in the shortest possible time (Platonov and Bulatova, 2019).

The work must be carried out globally and always through skills and coordination aspects. Reaction speed and gestural speed can be worked on from 7 or 8 years old. When it comes to travel speed, we will focus on short distances. Some of the activities to be carried out to develop this ability would be coordination games in the first cycles, relay races, jumps, chases, exits responding to different stimuli.

Benefits of speed: increased attention and concentration, allows faster and more efficient movements, and stimulates the functioning of the central nervous system.

Flexibility: Range of movement that the joints have with the greatest possible amplitude, facilitating the mobility of the muscles in physical activity, the importance of performing flexibility exercises has been established, which lies in the fact that they reduce the possibility of injuries, muscular pains and possible inflammation associated with joint stress due to more rigorous activities (Forteza Soler, Comellas and de Viñaspre, 2013). It is the ability to maximize the range of motion in a given joint which is developed through stretching exercises at the end of each exercise session (Naclerio et al., 2011).

It is a quality that, based on joint mobility, muscle extensibility and elasticity, allows the maximum travel of the joints in different positions, allowing the subject to perform actions that require great agility and dexterity (Castañer and Camerino, 1993). Flexibility must be worked on at all stages and may be present at all phases of the session, although the warm-up and cool-down phases are the ones that favor dynamic methods in the first levels and from the second third of primary and secondary use static methods. We can work on flexibility in a playful way through circuits by stations, using both mobility exercises and stretching.

Benefits of working on flexibility: it will help improve coordination, prevent different injuries of the musculoskeletal system, help care for postural hygiene and increase the performance of other physical capacities: strength-speed-resistance.

Coordination: is the ability to combine various complex movement patterns into a single distinctive movement, this skill is learned and improved by performing gymnastic exercises such as pull-ups, rope climbing, push-ups, sit-ups, handstands, pirouettes, among others (Samulski, Menzel and Prado, 2013).

Trying to fit this idea and fully respect the educational model that is present, the benefits of working with force are: improving muscle tone, greater performance to perform the tasks of daily life, or preventing some postural diseases.

Within the area of physical education, we must look for the motor enrichment and the harmonic development of the student, through the previous work of the physical condition, which is determined as we have seen, by the development of the different basic conditional capacities. We must ensure that this development is fundamentally based on health, which is possible to achieve from the correct teaching of physical literacy. Figure 2 shows aspects related to physical literacy, which must be considered and viewed holistically (own elaboration).

Figure 1 Physical literacy with a holistic approach

The expectations and reality of [physical] education

Physical education has overcome many issues along the years, one reason is because these issues established the discourse that had been portrayed as a way to respond to a society. According to Kirk (2010) physical education has portrayed these issues in different ways because it is the first

encounter that students from all ages have. One reason is because physical education offers a more fun and interactive form to teach an ideology or social aspects. At the same time physical education has become an answer to prevent different issues for the same reason. An example can be depicted through the rising health problem that overweight and obesity has become, because a physical education class can be a first step to understand in a thorough manner the variables students with these diseases face on a daily basis. As such, to provide a [pedagogical] approach that would help students to engage in physical activity and acquire healthy habits for a lifetime.

A physical education class can provide a safe space where students and teachers can interact without an expectation of what should or can be accomplished. According to Oliver and Oesterreich (2013), considering and listening to students' voices is a way to establish a series of steps that would help to build the appropriate curriculum and environment that a class will require, thus creating an opportunity for students to solve this health issue. However, it is important to say that, even though the benefits of creating an appropriate space and environment within the physical education class are known, the reality that teachers/facilitators and students face on a daily basis says otherwise. An example of this can be depicted through what Siedentop and van der Mars (2012) identify as the problems, issues and the future of physical education. Through a series of problems and issues they describe what would be the possible future of physical education if these different paths are followed: 1) The time available for physical education; 2) Class size; 3) Exemption/Waivers; 4) Physical activity as punishment; 5) Facilities; 6) Skill equity; 7) Liability; 8) Gender equity; and 9) Good and Bag competition.

There is now a strong body of research that support the benefits of the practice of daily physical activity (Center for Disease Control and Prevention, 2013; Trost & Van der Mars, 2009), however the time available for physical education within school is decreasing due to several social and political reasons (e.g. budget cuts, district policies). Similarly, these reasons create a direct link to provide class opportunities for students thus, a simple solution from an administrative perspective is to create large-sized classes. In this way, "all students" will get the daily physical education class. However, with large-sized classes the lack of facilities and equipment becomes a problem, which creates an issue for teacher/facilitators and students to interact. This is consistent with Kirk (2010) mentioning that the future of physical education can be depicted through three possible scenarios: a) more of the same; b) radical reform; and c) extinction. By radical reform Kirk mentions that higher education institutions should be directly linked to the public education system. What this means is that in different ways, theory-practice-research should be connected to provide a more comprehensive and complete way to tackle the possible issues faced on a daily basis. Because if more of the same is still reproduced, extinction would be most likely to occur. As such, it is important to say that teachers/facilitators should be prepared in different ways to address the issues.

A possible way that teachers could be prepared to handle different and difficult situations can be provided through professional development courses. According to Armour and Yelling (2004) through professional development teachers can create a safe and critical environment that would

allow them to increase and encourage their interest and educational standards, thus, build a diverse and holistic way of teaching. It is important to say that through professional development the proposed link of theory-practice-research can be accomplished, therefore, building a feasible way to understand and develop different solutions to an established issue, such as overweight and obesity in children and youth. However, this option is yet to be extensively explored in different contexts, one of them is the Mexican context. One characteristic of the Mexican context is that its premise is built on a hierarchy expectation also known as top-down approach. What this means is that all instructions, solutions and possibilities come from the top and individuals at the bottom are 'expected' to follow the leadership of individuals in power. This phenomenon also happens in physical education classes, where teachers are the sole providers of the instruction, environment and curriculum created for the class, and students are expected to follow without questioning the teacher's instructions. Thus, it is important to create different ways to challenge the expected and become comfortable with the unexpected in order to help and provide a different solution to rising issues known in society.

As such it can be said that physical education classes are a great solution to help overcoming the different identified issues portrayed along the society. Although, it is important to understand in-depth the importance of creating a safe and knowledgeable environment where individuals can comprehend its impact and how this may or may not affect their lives. At the same time, teachers should have a support system where they can feel comfortable enough to continue learning and link theory-practice-research as a way to help students to engage in physical activity for a lifetime. Despite the fact that the reality of physical education can be shown in a different way and the 'expected' future says otherwise, however, through understanding and comprehending the reality of physical education a possible solution can be brought up to help students and teachers to create a new reality that reflects a 'better' future.

Conclusions

Throughout this chapter our intention was to provide a glimpse into the reality that physical education and health face worldwide and Mexico is not the exception. Understanding these issues from the social and health perspective can provide a thorough scenery on how individuals deal from different fronts the possible solutions that our ever-changing society faces. Through physical activity literacy teachers and physical activity facilitators will be able to adequate their knowledge for life, at the same time, understanding the different physical capacities and how this work, can fulfill a deeper understanding of how to face different challenges, among them, overweight and obesity, to acquire healthy habits from an early age throughout lifespan. Especially we wanted to provide an opportunity for undergraduate and graduate students to learn in-depth the possibilities that they can offer in order to create a change in our society in order to generate strategies such as public health and educational policies. Because facilitators can create through different scenarios such as physical education classes as the first place on how knowledge is spread and creating a link between theory-practice and research, because in this way, students could overcome the different issues each one faces on a daily basis. As such, we can conclude that through physical literacy as

the first scenario where students engage in a physical activity service, this can become an essential aspect in their life but more importantly that physical activity facilitators should create an appropriate knowledge link to overcome issues such as overweight and obesity for present and future generations.

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The Development and Evolution of School Sports Policies since China's Reform and Opening up

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Abstract

Based on the perspective of "three types" policy tools, this paper combs the history and analyzes the content of 20 issued school sports policies since China's reform and opening up. The research results show that, since the reform, China's school sports policies have experienced four periods: restoration and reconstruction, exploration and improvement, deepening development and top-level design. With the development of society, the policies have been continuously improved, the use of policy tools, and the blueprint of multiple subjects participating in school sports have been gradually revealed, and the development elements of school sports has been constantly balanced. China's school sports policies have been continuously improved in the development process, but there are still some problems, such as the unbalanced use of policy tools, the single subject of behavior, the unbalanced development of factors and so on. Therefore, the formulation of school sports policies in the new era should adjust the proportion of policy tools and optimize the internal structure; Promotion of the joint governance of "family, school and society"; Leading the social force to develop physical education; Balancing all factors of school sport development.

Key words: School sport policies; Policy tool; Text analysis; Reform and opening-up

In 1978, the Communist Party of China held the Third Plenary Session of the Eleventh Central Committee, which was determined to pay main attention to the economic construction, which marked that China's social development was moving to a new historical era. Under this circumstance, school sport has been developing.[1]. Over the past 40 years, the Chinese government has paid more and more attention to youth sports work, and the formulation and promulgation of school sports policies have become more and more perfect, giving full play to its leading role in school sports practice. Looking back on history, it remains to be discussed in depth what historical evolution has been experienced, what historical experience has been formed, and how to move forward in reflection in the future. Based on the perspective of policy tools, this paper explores the development process of school sports policies, constructs a three-dimensional analysis framework through the classification method of "three types" policy tools, and makes a quantitative research on the text of school sports policy since the reform and opening up, hoping to explore the phased development characteristics and trend of China's school sports policies through data statistical analysis, and to discuss with peers, and provide reference and reference for the formulation of school sports policies in the future.

Construction of 3-dimensional analysis framework

This study selects the school sports policies text issued by the state since the reform and opening up as the research object. Through the official website databases of the CPC Central Committee, the State Council, the Ministry of education, the State Administration of sports and other official websites, as well as CNKI, relevant legal website databases and school sports policy books, this paper collects the Chinese school sports policy texts since the reform and opening up, follows the principles of authority, openness, uniqueness, comprehensiveness and integrity, and finally determines20 policy texts as the research object .

This paper mainly adopts the content analysis method, and encodes and counts the policy text through NVivo qualitative analysis software. It also discusses about the historical development of school sport, using charts of data to show the developmental features and trends of school PE policies deeply and intuitively.

Selection of 3-D analysis framework

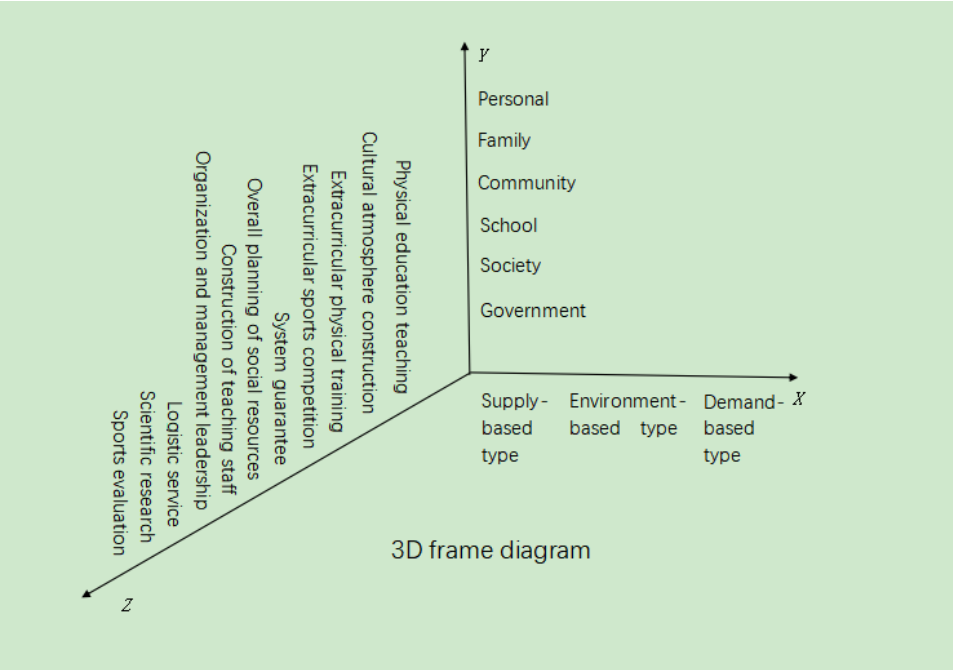


Figure 1 3D frame diagram

Dimension X: policy tool dimension

Rothwell and Ziegfeld's "three types" policy tools have been applied to the research of sports policies by many researchers in recent years, and have repeatedly proved that they have strong explanatory power on Sports Policy. The classification standard is divided into supply-oriented, environment-oriented and demand-oriented policy tools according to the different levels of the impact of school sports policies on school sports work and development. Each dimension is divided into two levels of indicators, and the specific composition is shown in Figure 2. Based on this, this paper constructs an X-dimension composed of supply-based type, environment-based type and demand-based type policy tools.

Among the three types, the supply-based type policy tool is an impetus to school sport development, and it was guaranteed by the government by providing talents, technology, information, funds and other elements directly in order to promote the development of school sport. The environment-based type policy tool is represented by the indirect effect on school sport, showing that the government promotes the environmental development through this kind of type policy tool, to provide a favorable policy environment. The demand-based type one plays a role in stimulating the development of school sport, during which process the government takes steps to expand the market demand for school sports development, and then expands the platform for school sport development.

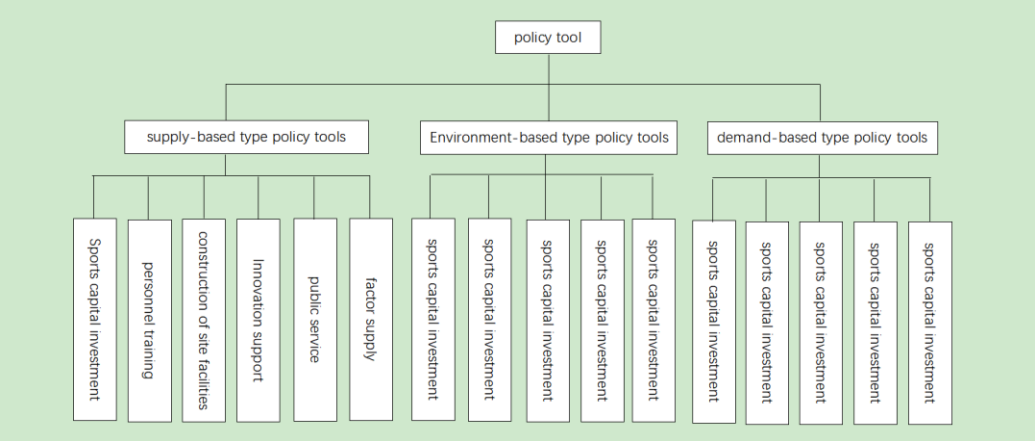


Figure 2 Classification of policy instrument dimensions [2]

Dimension Y: the dimension of relevant actors

Over the years, China's school sports have been committed to promoting the physical health of teenagers, bearing the expectations of the state and the people for the growth of teenagers. However, the practice of the years has indicated that relying solely on government behavior cannot promote the sustainable development of school sports, and the cognition and attitude of parents and society towards youth sports also seriously restrict the practical effect of school sports. Only with the concerted efforts of multiple subjects can school physical education obtain developing vitality. By sorting out the school sports policy text, it is found that the frequency of "family", "community", "society" and other subjects appearing in the text content have been increasing since 2006. Policy makers realize that school sports, for the purpose of enhancing students' physical health, not only needs the attention of the government and the school itself, but also needs the support of other forces such as society and family, so as to form a multi-subject governance system of school sports in the new era. Therefore, after statistically refining the content of the policy text, this study takes "government", "school", "society", "community", "family" and "individual" as the main force to achieve the goal of school sports, so as to construct the dimension-Y index.

Dimension Z: the dimension of school sport development

The analysis of each element of school sport can construct a dynamic process of its development more clearly. There are different emphases on the measures taken for the development elements, indicating different levels of attentions paid by Chinese government in different certain periods of time. On the basis of the original school sports elements, after studying the main contents of 20 school sports policies for many times and making statistics on the title contents, 11 elements such as physical education teaching, cultural atmosphere

construction, after-school sports training, after-school sports competition, logistics guarantee, overall planning of social resources, sports evaluation, system guarantee, construction of teaching staff, scientific research and organization and management leadership are determined, so as to construct the dimension Z.

Coding process

In this study, 20 Chinese school sports policy texts were coded and classified, so that researchers can quantify the text content and obtain the required research results through the data. The specific coding process is coded according to "policy text order- chapter series - unit sentence", and each sentence is a code.

Reliability and validity test

In order to ensure the accuracy of the coding unit, the reliability and validity of the coding results will be tested. In terms of validity, since the research objects are the policy texts published by the government's official website, and their authority has been guaranteed, the validity test of coding units is not involved. In the reliability test part, this study will ensure the reliability of the coding by double coding, and take the consistency reliability test for the coding results.

This paper adopts Holsti coefficient formula and Scott index in equivalence analysis to calculate the coding results, and discusses whether the coding results have good consistency. The results show that the Holsti coefficient and Scott index are 0.9865 and 0.9797 respectively, which ensure that the coded data has good reliability and can be used for subsequent research.

Historical evolution

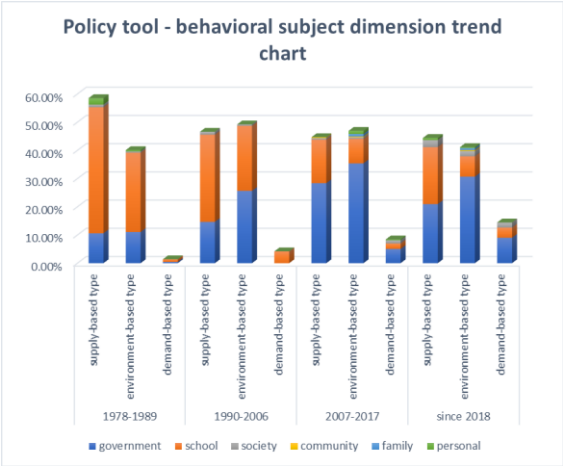
Through the in-depth analysis of school sport policies in different historical times,a clearer historical context of the policy-development could be seen. This study takes influential documents and events that have effects on school PE policies as criteria to divide the historical periods.They are: *The Regulations on School Sports Work* in 1990,*The Promulgation of "Central Document No. 7"* in 2007 and the convening of the National Education conference in 2018,dividing the school sports policy into four historical stages. Based on what has been analyzed above, this study uses the method of statistics and analyzes the data in the aspect of policy tools.

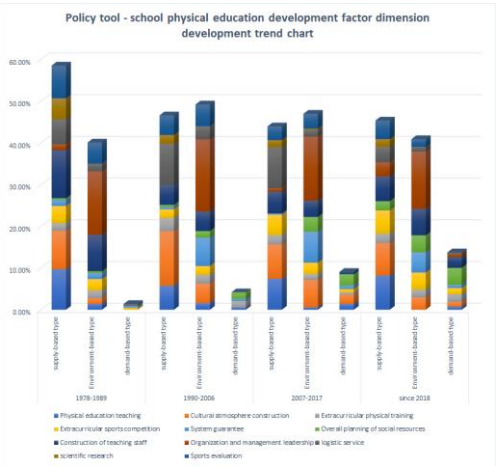
Table 1 Statistics of X-Y-Z 3D

	Physical education teaching	Cultural atmosphere construction	Extracurricular physical training	Extracurricular sports competition	System guarantee	Overall planning of social resources	Construction of teaching staff	Organization and management leadership	logistic service	scientific research	Sports evaluation		
government	1								25			Sports capital investment	Supply type
					1		25					personnel training	
								1	20			Construction of site facilities	
		6	2		1		3	4		14	3	Innovation support	
	4	20		1		2		8	7	2		public service	
	9	7	6	22							16	Factor supply	
	1	5		2				14	3		1	goal programming	Environment type
								1				Development background	
	1	3	2	15	31	2	20	40	2	1	13	Regulation management	
		2	1	1	3	1	7	12	2			External incentive	
	1	12	7	6	3	6	2	54	3		4	Strategic measures	
	1				1	5	1	1				government procurement	Demand type
	1	1	1	2		2	2					Cooperation and outsourcing	
		8		3		2	4					Sports overseas exchange	
						1						Introduction of foreign capital	
	1		4		1	1			1			Student cultivation	
school									4			Sports capital investment	Supply type
					1		39					personnel training	
									14			Construction of site facilities	
	2	2	2		1		1			10		Innovation support	
	1	3				1		2	5		5	public service	
	64	48	14	21	1						26	Factor supply	
	3	3	1				3	1			1	goal programming	Environment type
		1	1				1	1				Development background	
	2	1	1	4	15		11	4	4		16	Regulation management	
		1				1	11	2	2		1	External incentive	
		14	4	2	2	5	3	30	1		3	Strategic measures	
				2		2						Cooperation and outsourcing	Supply type
				1		4	1					Sports overseas exchange	
	3	2	5		5			1	1			Student cultivation	

data

society									2			Construction of site facilities	Supply type
		5				5						public service	
				1								Factor supply	
					1	1						Regulation management	Environment type
						2			2			External incentive	
						3						Strategic measures	
	1					7	1					Cooperation and outsourcing	Demand type
community									1			public service	Supply type
						2						Strategic measures	Environment type
family					1							Regulation management	Environment type
						4						Strategic measures	
personal							1					personnel training	Supply type
		5		1								Factor supply	
			1	1								Regulation management	Environment type
		2				1	1					Strategic measures	
	1											Student cultivation	Supply type





Recovery and reconstruction stage

During the time of the late 1970s to the early 1980s, the tasks of school sport policy making and its implementation were urgent in order to restore the work and reorder of school physical education. The policy makers used the supply-based policy tool to evaluate PE classes, cultural atmosphere, teachers, rear services, sport evaluation and other indicators. And they also used the tool in developing organizations, aiming at schools. In October 1979, *The Interim Stipulation of Physical Education in primary and secondary schools (Trial draft)* and *The Interim Stipulation of Physical Education in Colleges and universities (Trial draft)* were promulgated one after another, which determined the guiding ideology of "enhancing students' physique ". However, in the early 1980s, the demand for professional talents in all walks of life was particularly urgent. The university entrance examination paid more attention to academic selection, which led to the phenomenon of "emphasizing intelligence over physical education". The status of school physical education in school education was difficult to be effectively guaranteed. The use of supply-oriented type and demand-oriented type policy tools in school sports policies was seriously unbalanced. The relevant elements of school physical education were kept unbalanced.
2.2 The stage of exploring and improving

In the 1990s, the reform and opening up had good effects, and China's development entered a steady developing stage. The Chinese government paid more attention to education, and successively promulgated a series of documents and policies of school sport, especially *The Regulations on School Sport Work (1990)*, which promoted the institutionalization of this field. Therefore, the proportion of environmental policy tools increased, and the institutional guarantee index increased significantly while the Government behavior in the policy is also increasing. In 1999, the CPC Central Committee and the State Council proclaimed the decision

on deepening educational reform and completely promoting quality education, which established the idea of "health first", which had important guiding significance for the formulation of school sports policy. The continuous promotion of quality education reform has improved the status of school sports in school education, and people's demand for sports has also increased slightly at this time. In 2006, the Ministry of education, the State Sports Administration and the Communist Youth League together suggested and launched "the sport activity of hundreds of millions of students", which triggered enthusiasm of doing exercise among middle and primary schools throughout China. That also greatly improved the proportion of supply-based type and environment-based type policy tools in the construction of school sports cultural atmosphere in the policy at that time. However, the use of demand-based type policy tools at this stage is still insufficient. The subjects such as society, families and students have not really participated in the school sports work. School sports urgently need to build a multi-agent collaborative governance system.

Deepening development stage

In 2007, the CPC Central Committee and the State Council issued *The Opinions on Strengthening Youth Sports and Enhancing Youth Physique* (hereinafter referred to as "*Central Document No. 7*"), which is the first policy document from the national level specifically for school sports work. The construction of school sports policy has made a substantive breakthrough, which is reflected in the policy text, which is also a further increase in the proportion of demand-based policy tools. Since then, the State Council has successively issued *Some Opinions on Further Strengthening School PE work(2012)* and *The Opinions on Strengthening School Physical Education to promote the Development of Students' Physical and Mental Health* (2016, hereinafter referred to as "*No. 27 Document*"), which further improved the dominant position of the government, strengthened the subjectivity of families and communities, and gradually formed the concept of "home school social education".

At this stage, in order to promote quality education and promote the development of educational modernization, the central idea of the government's policy always focuses on "health first", puts improving the physical health of teenagers in the first place, strives for the coordinated development of various elements of school sports in addition to ensuring key tasks, pays more attention to the use of demand-oriented policy tools to open the school sports market, and increases the social demand for school sports. However, in the development of some elements, such as scientific research and sports evaluation, there has never been a breakthrough direction.

Top-level design stage

In 2018, the national education conference put forward the goal system of enjoying fun in physical exercise, strengthening physique, improving personality and tempering will [3], and established the concept of school sports development in the new era with "educating people" as the core. The school sports policy also paid more attention to demand-based policy tools, highlighting the care for the whole development of teenagers. In 2021, *The Opinions on the Integration of Physical Education and Education to Promote Teenagers' Healthy Development* and *The Opinions on Completely Strengthening and Promoting School Sport in the New Era* were issued and implemented. The two documents further focused on the status of school sport, focused on educational values, and improved the supply of school PE resources, creating a practical model of "learning practice competition integration", and building a multi-agent collaborative governance system under the leadership of the government.

Main achievements

The use of policy tools tends to be balanced gradually

Since the reform and opening up, China's school sports policy has alternately occupied the main content with supply-based type and environment-based type policy tools. The use of demand-based type policy tools has always been insufficient. The low social demand for school sports is the main factor leading to this problem. However, there are problems of obese children, the improvement of myopia rate and the decline of some physical fitness. The problems force the country to pay attention to the importance of school physical education. To improve the status of school sport and the health levels of teenagers, the policies of school sport policies in China have used the demand-based policy tools increasingly. Since the *"Central Document No. 7"* was issued, policy documents such as *The Outline of Constructing a Country of Strong Sports* and *The Opinions on Completely Strengthening and Improving School Sport in the New Era* have also been issued. There are also documents concerning the entrance examination to college in the subject of PE. And the proposal of the "Double Reduction" policy also improves people's demand for school sports to a certain extent. At the national level, through the rational use of policy tools, it is gradually promoting the status of PE subject which is significant for teenagers' all-round development, and which is also significant for a sustainable future development of school sport.

Diversified change of principal parts

The release of school sport policies requires the participation of principal relevant parts. In turn, it will have a direct impact on the implementation of policies. At the 2018 national education conference, President Xi Jinping made an important speech on accelerating modern education and building a strong educational country, and pointed out that schools, families, the government and society should have the responsibility to run education satisfactory to the people [4], and defined the important value concept of multi-body collaborative governance of school sports. From the current development of school sports policy, China's school sports governance system is moving towards the direction of multi subject coordination.

After the reform and opening up, the market economy has gradually replaced the planned economy, and the society began to take responsibility in sports governance. From "government driven" to "service-oriented government", the role of the government in sports governance has gradually changed, which also provides an opportunity for social resources to enter school sports. The idea of home-school cooperation was first put forward in *The Interim Regulations for Primary and Secondary Schools (Draft)* in 1952 to the establishment and improvement of the incentive mechanism for families, schools, governments and society. In 2020, in the policy of *The Opinions on Completely Strengthening and Promoting School Sport in the New Era* in 2020 [5], there is a need to build an incentive mechanism which perfects physical health concerned by “home, school and society”, and under this social circumstance, China is forming a new governance system of government-leading, society-participating and home-school-society nurturing in the new era.

Policy-guidance for multiple factors’ cooperation and development

School sport development has the features of complexity and diversity, which determine the comprehensiveness and depth of its policy making. From the perspective of the subject, school sport includes physical education, extracurricular physical activities, extracurricular physical training, competition and so on; However, as a policy maker, the work, like organizing and managing, scientific research, faculty construction and social resources, has a vital impact as well. With the continuous progress of society, China's school sports policy actively guides the improvement of various elements of school sports, especially in promoting the individual elements which were ignored at the beginning of the reform, such as system guarantee, cultural atmosphere construction and overall planning of social resources. Under the environment of multiple subjects participating in school physical education governance, the Chinese government firmly grasped the advantages of multiple subjects and started with improving

social awareness. The idea of "health first" is rooted well in people's heart, and the Chinese government uses the integration of social resources to promote PE education, and thereafter promotes the systematic establishment and perfection of faculty, regulations, scientific research, management and so on. When looking back on more than 40 years, we could see the innovation of school PE curriculum and sport activities; we could see the cultivation of sports talents under the social circumstance of "integration of PE and education"; we could see the increasing-number of PE teachers; we could see the cooperation of society, home and school; we could see the perfection of the school sport organization and of new institutions; we could also see the better evaluative criteria of school sport and improvement of scientific research level. Chinese school sport is moving to the direction of comprehensive and cooperative aspects.

Future outlook

Adjusting the proportion of policy instruments and optimizing the inner structure

In this study, there is an imbalance in the use of policy tools in China's school physical education policy, and the internal structure of each policy tool needs to be optimized. Specifically, the use of supply-based type and environment-based type policy tools is excessive, and the use of demand-based type policy tools is insufficient. From the internal structure of policy tools, the proportion of sports capital investment and the construction and use of venues and facilities are the lowest, which lead to the problems that the financial support for school sports is not in place and the school sports venues and facilities cannot meet the needs of students. In addition, the supply of talent training, innovation support and public services also needs to be improved. For environmental -based type policy tools, the use of regulatory management and strategic measures is excessive, while the use of external incentives is insufficient. Excessive laws and regulations and insufficient incentive measures are easy to lead to the rebound of government compulsive behavior, and weaken the enthusiasm of school leaders, physical education teachers, social organizations and other participants. What appears inside the demand-oriented policy tools is the lack of foreign capital introduction. Therefore, in the future, the formulation of China's school sports policies should expand the supply of sports funds and venues, facilities and equipment, reduce the use frequency of supply-based type policy tools, refine regulatory management measures and increase external incentive measures. It should also reduce the proportion of environment-based type policy tools, so that the use of policy tools tends to be balanced and its internal structure is continuously optimized. In addition, we should further expand the demand market for school sports, and increase the use of demand-based type policy tools in policies by strengthening the cultivation of students,

strengthening government procurement, promoting the cooperation between schools and enterprise organizations, and increasing overseas exchanges of school sports.

Breaking the single subject model and promoting the joint governance of "family, school and society"

In the "*No. 27 document*" issued by the general office of the State Council in 2016, it was proposed that "primary and secondary schools should arrange family sports homework and gradually form a mechanism for families, schools and communities to jointly guide students' physical exercise" [6], "The education from home, school and society" has become a new concept of school sports governance in the new era. However, the research results show that the participation of society, community, family and students in school sports policy is low. In the policies of different historical stages, only social behavior has increased slightly, and there are no obvious changes in the other aspects. The government and schools still occupy the leading position of school sports. It is not only people's insufficient understanding of school physical education and students' excessive academic burden under the long-term thought of "emphasizing intelligence and neglecting physical education", but also problems such as the lack of guidance of family physical education.

In 2019, the outbreak of the global COVID-19, China's implementation of the policy of "suspending classes and stopping learning" has gradually exposed the family education situation to people's vision. How to ensure students to learn and exercise at home efficiently becomes a great challenge for families and schools. In October 2021, *The Family Education Promotion Law of the People's Republic of China* was officially issued. This law helps to indicate a path of cooperation for home-education and school-education, and it also helps to promote the development of social educational service [7]. The policy clearly points out that primary and secondary schools should incorporate family education guidance into Teachers' training, which means that China's future school sports policy should include guiding family education in the work plan and shoulder the responsibility of guiding family physical education.

Policy-guidance and society-forces to help school sport development

Taking the government as the leading role was the core concept of Chinese sport governance in the past. The top-down centralized management of the single government provided the most effective way to develop. With the transformation of society, market economy and social organizations have emerged one after another. The advent of multiple subjects promotes China's sports governance to a new road of co-construction, co-governance and sharing in the

new era. However, the reality of Chinese school sports still does not get rid of the governance mode of "government standard". The results show that the proportion of government as the main body of policy behavior is far higher than that of society, and the phenomenon of single subject participation still exists in the process of school sports governance. From the first proposal of "service-oriented government" in the Sixth Plenary Session of the 16th CPC Central Committee to the second mention of the construction of "service-oriented government" in the 19th CPC Central Committee, the relationship between the Chinese government and society is slowly changing [8]. In order to accelerate the realization of this goal, in the future, China's school sports policy should actively guide the participation of social behavior and give full play to the role of society and market. The specific measures include the following three points: (1) to strengthen the government's procurement of sports services and guide social resources to serve school sports. (2) to support social organizations, enterprises and school sports to carry out cooperation and improve the level of school sports work. (3) to strengthen the supervision of the sports market and improve the public sports service system.

4.4 Promoting the balance of factors and promoting the sustainable development of school sport

The complex and diversified developing factors are the significant ones that have a great effect on sustainable development of school sport. In the past, school sport paid more attention to the input on fundamental resource and sport activities of both in school and after school. With the deepening of school sport development, the focus of policies has been changing. However, some problems have not been solved indeed. Among them, the most representative one is the backwardness of scientific research. Under the background of “developing the country through science and education”, the policy-makers should pay main attention to how to improving the levels of school sport scientific research and take measures to promote the transformation of scientific research achievement.

In addition, the use of policy tools by various development factors is also unreasonable and unbalanced. Specifically, in terms of development system guarantee, overall planning of social resources and organizational management, there are few supply-based type policy tools, so these elements are lack of policy driving force. Physical education teaching, logistics support and scientific research are insufficient in the use of environment-base type policy tools. Therefore, the establishment of these three needs to be improved in the process of development. In addition to the overall planning of social resources, there are deficiencies and deficiencies in the use of demand-based type policy tools in other development factors. As a key link leading the trend of school sports, the policy needs to have more comprehensive and clear instructions for the development of school sports elements, grasp the historical period of society, and deepen

and promote the smooth implementation of school sports. In short, only the balanced development of various elements of school sports can ensure the balance of the internal structure of school sports and make the sustainable development of it.

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Importance of Physical Education in the Early Stages of the Life Cycle, for a Healthy Life

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Abstract

The following article aims to corroborate the scientific findings that give the importance of physical activity in the early stages of the life cycle of human beings, and jointly disseminate worldwide the need that exists in various educational institutions in the public sector in Latin America, with respect to the harmonious and comprehensive development that all children should have in terms of (PE), sport, recreation and physical activity, in the course of their academic training. Therefore, a bibliographic study and field consultation is carried out, which manages to identify a series of publications located in different archives, databases, repositories and on-line catalogs (libraries), which support this research.

Key words: Physical education; Life cycle; Healthy life

Introduction

Physical activity is a component that alludes to any body movement produced by voluntary muscular action, with the aim of increasing energy expenditure; hence the importance of performing physical activity and implementing healthy lifestyles in the early formative stages, lies in taking advantage of these stages to achieve early learning and knowledge fixation, thanks to brain and psychomotor development that occurs in the first years of life (Hernández-Rincón E.H.,2018). For this reason, practicing some physical activity on a regular basis is crucial for the physical, mental, psychological and social development of children and adolescents (UNICEF, 2019).

A brief explanation about this topic; the life cycle is an approach that allows understanding vulnerabilities and opportunities to invest during early stages of human development; where it is recognized that experiences accumulate throughout life, that interventions in one generation will have an impact on the following ones, and that the greatest benefit of an age group may derive from previous interventions in a previous age group (MinHealth). For this reason, it is necessary to clarify that the life cycle comprises 7 stages of development, in which we find the prenatal stage, early childhood from 0-5 years, childhood from 6-11 years, adolescence from 12-18 years, youth from 14-26 years, adulthood from 27-59 years and older adults from 60 years and over (StuDuc n.d.).

In this order of ideas, it can be deduced that physical activity in children and adolescents generates immediate health benefits, and at the same time it is known that physical activity habits in infancy and adolescence tend to be maintained into adulthood, so it is also expected that these benefits are also present in the long term (Sánchez López, M.., Rodríguez Perea, M., Solera Martínez, M., Jiménez Rodero, C., Notario Pacheco, B., & Domínguez Contreras, M. L., 2005), Rodríguez Perea, M., Solera Martínez, M., Jiménez Rodero, C., Notario Pacheco, B., & Domínguez Contreras, M. L., 2005). Similarly, it is essential to note that, in recent decades, numerous studies have shown that the regular practice of physical activity is essential in order to improve our health, understood, as defined by the World Health Organization (WHO) in 1948, as the complete state of physical, mental and social well-being, and not only as the absence of conditions or diseases that have prevailed in today's society (Frago, Calvo J. M., 2014).

Likewise, multiple works and systematic reviews, have evidenced a considerable growth of research that highlight the health benefits of physical activity practice in children and adolescents (Córdova, Villa, Sureda, Rodríguez, Sánchez 2012; Ho, Ahmed, D'Amico, 2018; Veloso 2005). Therefore, the importance of introducing in these developmental stages, a dynamic life system where adequate, periodic, scheduled and well-prescribed physical activity is carried out, as a basic tool to achieve and preserve health; it will provide countless physiological, metabolic, anatomical, cognitive, social and academic benefits in an unobjectionable way (García, Rodríguez, J., &Fonseca Hernández, C. 2012).

However, much of the world is becoming less active, and although abundant works have been published in different countries analyzing the usual physical activity levels of this population sector,

the results show low levels of compliance with the general recommendations established at international level (Van Stralen, M.M., Yildirim, M., Wulp, A., Te Velde, S.J., Verloigne, M., Doessegger, A., 2014; Verloigne, M., Van Lippevelde, W., Maes, L., Yildirin, M., Chinapaw, M., Manios, Y.,... De Bourdeaudhuij, I. 2012; World Health Organization WHO. 2018). The recommended physical activity for girls/boys aged 5-17 years with a view to improve their cardiorespiratory and muscular fitness, bone health, cardiovascular and metabolic health markers, reduce symptoms of anxiety and depression, is to engage in at least 60 minutes of daily physical activity of moderate to vigorous intensity, through PE, play, sport, walking and recreational activity and physical education, in the context of family, school and community activities; however, exceeding 60 minutes of physical activity will provide additional health benefits, and vigorous-intensity activities, including those that strengthen muscles and bones, should be incorporated at least three times per week (World Health Organization WHO. 2018).

Development

Global estimates indicate that 27.5% of adults and 81% of adolescents do not meet the 2010 WHO physical activity recommendations, with little improvement observed in the last decade; there are also notable inequalities: data show that in most countries girls and adult women are less active than boys and adult men, with significant differences in physical activity levels between the highest and lowest economic groups and between countries and regions (World Health Organization WHO, 2020). In this sense, despite the fact that a sedentary life in these populations is very common, few studies on intervention programs with physical activity have focused on the time spent in school and during a pandemic of such dimension as the one we are living, paradoxically, the effects of other pandemics such as obesity, diabetes, depression, anxiety, stress, among many others, which are associated with an industrial lifestyle are exposed (Guerra, Y. d. 2021; Mora López, D. J., García Pinillos, F., & Latorre Román, P. Á. 2017).

Indeed, these results, and so many other recent analyses, lead us to ask whether the Covid-19 pandemic has left negative repercussions on the health of the population and the lack of a general physical culture; in addition to the scarce public resources within the health field, related to PE.

Along these lines, experts have been pointing out for years the need to include PE in general public health plans, health plans and to increase the number of hours in educational plans. In view of the above, in this last component it is essential to emphasize that it is the duty of all educational centers to create favorable environments for those receiving education, where free time is used productively, through support networks and the establishment of links and interactions in positive environments that help to enhance their wellbeing and integral development (Rodríguez Torres, Á. F.., Rodríguez Alvear, J. C., Guerrero Gallardo, H. I., Arias Moreno, E. R., Paredes Alvear, A. E., & Chávez Vaca, V. A. 2020).

On the other hand, it is recognized that everyone has different skills and abilities that help us to face the chores of life, which represents one of the educational objectives or goals of the 21st century, to achieve not only significant learning, but also to be able to solve problems in any context

(Loprinzi, P.D., Cardinal, B.J., Loprinzi, K.L., & Lee, H. 2012). That is to say, in the area of physical education these environments to which we refer can be created, since a motor-competent child is much more likely to practice physical activity, thus benefiting from the positive effects associated with it on his or her health (Merino Merino, B., Esteban, C., Pilar, & Justo Gil, S., 2016). In turn, it has been scientifically proven that those children who do not have the necessary opportunities to practice and acquire basic motor skills at the appropriate level, may be limited to participate in physical activities or sports, as they do not have developed the necessary foundations to be active (Merino Merino Merino, B., Esteban, C., Pilar, & Justo Gil, S., 2016).

Therefore, the content of PE as an activity that includes a broad set of body and motor activities implemented in different institutional settings: education, sport, health, leisure, free time and others that are expanded according to social dynamics, market or state demands (Rozengardt Rodolfo, 2006). In this line, we share below the features of the graduate profile obtained thanks to the PE area (Secretaría de Educación Pública. Méx. 2017):

Table 1 Features of the Physical Education graduation profile: Kindergarten, Primary and Secondary

Component	Expected learning
A. BODY AND HEALTH CARE	Identifies their own physical traits and qualities, and recognizes those of others. Performs physical activity from motor play and knows that it is good for health. (SEP Mx.20017)
B. BODY AND HEALTH CARE	Recognizes his or her body. Solves challenges through creative use of body skills. Makes informed decisions about hygiene and nutrition. Participates in situations of play and physical activity, seeking healthy and peaceful coexistence. (SEP Mx. 2017)
C. BODY AND HEALTH CARE	Activates their body skills and adapts them to different situations faced in school games and sports. Adopts a preventive approach by identifying the advantages of taking care of their body, having a balanced diet and practicing physical activity regularly. (SEP México 2017)

Source: The authors.

Even so, in current circumstances, PE is called to solve global problems typical of demographic advances and the cultural gaps of peoples; therefore, physical education teachers should develop life skills in their students, which contribute to a more active and healthy society (Posso Pacheco, 2020; Valladares Fuente, 2022). In this regard, it is essential to know what is happening with school PE and how it can be strengthened in this third millennium.

What is happening with school physical education (PE)?

Throughout the history of Latin America, PE has become for several decades one of the most neglected subjects in the educational system, where it is thought that the efforts are minimal or

even nonexistent to pass this subject or because of the simplicity of its contents, Consequently, PE has historically had a halo of "simple" or also called "Mary" around it, which has never been completely removed and, in many cases, we are still the "gym teachers" (Education 3. 0 Physical Education: the eternal 'Maria'?, 2020). However, despite the Covid-19 experience, physical education has renewed its essence in the school context, a clear example was the call made by (UNESCO, 2021) to governments to invest in quality PE, in order to obtain significant results at a low cost and high impact, to support the post-pandemic recovery towards the "new normal".

Therefore, quality PE has become a hot topic nowadays, but it is still difficult to establish a single definition of what to do to achieve good impact in pedagogical acts. In relation to this, although it is undeniable that the presence of PE in the curriculum offers an unbeatable opportunity to promote healthy habits that will last in the adult beings of the future, the main function of PE should not focus only on the health aspect, since we should not forget that we are talking about education, and therefore, its main strengths revolve around a broader concept (Del Val Martín, P., Sebastiani Obrador, E., & Blázquez Sánchez, D. 2021).

Hence, the global study regarding the situation of PE in schools carried out by (UNESCO, 2013) is captured as a model for Latin America, which showed that the time allocated to physical education varies substantially by country, with up to 183 minutes per week in Cuba and only about 60 minutes per week in Mexico. This means that the overall agreement of Latin American countries lags behind Europe and the time allocated to PE in Latin American countries is comparable to some Asian and African developing countries; however, European countries show a consistent time allocation to PE among all the countries represented, as can be seen in Table two (2) (Ho, W., Ahmed, M. D., D'Amico, R. L. d., Ramos, A., Ferreira, E. L., Ferreira, M. B. R., . . . Wong, B. (2018).

Another relevant study to consider in this literature review is that of (Mora Núñez, 2021), who emphasizes in his research on the current state of PE in official educational institutions, and jointly alludes to the role played by public policies in the construction of quality PE. For the purposes of this study, 17 teachers from different Latin American countries participated, and the result was an eminent concern when it was demonstrated that within the basic requirements for the development of this subject, there is no support from specialized PE teachers at the preschool and elementary school levels. In view of this reality, the authors determined as a priority to retake the preliminary study in order to know in more detail how the subject of PE is structured at the preschool, primary and secondary levels, in accordance with the educational regulations that govern each of these countries in the American continent. Therefore, an eight-question questionnaire is used to analyze the current state of PE in Latin America.

Table 2 Allocation of PE curriculum time in regions (mean minutes per week).

Latin America	Min per week	Europe	Min per week	Asia	Min per week	Africa	Min per week
Brasil	110	Luxembourg	142	China	105	Ethiopia	225
Chile	135	Andorra	165	Kazakhstan	115	South Africa	58
Colombia	120	Poland	156	Hong Kong	90	Gabon	150
Cuba	183	England	120	India	60	Guinea	100
Mexico	60*	France	220	Japan	125	Lesotho	110
Venezuela	90	Germany	135	South Korea	120	Libya	125

***Source*:** UNESCO-NWCPEA: World-wide Survey of School PE (2013). * Guerrero, M (2019)

On the other hand, it should be noted that the sample selected for this study was one hundred and ten (110) teachers who work in the field of PE, as National Delegates and/or collaborators of FIEPS; which represents a significant percentage of the population group intervened in twenty (20) countries. The following are the results found in the countries that opened their doors to this great study:

Table 3 Basic Structure of Physical Education in the School Context

	COUNTRY	1. Pupils of school age Presch. Years	Primary Years	Second. Years	2. PE the Official curículum. Presch. Yes	Presch. No	Primary. Yes	Primary. No	Second. Yes	Second. No	3 official physical education curriculum Yes	No	3.1 Who is responsible for the PE. in his country? Government	Others	4 Average students in physical education class Presch.	Primary	Second
1	México	4 a 6	7 a 12	12 a 15	1	0	1	0	1	0	1	0	1	0	20	26	26
2	Guatemala	4 a 6	7 a 12	13 a 15	1	0	1	0	1	0	1	0	1	0	35	40	40
3	Honduras	4 a 5	6 a 12	12 a 17	0	1	0	1	1	0	1	0	1	0	40	50	50
4	El Salvador	4 a 5	6 a 12	12 a 17	1	0	1	0	1	0	1	0	1	0	30	40	40
5	Costa Rica	4 a 5	6 a 12	12 a 16	1	0	1	0	1	0	1	0	1	0	20	25	25
6	Panamá	4 a 5	6 a 11	12 a 17	1	0	1	0	1	0	1	0	1	0	20	25	30
7	Nicaragua	6 a 7	7 a 13	14 a 18	1	0	1	0	1	0	1	0	1	0	20	20	50
8	Argentina	4 a 6	7 a 12	12 a 18	1	0	1	0	1	0	1	0	1	0	20	26	26
9	Brasil	4 a 7	8 a 13	14 a 17	0	1	1	0	1	0	1	0	1	0	20	40	40
10	Bolivia	4 a 5	6 a 12	12 a 17	1	0	1	0	1	0	1	0	1	0	35	40	40
11	Chile	3 a 5	6 a 12	12 a 17	0	1	1	0	1	0	1	0	1	0	45	45	45
12	Colombia	4 a 5	6 a 11	12 a 17	0	1	1	0	1	0	1	0	1	0	35	40	40
13	Ecuador	4 a 5	6 a 11	12 a 17	1	0	1	0	1	0	1	0	1	0	30	35	35
14	Paraguay	5 a 6	7 a 12	12 a 17	0	1	1	0	1	0	1	0	1	0	20	40	40
15	Perú	3 a 5	6 a 11	12 a 16	1	0	1	0	1	0	1	0	1	0	20	30	30
16	Uruguay	3 a 5	6 a 11	12 a 17	1	0	1	0	1	0	1	0	1	0	20	25	25
17	Venezuela	4 a 6	6 a 11	11 a 16	0	1	1	0	1	0	1	0	1	0	15	35	35
18	Cuba	0 a 6	6 a 12	12 a 15	1	0	1	0	1	0	1	0	1	0	15	30	30
19	Dominicana	4 a 6	7 a 12	12 a 16	0	1	1	0	1	0	1	0	1	0	20	35	35
20	Puerto Rico	5 a 6	6 a 10	11 a 18	1	0	1	0	1	0	1	0	1	0	20	30	30
	Sum				*13*	*7*	*19*	*1*	*20*	*0*	*20*	*0*	*20*	*0*	*500*	*677*	*712*
	Average				*1*	*0.4*	*1*	*0.1*	*1.0*	*0*	*1*	*0*	*1*	*0*	*47.6*	*64.5*	*67.8*
	Standard dev.				*0*	*0*	*0.2*	*0.2*	*0.0*	*0*	*0.0*	*0*	*0.0*	*0*	*8.7*	*8.0*	*7.8*
	Minimum				*0*	*0*	*0*	*0*	*1*	*0*	*1*	*0*	*1*	*0*	***15***	***20***	***25***
	Máximum				***1***	***1***	***1***	***1***	***1***	***0***	***1***	***0***	***1***	***0***	***45***	***50***	***50***
	Percent				***65***	***35***	***95***	***5***	***100***	***0***	***100***	***0***	***100***	***0***			

I T E M S
1.What is the school age in years of the students at the different levels of education? Preschool Primary Secondary.
2. Is Physical Education (P.E.) Official in Plans and Programs in Preschool, Primary and Secondary?
3. Is there a Specific National Curriculum for PE, at its different educational levels? 3.1 Who is responsible for the E.F. in his country?
4. What average number of students attend the P.E. session?
5. Monitoring by the P.E. Program Implementation Authority is done on a; monthly, quarterly, semi-annual, > six-monthly, > six-monthly basis
6. What is the frequency of the P.E. per week? preschool Primary secondary.
7. What is the total number of minutes per week received by P.E. students? Preschool, Primary and Secondary.
8. Staff that teaches P.E. Classroom teacher, Specialist teacher, other profile.

Source: The authors

Note: In Table three (3), we can observe that in item number one (1), it tends to vary in the average ages that students have according to the educational level they perform. In item two (2) we find that only thirteen (13) countries have physical education plans and programs at all educational levels, while in seven (7) countries there is some inconsistency in the preschool and primary grades. In relation to items three (3) and three point one (3.1), it should be noted that all the countries participating in this study (20) have a specific physical education curriculum at the different educational levels established by the national government. Finally, in item number four (4), it is detailed that the average number of students attending physical education classes is from fifteen (15) to fifty (50) students, depending on the country.

Table 4 Current status of School Physical Education (PE) in Latin America

		5. Temporality Supervision of the PE Program				6. Frequency of P.E. class per week			7. Physical education minutes per week			8. Personnel who teach PE: Specialist, another profile					
												Preescolar		***Primaria***		***Secundaria***	
	PAÍS	*Monthly*	*Quarterly*		*Biannual*	*> 6 months*	*Preschool*	*Primary*	*Secondary*	*Preschool*	*Primary*	*Secodary*	*Classroom teacher*	*Specialist*	*Classroom teacher*	*Specialist*	*Specialist*	*Other profile*
1	México	0	1	0	0	1	1	2	50	60	120	0	1	0	1	1	0
2	Guatemala	0	0	1	0	1	2	2	30	80	70	1	0	0	1	1	0
3	Honduras	0	0	0	1	1	1	2	30	40	80	1	0	1	0	1	0
4	El Salvador	0	0	0	1	2	2	2	45	90	90	1	0	0	1	1	0
5	Costa Rica	0	0	0	1	3	3	3	120	120	120	0	1	0	1	1	0
6	Panamá	0	0	0	1	1	1	1	30	45	45	1	0	0	1	1	0
7	Nicaragua	0	1	0	0	2	2	2	90	90	90	1	0	1	0	1	0
8	Argentina	0	1	0	0	2	2	2	90	100	120	0	1	0	1	1	0
9	Brasil	0	0	1	0	1	3	2	30	150	100	1	0	0	1	1	0
10	Bolivia	0	0	0	1	1	1	1	90	90	90	1	0	0	1	1	0
11	Chile	0	0	0	1	1	1	1	90	90	90	1	0	0	1	1	0
12	Colombia	0	0	0	1	1	2	2	**30**	**120**	**120**	1	0	1	0	1	0
13	Ecuador	0	0	0	1	2	2	3	**90**	**90**	**135**	0	1	0	1	1	0
14	Paraguay	0	0	0	1	1	1	1	30	40	80	1	0	0	1	1	0
15	Perú	0	0	0	1	1	2	2	30	180	180	1	0	0	1	1	0
16	Uruguay	0	0	0	1	2	2	2	80	80	80	0	1	0	1	1	0
17	Venezuela	0	1	0	0	1	1	1	20	90	90	1	0	0	1	1	0
18	Cuba	1	0	0	0	2	3	2	**40**	**135**	**90**	1	0	0	1	1	0
19	Dominicana	0	1	0	0	1	2	2	30	90	90	1	0	0	1	1	0
20	Puerto Rico	0	1	0	0	2.5	5	5	**75**	**250**	**250**	0	1	0	1	1	0
	Sum	*1*	*6*	*2*	*11*	*30*	*39*	*40*	*1120*	*2030*	*2130*	*14*	*6*	*3*	*17*	*20*	*0*
	Average	*0.05*	*0.3*	*0.1*	*0.6*	***1.5***	***2***	***2***	*56.0*	*101.5*	*107*	*0.7*	*0.3*	*0.2*	*0.9*	*1*	*0*
	Standard dev.	*0.223606798*	*0.5*	*0.3*	*0.5*	*0.6*	*1*	*0.9*	*30.7*	*49.6*	*44*	*0.5*	*0.47*	*0.4*	*0.4*	*0*	*0*
	Máximum	*1*	*1*	*1*	*1*	***3***	***5***	***5***	***120***	***250***	***250***	*1*	*1*	*1*	*1*	*1*	*0*
	Minimum	*0*	*0*	*0*	*0*	***1***	***1***	***1***	***20***	***40***	***45***	*0*	*0*	*0*	*0*	*1*	*0*
	Percent	**5**	**30**	**10**	**55**							**70**	**30**	**15**	**85**	**100**	**0**

Note 1: Cuba Provides physical education at the pre-university, higher technical and university levels, with two sessions per week with a total of 90 minutes.
Note 2: Puerto Rico Upper Secondary Education 14 to 18 years old, applies 2.5 average sessions of 50 minutes each.

ÍTEMS
5. Supervision of the Application of PE Programs, is its timing?: Monthly, quarterly, six months, > six months.
6. What is the frequency of the E.F. per week? : Preschool Primary Secondary.
7. What is the total number of minutes per week received by PE students? : Preschool, Primary and Secondary.
8. Personnel who teach the E.F. Classroom teacher, Specialist teacher, Other profile.

Source: The authors.

Note: Table four (4) shows that in item five (5), the governments of eleven (11) Latin American countries supervise physical education programs over a period of time of more than six (6) months, two (2) governments every six months, six (6) every three months and only one (1) government on a monthly basis. In relation to items six (6) and seven (7), we found that the frequency per week of physical education sessions in the school environment varies according to the regulations of each country. However, it could be identified that five (5) countries maintain the same frequency per minute in all educational levels, seven (7) increase the sessions in the last two levels, three (3) dose the amount of time with respect to the grade, four (4) maintain an unstable time (increase/decrease) and only one (1) country maintains the time established in the first formative levels, to later increase it in secondary school. Finally, in item number eight (8), it is evident that fourteen (14) countries use the figure of the classroom teacher to teach the subject of physical education at the preschool level, and six (6) have specialists; at the primary level, seventeen (17) countries have specialist teachers in these grades and three (3) still have classroom teachers; while, at the secondary level, the total number of countries participating in this study (20), develop PE sessions with a specialist teacher of the specific subject.

Now, despite the fact that these transcendental studies are taken as a reference for the PE sector, there are two particular cases that need to be addressed in this article; the first one emphasizes the problem that has been occurring in Chile in relation to the stipulations of the National Education Council, regarding the modification of the school curriculum, in which it is established through agreement No 57/2019, that the subject of physical education and health (EFYS), will be optional for the III and IV medium courses from the application of the two thousand twenty curriculum (PUCV, 2019). Consequently, the decision to eliminate the obligatory nature of this subject for third- and fourth-year students (13 to 18 years old) continues to cause discrepancies (Senado, 2019), since according to the Colegio Médico De Chile A.G. (2019) it has generated rejection by a dozen groups of health, education and sports professionals (Perez Tapia, 2021). (2019) has analyzed the rejection of a dozen groups of health, education and sports professionals (Perez Tapia, 2021).

In the meantime, it is worth mentioning that, throughout this exhaustive analysis, we were able to identify that in Brazil a series of anomalies have been increasing in the Secretariat of Education of the State of Rio Grande do Sul, which deteriorate the essence and/or purpose of the subject of physical education. In fact, we had the opportunity to know, study and detail an open letter made by different entities or organizations in the sector, including the Rio Grande do Sul delegation of FIEPS, who besides being one of the standard bearers in being a leader in this initiative to raise awareness about the importance of this discipline in society, also allowed us to access the document where the current situation of physical education in the school context is exposed in detail.

Figure 1 Image obtained from the Facebook profile of FIEPS-RS Delegate Everton Deiques

Given that:
With this government action, in the first years (from 1st to 5th grade) the number of hours of Physical Education will be reduced to only 1 hour and 40 minutes per week. Worse, in the later years (6th to 9th), the workload seems to respond to an announced countdown that would start with 2 periods per week for the 6th year, and would be reduced to a single period in the 7th, 8th , 9th and first year of high school. Sacrificing the end of PE in the 2nd and 3rd years of high school, there would be no more conventional PE classes, something unprecedented in Brazil, in its 171 years of history in the educational sector. And what is aggravating is that this Ordinance 350/2021 is already beginning to show signs of a domino effect in municipal networks, as some municipalities are already trying to adopt this reduction of periods for their elementary schools (Fédération Internationale d' Education Physique Et Sportive FIEPS.D. Rio Grande DS (2022).
Source:https://www.facebook.com/photo/?fbid=4265731333528422&set=a.362131163888478

Similarly, it is appropriate to clarify that, according to the latest report presented by the Brazilian Institute of Geography and Statistics (IBGE), the volume of physical education classes in official elementary schools is provided by two classes per week lasting 45-50 minutes. This time is only 8% of the time that schoolchildren remain in school during the week and where they dedicate more time to moderate and vigorous physical activity (MVPA), on days that include PE classes than on days without them; therefore, it is a challenge for public educational policies to guarantee access to knowledge and a minimum infrastructure for learning for all schoolchildren (Gonzalez RH, F.-G. M. 2021).

For this reason, based on the above, we conclude in this section that it is essential to consider the educational progress of countries as a component of the process of improving the living conditions of societies, i.e., their development. In this context, education policies must be harmonized with the social, political, economic and cultural reality of countries, and must be gradual, coherent and consistent. Therefore, policies must change as the country's educational development progresses, so that these changes pose substantial challenges for decision-makers, since they must work to manage the improvement of the educational system (Pérez Tapia, C. A. 2021).

Conclusions

Having completed the literature review of this study, we conclude that physical exercise, properly prescribed, advised and controlled by health professionals, represents multiple benefits for physical, mental, social and public health, and has a significant impact on the prevention of diseases in the different stages and special conditions of life (Márquez Arabia, J. J. 2020).

Therefore, we infer that those responsible for designing health policies in each nation, are in the obligation to consider these significant benefits in the evolutionary development of children and adolescents, when promoting physical activity and healthy eating programs in school environments (Sánchez Ruiz-Cabello FJ, Campos Martínez AM, de la Vega de Carranza M, Cortés Rico O, Esparza Olcina MJ, Galbe Sánchez-Ventura J, et al., 2019).

Another fact to consider, in terms of health and education, is to ask the politicians in charge to make school PE a compulsory discipline for all (for example, boys and girls, and young people with disabilities) and to promote and achieve equal provision in terms of quantity, quality and content (United Nations Educational Scientific and Cultural Organization UNESCO, 2021). Likewise, it is achieved to guarantee through the area of PE, recreation and sport, the fulfillment of the 2030 Sustainable Development Goals, taking as a priority items 3, 4, 5 and 16, so that good health, quality education, gender equality, peace and justice are promoted from the school context (Baena-Morales, S., Merma-Molina, G., & Gavilán-Martín, D., 2021; United Nations ECLAC, 2018; United Nations Educational Scientific Cultural Organization UNESCO, 2021).

Finally, it is recommended to all the people who have the possibility to read this research, that if they wish to present this proposal before any governmental entity, they will have to understand the current political landscape in order to effectively influence the processes and contents of the policies and equally to know which positions, responsibilities, commitments, committees and members are important for the development of policies related to physical activity, PE, school sport and health. All of this will help build consensus among the various stakeholders, and likewise allow you to leverage the public and political momentum needed for policy change, with the goal of getting the leaders of the day to implement each of the stated requests (United Nations Educational Scientific Cultural Organization UNESCO., 2021).

Reflection

"*Let us build in the framework of physical education, public policies of an inclusive nature, aimed at solving problems that benefit the Latin American community in its different formative stages, from the official educational institutions*".

José Francisco Mora Núñez,2022

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Physical Activity at School of Children in Poland during the First Three Years of Primary Education

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Abstract

Physical activity is a key component of a child's correct development and functioning. Early school children undergo a period of intense physical, motor, mental and social development. Because physical activity allows them to fully satisfy the resulting needs, it is important to guarantee its appropriate dose at this age. Schools, where children spend a major part of their time, are among the institutions responsible for fulfilling this guarantee. This study analyses the importance of physical activity in early school children. The authors took into account the current recommendations for physical activity of children and observed the course of physical education lessons and breaks at school.

Key words: Physical activity, Physical education, School, Primary education

Introduction

Physical activity (PA) is a natural human need at all stages of life. It is considered one of the most important components of a healthy lifestyle, especially in early school age due to its role in stimulating and supporting correct growth and development, shaping motor abilities and coping with stress (Payne & Isaacs, 2016). Children show a natural need for exercise, which is why they willingly and enthusiastically engage in all forms of PA. A characteristic feature of early school age that should be taken into account in relation to children's everyday activity is a high aptitude for learning new motor skills, especially during sensitive periods (Unierzyski et al., 2019). Consequently, it is crucial to appropriately incorporate PA into children's everyday schedule. In this respect, particular attention is paid to the role of educational institutions, such as schools, in which children spend most of their day once they begin their education, i.e., from the age of 7 years. Because schools organise physical exercises, they affect the children's future outlook on PA for their entire lives (Tremblay et al.; 2016, Erwin et al.; 2012, Ramstetter et al., 2010).

Importance of PA in the development of primary school children

Physical activity can be understood as any bodily movement produced by skeletal muscles that require energy expenditure (Ward DS, 2007). It is considered one of the basic human biological needs. Physical activity during early school age is one of the most important factors stimulating correct development, including control over one's body and motor coordination. Physical activity is also very important in children undergoing a growth spurt, which takes place over the first few years of primary school, and may amount to up to about 7 cm of height gained per year. Physical activity strengthens the skeletal system, which may alleviate growing pains (Ormańczuk, 2020).

Nałęcz, Mazur and Fijałkowska (2021) propose five primary functions of PA that play a major role in childhood: stimulatory, adaptive, compensatory, corrective and prophylactic. The first function, stimulatory, is responsible for supporting correct growth and development. Regular PA stimulates the body to work with higher intensity. The increased amounts of necessary substances and oxygen transported into blood by the cardiovascular system reinforces the musculoskeletal and respiratory systems. As a result, physical exercise improves lung capacity. The nervous system is also involved: due to the accelerated development of brain centres responsible for movement, it gains a range of own motor experiences, as well as gradually improves muscle memory and focus (Ormańczuk, 2020).

The adaptive function of PA shapes motor abilities and determines adaptability to different conditions in life. Through PA, children are able to strengthen their bodies, i.e. increase their tolerance to various external factors, such as heat or cold, and resistance to social factors, such as stress.

The compensatory function of PA is primarily related to counteracting insufficient PA in children. Physical activity can restore the balance between beneficial and harmful factors in a young body, thus ensuring correct development. In turn, the corrective function applies to

children with various disorders, including bad posture, overweight or obesity (Carson et al., 2013; Hills et al., 2011; Janssen & Leblank, 2010). Finally, the prophylactic function involves preventing health problems and fostering healthy habits. All five functions should be incorporated into physical education.

Physical activity of early school children is also particularly important due to the stage of motor development at this age, which is optimal for the development of most motor abilities. Without a doubt, early school age still involves an increased need for PA, but at the same time, children's' movements become purposeful, harmonious and more efficient. Learning new motor tasks with a complex structure comes easily to children. Furthermore, the precision of movement also increases, with almost all motor abilities and foundational movement skills reaching a relatively high level by the end of the early school period. All of the aforementioned manifestations of motor development in early school children also determine the occurrence of the second apex in motor development (Tomik et al., 2018). The second apex lends itself to building speed and agility and maintaining appropriate flexibility. Conversely, intense strength-based exercise should be applied with due care (Osiński, 2011). A sensitive period involving an increased aptitude for learning motor tasks and rapid development of motor abilities is also one of the best times to learn various sports forms (Payne & Isaacs, 2016). Furthermore, children enter a stage of social development, during which they enjoy cooperating with others, and by the end of the period, they even identify with their group of peers. Characteristically, they also want to compare their capabilities and abilities with others (Garbowski & Górna-Łukasik, 2012), which encourages them to take on such forms of PA as games or team sports.

Failing to meet the minimal PA needs in children may lead to severe consequences; one of the most important among these is an increase in overweight and obesity, especially noticeable during the early school age. The Supreme Audit Office (*Najwyższa Izba Kontroli*, NIK) in Poland has issued a warning (NIK, 2013) that Polish children show the most rapid increase in overweight and obesity in Europe while also showing a consistent decrease in PA. The authors of the report also point out that Polish children engage in PA less than their peers from other European countries. The positive energy balance in children and youth may result not only from increasingly sedentary activities, but also from commuting predominantly by car or various means of public transport and a regular intake of excessive, calorie-rich meals (Nałęczkowska, Mazur & Fijałkowska, 2021). Physical inactivity may lead to the increased share of children with overweight and obesity among the population, a high prevalence of bad posture, as well as a considerable decrease in the physical fitness of Polish children, which has been observed over the last 30 years (Sakłak, Szark-Eckardt & Pasek, 2021).

Recommendations for PA in early school children

The WHO (2020) recommends a minimal dose for children and youth aged 5–17 years of 60 minutes per day of moderate to intense PA, which should primarily involve aerobic exercise. Children and youth should also perform intense aerobic exercise three times per week, as well as

activities that strengthen the muscles and bones. Furthermore, the WHO recommends reducing sitting and screen time.

Recommendations for PA in early school children have also been developed in Poland. The Ministry of Sport and Tourism, in cooperation with experts, published a research-and-analysis report entitled *Krajowe Rekomendacje Prozdrowotnej Aktywności Fizycznej* (National Recommendations for Healthy Physical Activity). The report diagnosed PA in Polish society between 2015–2017, and the collected data were used to develop recommendations concerning minimal PA for various age groups, from children and youth, through adults, to elders. The recommendations for early school children (6/7–11 years old) match those developed by the WHO and amount to at least 60 minutes of organised or spontaneous daily PA, which should involve aerobic exercise. Early school children should also perform high-intensity activity three times per week, which also matches the WHO recommendations. As the authors of the report state, 'this physical activity should include physical games and play, sports activities, commuting, recreational activities, as well as physical education lessons or other organised forms of physical activity performed with family, at school or with the local community (Tomik i inni, 2018). A report published by the Institute of Mother and Child entitled *Aktualna ocena poziomu aktywności fizycznej dzieci i młodzieży w wieku 3-19 lat w Polsce* (Current Assessment of the Level of Physical Activity in Children and Youth Aged 3–19 Years in Poland) also provides recommendations for PA in early school children. Among these are limiting screen time to two hours daily, promoting traditional forms of physical recreation during free time as an alternative to screen time, increasing the accessibility of gymnasiums and sports equipment at school and encouraging children to commute actively to or from school, i.e. by walking or cycling, in cases where commuting would take no longer than 30 minutes. The report also stated that about 20% of early school children did not meet the recommended minimum of PA, most of whom were girls (Fijałkowska, 2018). According to the results obtained during an assessment conducted as part of the Global Matrix 3.0 project 80% of Polish children do not meet the criterion of minimal daily PA (Aubert et al., 2018).

All of the above recommendations, both global and Polish, aim to promote taking up PA to ensure optimal functioning and minimise the risk of health problems, especially because the level of PA decreases with age (Ostręga, 2017).

Physical education in early school education of children

Subject literature defines physical education as deliberate action aimed at shaping healthy and prosocial attitudes, supporting physical and health development and building a habit of performing PA and maintaining physical endurance, motor fitness and correct body posture (Osiński, 2011). Physical education is a mandatory subject in primary education across the EU. Furthermore, the value of physical education is highlighted by the fact that in the curricula in all European countries, it is taught throughout the entire period of mandatory education (Sakłak, Szark-Eckardt & Pasek, 2021). In Poland, in accordance with the Regulation of the Minister of National Education on the framework daily schedule in public education, the minimum weekly volume of physical education in early childhood education is three hours (Dz.U. 2012 poz.204).

As per the core curriculum, the primary aim of physical education is building a habit of performing PA. Lessons should focus on developing each student's interests and attitudes and supporting the building of a positive self-image as a participant of broadly defined PA, including recreational, sports and touristic activity. According to recommendations, physical education lessons must be conducted in a gymnasium, in an appropriately equipped substitute room, on a school playing field or in a natural environment. Furthermore, the core curriculum recommends that students perform different roles over the course of the lessons, including the initiator and organiser of physical exercises, games and play, player, referee and fan (Dz.U. 2017 poz. 356).

The core curriculum also lists areas to be covered during physical education lessons in grades 1–3 of primary school, including maintaining personal hygiene and health, motor fitness and various forms of sports and recreation. The purpose of these topics is to help students achieve awareness of the importance of systematicity and perseverance in exercising and various forms, such as team sports, gymnastics or track-and-field (Dz.U. 2017 poz. 356).

Physical education lessons in early school education are children's first contact with systematic organised PA. Lessons in grades 1–3 of primary school in Poland amount to a total of 96 hours over a school year. This volume allows for certain optimism compared to other European countries, as indicated in a comparison included in a study by Pośpiech (2006) of the average weekly volume of obligatory physical education lessons in minutes across the subsequent stages of education (Tab. 1).

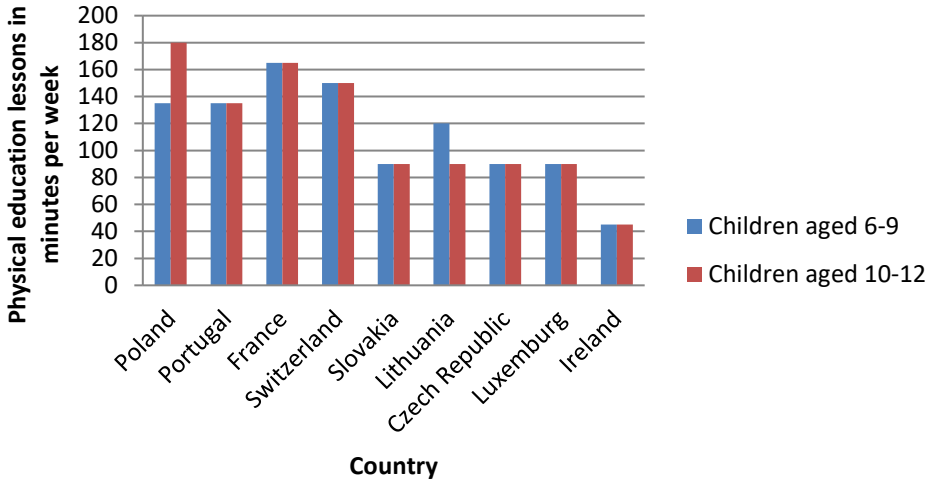

Figure 1 Mean weekly volume of mandatory physical education lessons in minutes for early school and school children across selected countries in Europe

Source: authors' own elaboration based on: Pośpiech, J. (2006). *Jakość europejskiego wychowania fizycznego w świetle badań* [Quality of Physical Education in Europe in Light of Research]. Racibórz: Wydawnictwo Państwowa Wyższa Szkoła Zawodowa.

However, it is debatable whether physical education lessons at school are actually or effectively spent on PA. In a study by (Białek, Fila & Zielonka, 2015), 80% of assessed teachers declared

conducting three physical education lessons per week. Unfortunately, there were also teachers who declared conducting only two (7%) or even one (7%) lesson per week. A study conducted by Madejski (Madejski, 2013) showed that only 64% of primary school students had physical education lessons in a gymnasium, and even then, only once per week, while about 10% did not use a gymnasium at all. Another important factor for the evaluation of the quality of physical education is how the lessons are conducted. According to a survey conducted by NIK (NIK, 2013), only 21% found the lessons to be interesting. Unfortunately, the remaining students (79%) disagreed (NIK, 2013). The fact that such situations take place already at an early stage of education may considerably reduce the importance of PA, leading to children developing a negative attitude toward it.

An important part of school time are breaks, during which children may also perform PA, which contributes to the recommended minimum of PA. Breaks can be defined as the time between lessons during which children can engage in spontaneous or organised play at the premises of the school (Andrzejczuk, 2017). In Poland, children have at least four breaks daily at school. It is estimated that moderate PA performed by children during a break may even amount to 40% of total break time and constitute a major contributor to the recommended minimum dose of PA for this age group due to the accumulation of active minutes over the course of a day (Parish et al.; 2013; Ridgers et al., 2012). Engaging in PA by children during breaks may bring numerous health benefits, especially those related to maintaining an appropriate body composition and correct functioning of the circulatory system (Carson et al.; 2013; Kwon et al., 2011). Breaks are also important due to the developmental opportunities they offer to children, along with an opportunity for rest, relaxation and improved chances for good performance at school (Ickes et al., 2013, Parrish et al., 2013).

Summary

Physical activity is a key element for the correct development of children. Some of the benefits of regular PA indicated in subject literature are improved physical fitness, endurance and immunity, strengthened bones, increased muscle strength and endurance, reduced excessive body mass, decreased blood pressure in youth with moderate hypertension, reduced concentration of cholesterol and/or triglycerides, as well as increased readiness for learning, better mental well-being and improved social relationship (Nałęczkowska, Mazur & Fijałkowska, 2021) s.

Early school age is also especially important due to the opportunities offered by this stage of development, particularly by the second apex of motor development, which is a very beneficial factor for the shaping of children's lifelong attitude toward PA and building selected motor abilities. Early school age is also an appropriate period to encourage children to take on various sports disciplines considering the ease with which they learn new motor skills.

A key element here is a consistent improvement in the quality of education and encouraging children to fully participate in physical culture from the youngest age. This depends to a considerable extent on awareness of PA needs and the importance of PA in ontogenesis. To this

effect, an active attitude on the part of teachers in early school education along with school-led initiatives, such as organising after-school sports classes, can have a beneficial influence. Furthermore, it is important to support the development of various motor abilities from the earliest age by implementing educational programmes to promote everyday PA (UNESCO, 2021).

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Percentiles of Physical Qualities in Men and Women of Primary Schools, in San Luis Potosí Mexico

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Abstract

Different studies show an alarming deterioration of poor physical condition in children and adolescents caused by sedentarism, mainly in industrialized societies (Ortega, Castillo, Moreno 2005). Also, the United Nations Children's Fund (UNICEF)notes that Mexico ranks first in the world in childhood obesity and second in adults (Senate of Mexico, 2017). These obesity crises are also manifest in Spain, the Netherlands, Belgium, Denmark, Australia, and Japan, cited by Aguilar, Pradilla, and Mosquera (2011). *Purpose:* To determine the percentiles of physical qualities of men and women of Primary Education, ages 9 to 11, in San Luis Potosí, Mexico. *Methodology:* There was a participation of 6,333 students. Six Tests of Physical Qualities related to health and sports activity were selected, following the protocols recommended by AAHPERD (1970) American College of Sports Medicine (2014). *The hypothesis* of this study was: Percentiles located with students from the state of San Luis Potosí (SLP) are lower than in other studies. *Results:* Percentiles 5 to 99 were obtained; for the internal and external analysis of the Physical Qualities, the percentile (p) 50 in men and women was considered. In the Flexibility Test, women are more flexible than men. In the tests related to cardiorespiratory resistance, strength/muscle endurance, and speed, men present better results than women. These percentiles were compared with other studies carried out; in Latin America is, their values similar; with higher values were located in those of the United States of America and other countries of Europe. *Conclusion*: these percentiles obtained are a reference of the Physical Qualities in SSLP from 9 to 11 years, considered a diagnostic tool for the safe prescription of exercise in physical education and school sports sessions.

Key words: Percentiles, Physical qualities, Physical education

Introduction

Several studies show an alarming deterioration in the poor physical condition of children and adolescents caused by sedentarism, mainly in industrialized societies (Ortega, Castillo, Moreno 2005). The World Health Organization (WHO 2002) and the Pan-American Organization (PAHO 2002) express the need for the timely diagnosis and implementation of physical activity programs that are reflect in the improvement of cardiorespiratory and muscular capacity as their nutritional status, with positive effects on their physical, social and psychological environment for a healthy life.

For Secchi, García, (2012) cited by Vidarte, Vélez, Arango, Parra (2022):

> Physical condition is related to health, defined as the ability that a person has to perform activities of daily life with vigor and refers to those components of physical condition that are related to health: aerobic ability; muscle-skeletal capacity; motor capacity; and body composition. (Secchi, G. 2012:163).

Other studies on physical condition carried out by Pila (2012) in Mexico, Cuba and Venezuela mention the contribution of the Physical Quality as the set of components the individual must possess. The AAPHERD in 1958 marks the starting point with different Tests to evaluate the PQ; Canada has also made different contributions to evaluate the Physical Qualities.

In Mexico, there are few works on physical qualities in primary school students; some correspond to Hermenegildo Pila (1997), supported by the National Commission of Physical Culture and Sport (CONADE). Another document is the Manual of Measurement in Physical Education, published by the National Council for the Development of Physical Education and Sport in Basic Education (CONDEBA 2000). The most recently applied to the whole country, with the name of "Ponte al Cien" (Measuring Physical Qualities), promoted by CONDEBA and CONADE (2013), the latter's final results are not known.

The preceding shows the importance of attending to physical condition in school children, with the application of physical qualities tests, considered as a strategy to know their results and implement activities that support the preservation of health.

The state of San Luis Potosi is geographically located in the center of the Mexican Republic. With industrial development and great cultural wealth, the Department of Physical Education of the (SEGE) San Luis Potosí, in coordination with the International Federation of Physical and Sports Education (FIEPS), set the objective: *Determine the percentiles of physical qualities in men and women of primary education.*

For this study, the Physical Qualities Tests related to Flexibility, Strength (abdominal), Explosive force (jumps: horizontal and vertical), travel speed, and cardiorespiratory resistance was applied. Authors of the American Alliance for Health, Physical Education, Recreation and Dance AAHPER

(1970), Bravo C. (2016), Fernandes J. (2003), Pila H. (1997), Blázquez D. (1996), Martínez (2008) were consulted for the application protocols of the various Tests.

Methodology

The participating students were from primary schools of 9, 10, and 11 years of age, with a total of 6,333 participants (51% men and 49% women), with a collection of 15,833 samples. This study was carried out with a collection of data from three school cycles, 2018 - 2020, from public and private primary schools, which are located with an average to medium-low socioeconomic level (90%) and high (10%), belonging to three regions of the state of San Luis Potosí.

For the current project, a Test Battery suggested by the AAHPERD mentioned by Fernandes (2003) and EUROFIT was considered, applying the following Tests: Traditional Sit and Reach (Wells & Dillon); Sit-up (Pollock & Wilmore) 60 seconds; Speed 30 meters; Vertical Jump (Sargent & Lewis); Standing Long Jump (Johnson & Nelson); Shuttle Run / Course Navette (Léger & Lambert).

The procedures for carrying out this project were carried out through the physical education authorities, with information on the project to school directors and parents. To ensure the integrity of the participating students, the ethical aspects of research expressed in the Declaration of Helsinki (1964) were considered, in Mexico, the General Health Law on Health Research (Chamber of Deputies DOF 02-02-2014). This research project was endorsed by the Ethics Committee composed of the Department of Physical Education of the SEGE and the Technical Pedagogical Committee of the FIEPS North America.

The methodology of each Test was explained to the participants; in its realization, they were assisted, and a previous "heating" was applied for each Test to avoid injuries (Platonov 1991). The results of each Test were manually recorded in a format delivered to the evaluators.
For the final analysis of the collected data, the statistical treatment (quantitative) was made through several templates, Excel, Microsoft, and Software Statistical Package Social Sciences (SPSS v. 20.0); in this way, the percentiles were determined and ranked from 5 to 99. Percentiles were passed to a *qualitative assessment of seven levels*, with the following interpretations: Very low, Low, Medium-low, Medium, Medium-high, Good, Excellent.

To operate successfully percentile actions obtained from (PQ) or Physical Capabilities, it is necessary to have as a reference the Global Plan of Action on Physical Activity 2019 - 2030 of the WHO: This calls on the government authorities to support the action of School Physical Education, which is associated with adopting healthy lifestyles impacting the school population.

Results

After applying the Physical Qualities Tests to men and women, the teachers expressed their approval to continue these results and to know the statistical data the present study yielded to

appreciate the reality of the Physical Qualities, students (9, 10, and 11 years old) from the state of San Luis Potosí.

Tables 1, 2, and 3 show a descriptive analysis of the results obtained in men and women, with the Percentiles from 5 to 99, with the name of each of the Physical Qualities and age. For the analysis of results, the percentile (p). 50 was taken as the basis.

Sit and Reach test women 9 and 10 years old present a difference 3 cm greater than men; in 11 years women present a difference in favor with 4 centimeters.

The argument for flexibility is significant in women because they are designed for a greater amplitude of movement, especially in the pelvic region: wider hips with less muscle tone. Corbin (1980) mentions that girls have more significant potential for flexibility due to their lower height of the center of mass and shorter legs. Martin (1982), in his Sensitive Phase Model (SPM), explains that from six (6) to ten (10) years of age, boys and girls have a high level of flexibility development; from year 11 onwards, flexibility is placed at a basic level.

In sit-up tests, men have better results than women; in 9 years, there is a difference of 6 repetitions; in 10 years, the difference is five repetitions; and in 11 years, a difference of 4. It is noted as eight years of age. That women in the 11 years are improving their strength. Martin (1982), in his SPM, mentions that the capacity of the force develops from

In the Speed Test, 30 m. men have better results than women. At the age of 9, there is a difference of three (3) tenths of a second being favoring men. At the age of 10, there is a difference of four (4) tenths of a second, favoring men. At the age of 11, there are a difference of two (2) tenths of a second, lower in men than women. In this Displacement Speed Test, their results in men and women do not exist significant differences in their times, which are very close, as seen in Tables 1,2, and 3. Rabadán (2010) mentions that the speed of displacement in puberty values is similar to that of adults.

Vertical Jump Test, men scored better than women. In the nine years, it is observed that men are with a (1) centimeter better than women; in the ten years, the difference is three (3) centimeters favoring men; in the 11 years, men are with two (2) centimeters better than women. In the end, the differences are very short between men and women. Meanwhile, Martin (1982) in his SPM, mentions the capacity of explosive speed, which has a good development from 8 to 12.5 years.

Test Standing Long Jump, in the ages of 9 and 10 years, a difference of 10 centimeters was found to favor men; in the 11 years, men present a greater displacement of 13 centimeters, compared to the mark obtained by women.

In the Shuttle Run Test, men have a better route than women. For example, in the nine (9) and 10 years a difference of 0.5 periods or paliers of travel was obtained favoring men. In the 11 years, it is observed that the improvement of men compared to women, was a difference a (1) period or

Table 1. Percentile: Sit and Reach, Sit – Up, Speed 30 m, Vertical Jump, Standing Long Jump, Shuttle Run in 9 year-old Men and Women.

PERCENTILE	SIT AND REACH (Wells & Dillon), AAHPERD traditional	SIT - UP (Pollock & Wilmore), Repetitions 60 seconds.	SPEED 30 METERS Expressed in seconds.	VERTICAL JUMP (Sargent & Lewis)	STANDING LONG JUMP-Johnson & Nelson.	SHUTTLE RUN. Course Navette Léger - Lambert) 1 minute.	
	Centimeters	Repetitions	Seconds	Centimeters	Centimeters	Period / Palier	
5	8	18	8"1/10	17	95	1.0	
10	14	19	7"6/10	18	101	1.0	
15	17	20	7"4/10	20	105	1.0	MEN
20	18	21	7"1/10	21	106	1.0	
25	19	23	6"9/10	21	109	1.5	
30	20	24	6"8/10	22	110	1.5	9
35	21	25	6"7/10	23	112	1.5	
40	22	26	6"6/10	24	115	2.0	YEARS
45	23	27	6"5/10	24	116	2.0	
50	24	28	6"5/10	25	120	2.5	
55	25	29	6"4/10	26	125	2.5	
60	26	30	6"4/10	26	128	2.5	
65	27	31	6"3/10	27	129	3.0	
70	28	32	6"3/10	28	132	3.0	
75	28	33	6"2/10	29	135	3.5	
80	29	35	6"1/10	30	138	4.0	
85	30	37	6"1/10	31	142	4.5	
90	32	38	6"0/10	32	145	5.0	
95	34	41	6"0/10	35	149	6.0	
99	36	47	5"6/10	38	160	8.0	
5	16	10	8"3/10	15	80	1.0	
10	19	14	7"8/10	17	93	1.0	
15	20	15	7"6/10	18	96	1.0	
20	21	16	7"5/10	19	98	1.5	
25	22	17	7"3/10	20	100	1.5	WOMEN
30	23	18	7"2/10	20	102	1.5	
35	24	19	7"1/10	21	105	1.5	
40	25	20	7"0/10	22	106	1.5	
45	26	21	6"9/10	23	110	2.0	9
50	27	22	6"8/10	24	110	2.0	
55	27	24	6"7/10	24	113	2.0	YEARS
60	29	25	6"7/10	25	115	2.0	
65	30	26	6"6/10	25	117	2.5	
70	30	27	6"5/10	26	120	2.5	
75	32	29	6"5/10	26	120	3.0	
80	32	31	6"4/10	27	124	3.0	
85	33	32	6"3/10	28	129	3.5	
90	34	34	6"2/10	29	131	4.0	
95	35	36	6"1/10	31	140	4.5	
99	39	40	5"9/10	35	148	7.5	

Source: Author *School population Primary*

Table 2. Percentile: Sit and Reach, Sit – Up, Speed 30 m, Vertical Jump, Standing Long Jump, Shuttle Run in 10 year-old Men and Women.

PERCENTILE	SIT AND REACH (Wells & Dillon), AAHPERD traditional	SIT - UP (Pollock & Wilmore), Repetitions 60 seconds.	SPEED 30 METERS Expressed in seconds.	VERTICAL JUMP (Sargent & Lewis)	STANDING LONG JUMP-Johnson & Nelson.	SHUTTLE RUN. Course Navette Léger - Lambert) 1 minute.	
	Centimeters	Repetitions	Seconds	Centimeters	Centimeters	Period / Palier	
5	14	14	7"8/10	19	94	1.0	
10	15	18	7"2/10	21	100	1.0	
15	18	19	7"0/10	22	105	1.0	
20	19	22	6"8/10	23	110	1.5	
25	20	23	6"7/10	24	114	1.5	
30	21	24	6"6/10	25	115	1.5	MEN
35	22	25	6"5/10	26	119	2.0	
40	23	26	6"4/10	27	120	2.5	
45	24	27	6"3/10	27	121	2.5	10
50	25	29	6"3/10	27	125	3.0	
55	25	30	6"2/10	28	126	3.0	YEARS
60	26	30	6"2/10	29	130	3.0	
65	27	31	6"1/10	30	132	3.5	
70	28	34	6"0/10	31	135	4.0	
75	29	35	6"0/10	32	137	5.0	
80	31	36	5"9/10	32	140	5.0	
85	33	39	5"9/10	34	145	6.0	
90	34	40	5"8/10	34	150	7.0	
95	37	45	5"5/10	36	157	8.5	
99	41	60	5"2/10	40	171	9.0	
5	17	10	7"5/10	18	85	1.0	
10	20	14	7"4/10	19	91	1.0	
15	22	15	7"3/10	20	95	1.5	
20	23	16	7"1/10	20	100	1.5	
25	24	18	7"0/10	21	102	1.5	WOMEN
30	24	19	7"0/10	22	105	1.5	
35	26	20	6"9/10	23	110	2.0	
40	26	21	6"8/10	24	110	2.0	
45	27	22	6"7/10	24	113	2.5	
50	28	24	6"7/10	24	115	2.5	10
55	28	25	6"6/10	25	116	3.0	
60	30	26	6"5/10	26	120	3.0	YEARS
65	30	28	6"4/10	26	120	3.5	
70	31	30	6"3/10	27	123	3.5	
75	32	31	6"2/10	28	125	3.5	
80	33	31	6"1/10	28	130	4.0	
85	34	33	6"1/10	29	131	4.5	
90	35	35	6"0/10	30	137	5.0	
95	37	40	5"8/10	32	145	6.0	
99	47	45	5"5/10	40	151	7.5	

Source: Author *School population Primary*

Table 3. Percentile: Sit and Reach, Sit – Up, Speed 30 m, Vertical Jump, Standing Long Jump, Shuttle Run in 11 year-old Men and Women.

PERCENTILE	SIT AND REACH (Wells & Dillon), AAHPERD traditional	SIT - UP (Pollock & Wilmore), Repetitions 60 seconds.	SPEED 30 METERS Expressed in seconds.	VERTICAL JUMP (Sargent & Lewis)	STANDING LONG JUMP-Johnson & Nelson.	SHUTTLE RUN. Course Navette Léger - Lambert) 1 minute.	
	Centimeters	Repetitions	Seconds	Centimeters	Centimeters	Period / Palier	
5	14	13	7"8/10	19	100	1.0	
10	16	17	7"1/10	22	105	1.5	
15	20	21	7"0/10	23	110	2.0	
20	20	23	6"7/10	24	113	2.0	
25	21	25	6"6/10	25	120	2.5	
30	21	26	6"5/10	26	125	2.5	
35	23	28	6"4/10	27	126	3.0	MEN
40	24	29	6"3/10	27	127	3.0	
45	24	30	6"2/10	28	130	3.5	
50	25	31	6"2/10	29	131	4.0	11
55	26	32	6"1/10	30	134	4.0	YEARS
60	27	33	6"0/10	30	135	4.5	
65	27	35	5"9/10	31	138	5.0	
70	28	38	5"9/10	32	139	6.0	
75	29	39	5"8/10	33	140	6.5	
80	32	40	5"7/10	34	145	7.0	
85	34	42	5"6/10	36	150	8.0	
90	34	43	5"5/10	37	155	8.5	
95	35	48	44"0/10	39	162	9.0	
99	43	57	4"9/10	44	175	9.5	
5	18	11	8"1/10	19	90	1.0	
10	19	15	7"5/10	20	97	1.0	
15	22	16	7"4/10	22	100	1.5	
20	24	20	7"2/10	22	103	1.5	
25	25	21	7"1/10	23	106	1.5	
30	25	22	6"8/10	24	110	2.0	WOMEN
35	27	24	6"7/10	24	110	2.0	
40	28	25	6"6/10	25	113	2.0	
45	28	26	6"5/10	26	115	2.5	
50	29	27	6"4/10	27	118	3.0	11
55	30	29	6"4/10	28	120	3.0	YEARS
60	32	30	6"3/10	29	120	3.0	
65	32	30	6"2/10	29	124	3.5	
70	33	32	6"2/10	30	125	4.0	
75	34	33	6"1/10	31	128	4.5	
80	35	35	6"0/10	32	130	5.0	
85	35	37	6"0/10	33	134	5.5	
90	36	39	5"9/10	34	139	6.5	
95	38	43	5"8/10	35	148	8.0	
99	44	56	5"4/10	41	155	9.0	

Source: Author *School population Primary*

complete palier; the latter result coincides with those explained, by Martín (1982) and Rabadán (2010), in this capacity of cardiorespiratory resistance begins a stage of overcoming from 11 years of age marked in the PMS.

In Table 4, a *qualitative assessment is presented*, with percentiles grouped to give the following interpretation: p. 5 to 10 obtain the Very Low Level; p.15 to 25 as Low Level; p. 30 to 40 Low Mean Level; p. 45 to 55 Medium Level, p. 60 to 70 High Mean Level; p. 75 to 85 Level Good; 90 to 99 Level Excellent.
In this table, all physical qualities evaluated are concentrated, having a quick visualization of the location of all the percentiles achieved in this research.

Table 4. Percentile Levels of Physical Qualities in men and women from 9 to 11 years of age.

TEST		MEN								WOMEN							
	Age years	Sample	Very low	Low	Medium low	*Medium*	Medium high	Good	Excellent	Sample	Very low	Low	Medium low	*Medium*	Medium high	Good	Excellent
SIT AND REACH AAHPERD Traditional Values Centimeters	9	*205*	08 - 14	17 - 19	20 - 22	*23 - 25*	26 - 28	28 - 30	32 - 36	*200*	16 - 19	20 - 22	23 - 25	*26 - 27*	29 - 30	32 - 33	34 - 39
	10	*215*	14 - 15	18 - 20	21 - 23	*24 - 25*	26 - 28	29 - 33	34 - 41	*205*	17 - 20	22 - 24	24- 26	*27 - 28*	30 - 31	32 - 34	35 - 47
	11	*215*	14 - 16	20 - 21	21 - 24	*24 - 26*	27 - 28	29 - 34	34 - 43	*215*	18 - 19	22 - 25	25 - 28	*28 - 30*	32 - 33	34 - 35	36 - 44
SIT - UP (Pollock Wilmore) Repetitions 60 seconds	9	*200*	18 - 19	20 - 23	24 - 26	*27 - 29*	30 - 32	33 - 37	38 - 47	*200*	10 - 14	15 - 17	18 - 20	*21 - 24*	25 - 27	29 - 32	34 - 40
	10	*623*	14 - 18	19 - 23	24 - 26	*27 - 30*	30 - 34	35 - 39	40 - 60	*580*	10 - 14	15 - 18	19 - 21	*22 - 25*	26 - 30	31 - 33	35 - 45
	11	*616*	13 - 17	21 - 25	26 - 29	*30 - 32*	33 - 38	39 - 42	43 - 57	*588*	11 - 15	16 - 21	22 - 25	*26 - 29*	30 - 32	33 - 37	39 - 56
SPEED 30 Meters Values in seconds	9	*200*	8.1 - 7.6	7.4 - 6.9	6.8 - 6.6	*6.5 - 6.4*	6.4 - 6.3	6.2 - 6.1	6.0 - 5.6	*200*	8.3 - 7.8	7.6 - 7.3	7.2 - 7.0	*6.9 - 6.7*	6.7 - 6.5	6.5 - 6.3	6.2 - 5.9
	10	*205*	7.8 - 7.2	7.0 - 6.7	6.6 - 6.4	*6.3 - 6.2*	6.2 - 6.0	6.0 - 5.9	5.8 - 5.2	200	7.5 - 7.4	7.3 - 7.0	7.0 - 6.8	*6.7 - 6.6*	6.5 - 6.3	6.2 - 6.1	6.0 - 5.5
	11	*205*	7.8 - 7.1	7.0 - 6.6	6.5 - 6.3	*6.2 - 6.1*	6.0 - 5.9	5.8 - 5.6	5.5 - 4.9	205	8.1 - 7.5	7.4 - 7.1	6.8 - 6.6	*6.5 - 6.4*	6.3 - 6.2	6.1 - 6.0	5.9 - 5.4
VERTICAL JUMP Sargent & Lewis Value centimeters	9	*380*	17 - 18	20 - 21	22 - 24	*24 - 26*	26 - 28	29 - 31	32 - 38	370	15 - 17	18 - 20	20 - 22	*23 - 24*	25 - 26	26 - 28	29 - 35
	10	*380*	19 - 21	22 - 24	25 - 27	*27 - 28*	29 - 31	32 - 34	34 - 40	370	18 - 19	20 - 21	22- 24	*24 - 25*	26 - 27	28 - 29	30 - 40
	11	*380*	19 - 22	23 - 25	26 - 27	*28 - 30*	30 - 32	33 - 36	37 - 44	380	19 - 20	22 - 23	24 - 25	*26 - 28*	29 - 30	31 - 33	34 - 41
SATANDING LONG JUMP. Values centimeters	9	*588*	95 - 101	105 - 109	110 - 115	*116 - 125*	128 - 132	135 - 142	145 - 160	570	80 - 93	96 - 100	102 - 106	*110 - 113*	115 - 120	120 - 129	131 - 148
	10	*585*	94 - 100	105 - 114	115 - 120	*121 - 126*	130 - 135	137 - 145	150 - 171	565	85 - 91	95 - 102	105 - 110	*113 - 116*	120 - 123	125 - 131	137 - 151
	11	*590*	100 - 105	110 - 120	125 - 127	*130 - 134*	135 - 139	140 - 150	155 a 175	590	90 - 97	100 - 106	110 - 113	*115 - 120*	120 - 125	128 - 134	139 - 155
SHUTTLE RUN. COURSE NAVETTE. Léger & Lamber. 20 m. Period 1 minute.	9	*221*	1.0 - 1.0	1.0 - 1.5	1.5 - 2.0	*2.0 - 2.5*	2.5 - 3.0	3.5 - 4.5	5.0 - 8.0	*185*	1.0 - 1.0	1.0 - 1.5	1.5 - 1.5	*2.0 - 2.0*	2.0 - 2.5	3.0 - 3.5	4.0 - 7.5
	10	*215*	1.0 - 1.0	1.0 - 1.5	1.5 - 2.5	*2.5 - 3.0*	3.0 - 4.0	5.0 - 6.0	7.0 - 9.0	*185*	1.0 - 1.0	1.5 - 1.5	1.5 - 2.0	*2.5 - 3.0*	3.0 - 3.5	3.5 -4.5	5.0 - 7.5
	11	*220*	1.0 - 1.5	2. 0 - 2.5	2.5 - 3.0	*3.5 - 4.0*	4.5 -6.0	6.5 - 8.0	8.5 - 9.5	*225*	1.0 - 1.0	1.5 - 1.5	2.0 - 2.0	*2.5 - 3.0*	3.0 - 4.0	4.5 - 5.5	6.5 - 9.0

Saurce: Author *School population Primary*

Discussion and conclusion

The following findings emerged from the present study:

The stated objective was fulfilled *Determine the percentiles of physical qualities in men and women from 9 to 11 years of age of Primary Education in San Luis Potosí.* Have percentiles of their own obtained from a battery of six Physical Qualities, which are related to the statement by (Gudes; 2007, Martínes & López; 2008) in a sense. That four Tests can focus on physical evaluation related to health, and six to eight are related to the evaluation of sports performance. In this sense, the battery of Physical Qualities applied encompasses health with the Tests of flexibility, muscle endurance, and cardiorespiratory capacity (Shuttle run); other Tests of muscle strength (jumps) and speed are added to support sports performance.

The cut-off points were expressed in percentiles, similar to those presented by Blázquez (1996). These percentiles are grouped to express a qualitative evaluation.

This study highlights that woman have more flexibility compared to men of all ages. The remaining Tests show slight differences in their values, being higher than that of men than women.

The comparison of values obtained with other countries is essential to know and overcome the weaknesses, this analysis was done with the age of 10 years and the (p) 50 in men and women, and the following results were obtained: For the *Flexibility* test, the data found in (p) 50, of the students of San Luis Potosí (SLP) in men are 25 and women 28 centimeters, data that are lower than those found by (Salleg 2010 and Teleña 2000) Colombia and Miami USA, where the men obtained 26 and 30 cm.; the women with 31 and 33 cm.

In *abdominal strength*, the results of (p) 50, of the SLP students were, in men 29 and women 24 repetitions, these data are lower than those presented by (Teleña 2000. AAHPERD 1976) the USA and Miami USA; where the men got 49 and 31 and the women 45 and 27 repetitions. We also found minor results (Cossio, Arruda-Miguel 2009) in men with 27 and women with 23 repetitions concerning those of SLP students.

In Speed 30 meters, in (p) 50 this study, a time of 6.3/10 seconds was reached for men and 6.7/10 seconds for women; these data are greater than those presented by (Morales, Pila;2014. Pila H.;2004) in Venezuela and Cuba, where they obtained in men 5,9/10 and 6.1/10, in women 6.2/10 and 6.5/10 seconds.

The Vertical Jump maximum of (p) 50 was 27 centimeters for men and 24 for women; these data are lower than those mentioned by (Teleña, P.; 2000) in the USA and Belgium, with 35 and 29 centimeters in men and 32 and 28 centimeters in women. We also obtained minor data cited by (Morales, Pila; 2014) in Venezuela and Uruguay, in men between 26 and 20 cm. and women between 20 and 18.6 cm, compared with those obtained by SLP students.

The Long Jump feet together for this Test at your (p) 50, were obtained results in SLP students in 125 cm men and 115cm women, which are lower than those found by (AAHPERD, National Fitness Standards USA, Fernades 2003, Blázquez 1996). These express data in men of 152, 149, 144, 143 cm; women with 147, 142, 120, 133 cm., compared with students of San Luis Potosí.

For cardiorespiratory resistance, as was the Course Navette in its (p) 50, a distance was obtained in men of 460 meters (3 periods or paliers) and women with 380 meters (equivalent to 2.5 periods). These data are lower than those expressed by (Blázquez 1996 EUROFIT battery), where they developed a distance in men 900m and women 720 meters. Other data were also found in Peru, which are lower than this investigation.

The results showed that the population studied has a lower level of physical performance compared to developed countries and similar results with those found in Latin America, proving the hypothesis raised in this study.

These results establish that the assessment of physical qualities must be part of the diagnoses of physical education programs and that it has a close relationship with health (Gutiérrez, 2007). Considering these results in planning the physical education sessions, the teacher will have more people active for a healthier world (Pan American Health Organization A. 2018 - 2030).

Conclusion

- With these percentiles of the Physical Qualities obtained, they are a reference in the students of San Luis Potosí from 9 to 11 years, considered as a diagnostic tool for the safe prescription of exercise in the sessions of physical education and school sport.
- With this research, it is observed that there is a prevalence of low levels of Physical Qualities, and urgently requires the constant practice of physical exercise in the school population of San Luis Potosí.
- A tool that helps strengthen public programs and policies to reduce obesity problems and other risk factors, with good physical and sports education practices for a healthy life.

Recommendations

Consider new lines of research: Quality of life—update body composition study.

Appreciation

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Effect of Exercises on Elderly to Prevent Fall: A Narrative Review

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Abstract

Falls are the leading cause of illness and disability among the elderly. When the age of individual increases, changes in physiology occur, including stress, mitochondrial dysfunction, distortion of the provocative process, less hormone production, and a reduction in total energy utilised over a period, all of which can lead to organ degeneration. These actions destroy neuron cells over time, impair bone density, and lessen muscle mass and strength. Regular exercise is essential for healthy ageing and offers many health benefits, including a reduced risk of illness and disability. A well-balanced fitness programme for the elderly can help them avoid falls and improve their day-to-day performance, so improving their quality of life. It is proposed that an exercise programme consists of a variety of forms to improve balance, postural control, cognition, muscle strength, and overall quality of life. The therapists, who are experts in prescription exercise and physical activity, promote exercise among the elderly in order to prevent falls. Promoting physical activity and exercise is critical in the daily lives of the elderly. Thus, this study aims to conduct a narrative review on the effect of exercise on fall prevention among the elderly.

Key word: Exercises, Prevent fall, Elderly, Physical activity

Introduction

Falls are the leading cause of illness and disability among the elderly. Every year, over one-third of people aged 65 and above fall, with a range of moderate to severe outcomes. Half of these individuals suffer more than one fall and are more likely to fall again (Moylan *et al.*, 2007). When the age of an individual increase, changes in physiology occur, including stress, mitochondrial dysfunction, distortion of the provocative process, fewer hormone production, and a reduction in total energy utilized over a period, all of which can lead to organ degeneration. These actions destroy neuron cells over time, impair bone density, and lessen muscle mass and strength (Sieber, 2017).

As a result, it reduces one's capacity to do everyday tasks, increasing the danger of falling and lowering one's standard of life. According to Rubenstein (2006), falls are the leading cause of senior health concerns, and the rate of falls rises with the increase in age. Falls occur because of a variety of interconnected situations. Adverse drug effects and impaired balance are the two very important primary indicators of a fall event in older persons (Gillespie et al., 2021). According to Kojima (2015), older persons have difficulties maintaining their postural integrity while doing daily tasks, which increases the likelihood of falling.

Additionally, older adults with mild cognitive impairment who live in the community fall twice as frequently as their cognitively intact peers (Taylor et al., 2012; Manaf, 2020). In community-dwelling older people, mild cognitive impairment is a predictive risk factor for falls (Delbaere *et al.*, 2012; Doi *et al.*, 2015). It is characterised as a stage of cognitive impairment that occurs between normal ageing and dementia (Winblad *et al.*, 2004). In older people with mild cognitive impairment, decreased muscle strength, worse balance control, and reduced walking speed, along with growing age and cognitive deterioration, increase the risk of falling (Deandrea *et al.*, 2010; Laughton *et al.*, 2003). A strategy that combines physical exercise and cognitive training into a single treatment plan may be the most effective way to address these risk factors all at once (Thom & Clare, 2011; Eggenberger *et al.*, 2015).

Postural control entailed synchronising multiple of a person's systems. The sensory system, which includes the vestibular, visual, and somatosensory systems, is combined with the central nervous system and the musculoskeletal system to infer the situation. The sensory system will reduce your ability to sense illumination contrast, judge distance, and see spatial relations as you become older. These appeared to be the typical deficits associated with falls in older people (Lord, 2006). According to Ishiyama (2009), the changes in the vestibular system are part of ageing.

A decrease in the number of hair cells in the semi-circular canals demonstrates these changes. Additionally, Lord and his colleagues (1996) discovered in 1996 that the risk of falling in older adults is exacerbated by a diminished perception of movement and posture, as well as a loss of lower limb strength and sensation (Lord et al., 1996). Rubenstein (2006) stated that inter-joint synchronisation is impacted, affecting muscle action during daily tasks such as walking. As a result,

the elderly person's ability to avoid falling is compromised. Thus, the purpose of this study was to summarise the benefits of improving muscular strength, stability, and risk of falling. The investigation will aid in the development of exercise training programmes for older adults with the goal of reducing falls and improving quality of life.

Role of exercise in preventing elders from fall

Overall muscular strength is known to wane as people become older. Falls become more likely when lower limb strength deteriorates. Muscle strength (Nichols *et al.*, 1993) and response time (Lord & Castell, 1994) may both be improved by exercising on a regular basis. According to Chodzko-Zajko and colleagues (2009), cardiovascular fitness exercise as well as resistance exercise are generally supplied among older individuals and based on aerobic exercise training and strength exercise adapted as separate measures, older adults can be utilised. Balance improvements, on the other hand, may occur following long-term training strategies.

Marques and his colleagues (2017) investigated the relationship between knee muscular strength and balancing changes in stable older persons after 8 months of increasing aerobic and resistance training. The one-leg stance test and up and go test (UGT) and centre of pressure measurements were used to assess leg strength and balance. Both treatments resulted in improved equilibrium performance, according to the findings. Leg strength was found to have improved after resistance exercise and aerobic activity. They discovered that both resistance and aerobic training increase balance; however, resistance exercise was also beneficial in increasing leg strength. Additionally, an increase in leg strength following resistance exercise has a significant impact on improvements in static and dynamic balance (Marques *et al.*, 2017; Rao *et al.*, 2021). The greatest risk for falls in older persons is decreased balance with age and loss of equilibrium (Beauchet *et al.*, 2009). There seems to be evidence to back up the effectiveness of exercise in helping healthy older persons maintain their posture while completing daily activities. A well-known balancing training programme for older individuals is designed to reduce the risk of falling and improve balance function in everyday life.

Both static and dynamic balance, postural control is achieved by posturing the centre of mass (Nagy *et al.*, 2007). The balance exercise includes static or dynamic stability postures, which are performed by older persons. These exercises benefited by reducing support base and visual information, producing a shift in the person's centre of gravity. Using wobble boards, foam surfaces, or perturbation platforms to change the standing surface. The body will try to recreate the interruptions that cause people to fall out of their everyday routines (Rogge *et al.*, 2018). Nagy and his colleagues (2007) conducted an 8-week programme that included static and dynamic balance exercises, as well as strength, flexibility, and aerobic exercises. The results showed that older adults improved their postural control regulation with and without visual input, and that the more challenging direction (i.e., mediolateral) increased their postural control regulation.

In older persons, coordinated exercise with limited and low-speed training improves mental functioning (Wong *et al.*, 2001). It includes the stimulation of the cerebellum, which is responsible for motor control and learning, and has been linked to alterations in higher cognitive functioning (Manto *et al.*, 2012). Wong and his colleagues (2001) also mentioned that Tai Chi exercises are linked together with a continuous sequence of motion (cooperation) and the body is constantly moving side to side, with the knees and hips in flexion (lower centre of gravity and balance). Various components of the body spend most of their time acting as stabilisers and mover, necessitating smooth motions that do not compromise balance and stability (Raj *et al.*, 2020). The effect of exercises effect of exercises on elderly to prevent fall is shown in Table 1.

Discussion

The discussion will focus on the effect of exercise to prevent fall among the elderly. Table 1 demonstrated numerous beneficial effects using exercises on the physical and functional activity among the elderly. Exercise has a positive impact on balance and muscle strength; developments in skills would enable elderly to be more independent in their daily activity. Falls in the elderly are an indicator of frailty, immobility, and acute and chronic health deterioration. Falls, in effect, reduce function by causing injury, activity limits, fear of falling, and mobility loss. The majority of injuries in the elderly are caused by falls; fractures of the hip, forearm, humerus, and pelvis are commonly caused by the combined effect of falls and osteoporosis. It is essential to understand the benefits of exercise for promoting the fall prevention among elderly. It may affect various aspects of their lives such as daily living activities and the ability to participate in exercise to become more active and fit.

Twelve week of multicomponent exercise program on balance, strength, endurance, and flexibility improve the dynamic balance among the elderly. In additional, fourteen week of conventional resistance training (CRT) group and elastic resistance training (ERT) such as 3 multi-joint exercises, upper limbs and lower exercise result approach of ERT may be used as an alternative strategy to CRT to promote functional improvements in older people. Furthermore, 4-week training of exercise such as 60-second sit-to-stand (STS), seated knee extensions of alternating legs, standing knee bends of alternating legs, marching on the spot, and standing calf raises. At the same time hold onto a chair for stability during standing exercise shown that improving leg power, muscle size and sit-to-stand score compare with control group. Its indications that maximum leg press force and power may also improve in function activity.

On the other hand, respiratory exercises, active and strengthening for the joints of upper and lower extremities and spine, isometric exercises for strengthening the abdominal muscles and weight-bearing exercises improve the balance and muscle strength among elderly. Exercises should be practiced regularly because with advancing age the muscle tissue is decreased as well as the strength of the muscles and physical abilities. Therefore, exercises maintain physical condition, mobility and social life and hence contribute to a better quality of life.

Table 1

Author (year)	Participants (N), gender, age	Intervention	Outcome measurement	Length of study and Frequency per week (Duration)	Result
Lipardo & Tsang, (2020)	N = 92, community-dwelling older persons with mild cognitive impairment (aged 60–83) Divided in 4 groups group physical training group combined physical and cognitive training group cognitive training group waitlist control group	The physical training group and the combined physical and cognitive training group had the same multicomponent exercise program on balance, strength, endurance, and flexibility, with no less than one-third focused on balance training. The cognitive training group was involved in a set of paper-based cognitive exercises on executive function, memory, attention, and orientation training with an emphasis on executive function. Waitlist control group was instructed to go on with their usual daily routine, habits, and physical activity level, and would receive the intervention, combined physical and cognitive training, on a later date after the completion of all the other intervention groups.	fall incidence, overall fall risk, dynamic balance, walking speed, and lower limb strength.	12 weeks 3 times per week (60 to 90minutes)	Dynamic balance was improved with combined physical and cognitive training compare with another group.
Souza *et al.* (2019)	N = 25, older women community dwelling Divided in 2 groups; Conventional resistance training (CRT) group and Elastic resistance training (ERT) group	All participants performed a full-body protocol with 3 multi-joint exercises being two exercisesfor upper limbs (chest press and row) one for lower limbs(squat) following a minimal dose approach Each exercise was performed with two sets, with 10 to 14 repetitions. Sixty seconds of rest intervals were used between sets and exercises.	Functional test, Chair to stand Arm curl ,8-foot up-and-go, 6-minute walk test, Sit-and-reach, Back stretch and Blood pressure	14 weeks, twice per week (15 to 18 min)	The result shown that CRT group from pre- to post-training in the 6-min walk were significant increases. While the Arm Curl test and 8-feet up-and-go the showed the greatest magnitude of treatment effect in both groups. The minimal dose approach of ERT may be used as an alternative strategy to CRT to promote functional improvements in older women.
Perkin *et al.* (2019)	N = 20 older men and	ES group will receive exercises were 60-second sit-to-stand (STS), seated	60 second sit-to-stand score, rating	4 weeks, twice per day	The result shown ES group improving leg power, muscle size and sit-to-stand score compare with control group. Its indications

	women community-dwelling, (65–80 years) Divided 2 group: exercise snacking intervention (ES), n = 10 Control Group, n = 10	knee extensions of alternating legs, standing knee bends of alternating legs, marching on the spot, and standing calf raises. At the same time hold onto a chair for stability during standing exercise.	of perceived exertion velocity, force, and power variables of leg pressing anthropometric measurement (calf and thigh muscle and percentage body fat), and Diet recorded.		that maximum leg press force and power may also improve in function activity.
Vitale *et al.* (2020)	N = 9 elderly people, (60–80 years) Divided 2 group: Intervention Group, n = 5 Control Group, n = 4	Intervention group receive warm-up included light dynamic movements and exercises for all the body areas and joints (e.g., walking and skipping on site), including upper/lower limbs (e.g., shoulder and elbow circles or half squat) back (e.g., twists and side bending), and neck (e.g., 3-axis movements).	Anthropometric assessment, Whole-body dual energy X-ray absorptiometry, thigh magnetic resonance, mini-Balance Evaluation Systems Test, chair stand test; b. Handgrip strength test and dynamometers	24 weeks, 4 time per week (55 minutes)	The result shown that the intervention group improved lower limb strength. They concluded that during the lockdown period, and these benefits in muscle strength were likely associated with the home-based resistance training program.
Aartolahti *et al.* (2020)	N = 182 elderly age 80 (SD ± 3.9) years] Divided 2 group: Male Group, n = 52 Female Group, n = 130	Each training session started with a 15-min balancing exercise as a warm-up , static and dynamic, standing, walking, turning and reaching exercises where challenge was adjusted by changing the size or stability of the base of support with dual task and eyes-closed situations. progressive resistance training for 60 min included knee extension and flexion, leg press, hip adduction, abduction and extension and abdominal crunches. perform 8–12 repetitions and two to three sets of the exercises	Knee extension strength, Knee flexion strength, Chair rises, Walking speed, Timed up and go and Berg Balance Scale	2 years, once per week (75 minutes)	The result shown that both women and men improved their chair rise capacity. Women's knee extension and flexion strength improved by walking speed while men, no changes in muscle strength or walking speed occurred during training or follow-up. No changes in BBS and TUG were observed at the end of the intervention but decrease in BBS was observed at post-intervention follow-up in men.

Marini *et al.* (2019)	*N* = 44, osteoporosis elderly women (Age: from 60 to 75) Divided 2 group: experimental group, n = 22 Control Group, n = 18	Experimental group receive Warm-up: 15 min; multi-articular exercises, focus on joint mobilization, balance and postural control during walking. -Workout: 35 min; resistance bodyweight exercises (isometric and dynamic). -Cool down: 10 min; Stretching, Exercise in an upright and supine static position, holding a stretch position for up to 30 s under IG Supervised.	Health-Related Quality of Life ECOS-16 EuroQoL (EQ-5D-3L) Fear of Falling: FES-I questionnaire, Lumbar Back Pain: VAS, Physical performance: POMA, 6-MWT and Chair Sit-and-Reach.	24 weeks, 2 times per week (60 minutes)	The result shown that experimental group greater significant in Health-Related Quality of Life questionnaire, fear of falling questionnaire, VAS, POMA, 6-MWT and Chair Sit-and-Reach compare with control group. They conclude that feasibility, safety and the positive effect of the proposed exercise protocol on quality of life, fear of falling, balance and functional exercise capacity show that programs should be extended also to patients with osteoporosis and a history of vertebral fracture.
Koevska *et al.* (2019)	*N* = 92 postmenopausal osteoporosis (Age: from 60 to 75) Divided 3 group: patients with exercises and physical modalities group Exercise Group Control Group	Patient's with exercises and physical modalities group received physical modalities (interferent currents and magnetic therapy) for 3 weeks Exercise Group received the respiratory exercises, active and strengthening for the joints of upper and lower extremities and spine, isometric exercises for strengthening the abdominal muscles and exercises for balance. For weight-bearing exercises, the weight was determined by the functional abilities of the patients, 1 (one) kilogram at the most. Exercises were performed. Each exercise was repeated for 5 to 8 times.	Quality of life was determined with a specific questionnaire Qualeffo-41.	3 times per week;	The results showed that significant statistical difference in terms of pain, physical activity, social life, the perception of own health was shown between the groups ($p < 0.0001$), only in term of mental function were no significant ($p < 0.3$). They conclude that Exercises should be practiced regularly because with advancing age the muscle tissue is decreased as well as the strength of the muscles and physical abilities. Therefore, exercises maintain physical condition, mobility and social life and hence contribute to a better quality of life.
Carral *et al.* (2019)	*N*= 24 elderly women (Age: from 60 to 75) Divided 2 group: intervention group, n = 11 Control Group, n = 13	Intervention group received lower limb strengthening exercise such as Knee flexion/extension, Hip flexion and abduction, ankle Plantar flexion, inversion and eversion. Each of the exercise was 15 repetition for 3 set.	Barthel index of daily living activities, the five times sit-to-stand test (FTSTS) and timed up and go (TUG) test	12 weeks, twice per week	The SG maintained the Barthel index scores for activities of daily living and improved in the FTSTS; the CG showed a significant decrease on both tests. The dynamic balance test showed significant differences between groups for the variables sit to stand, peak angular velocity, anterior-posterior range, turning, stand to sit, total time, and speed. They conclude that the muscle strength intervention programs may help promote healthy lifestyles by maintaining autonomy, improving function, and balance.

Conclusion

Finally, falls are very prevalent among the elderly. The decreasing of total muscular strength is connected to ageing. Falls become more likely when lower limb strength deteriorates. According to the findings, a well-balanced fitness programme for the elderly can help them avoid falls and improve their day-to-day performance, so improving their quality of life. To improve balance, postural control, cognition, muscle strength, and quality of life, it is proposed that an exercise programme consist of a combination of forms. To prevent the occurrence of falls, therapists or instructors should establish an exercise programme for older adults in community or home-based activities which includes mild-to-high difficult balance tasks that are completed at the right time and frequency. The exercise programme protects their safety, and exercises like static and dynamic exercise, as well as resistance exercise, help to lower the danger of falling. Fall prevention in the elderly can be achieved by progressing to activities that require overall physical and cognitive capabilities.

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Criticality in New Zealand Physical Education: Disrupting the Orthodoxy, Creating a New Imagery

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Abstract

Aotearoa New Zealand has a short, but rich history of diverse developments in physical education. Government initiatives, perceived learner needs, agendas of community agencies, the shifting of societal standards, political economies of health and sport, and individual teacher value beliefs have all played part in shaping curriculum orientations. One curriculum orientation, however, seems to have altered the course of health and physical education in the New Zealand curriculum. It continues to have a significant effect on the physical education landscape through its ability to entice thought and disruption to the 'norms' of health, physical activity, play and sport. This socio-critical curriculum value orientation is now more important than ever, as New Zealand enters another round of curriculum discussions and 'refreshes'. It has the possibility of creating a new imagery for health and physical education. *Health and Physical Education in the New Zealand Curriculum* has serious scope for evolution; but only if those in charge acknowledge and value the depths of its past.

Key words: Socio-critical curriculum, Critical pedagogy, Health and Physical Education in New Zealand Curriculum, New Imagery, Value orientations

This chapter sets out to briefly outline the historical foundations from which physical education (PE) in Aotearoa, New Zealand (NZ) developed. From the time of indigenous settlement to the colonisation of the British in the 1800s, NZ PE has been built predominantly on three dominant curriculum value orientations. Arguably unique to NZ, the socio-critical curriculum value orientation has been the most recent focus in NZ PE. Bought about by comprehensive economic and social reforms in the 1990s, the health and PE curriculum has required a seismic shift in thinking and practice. Fundamental to the change has been the introduction of a strong criticality, which has challenged and disrupted orthodox practices. Seeking a new imagery, this chapter highlights present developments and lays down the challenge to liberate present knowledge and truths in the quest to address social justice and equity issues that are ubiquitous in orthodox programmes.

Backgrounding Physical Education in Aotearoa New Zealand

Aotearoa NZ's history is comparatively short but is enormously rich with diverse developments. Originally settled by the Polynesians (indigenous people of the South Pacific) approximately 750 years ago, New Zealand Aotearoa (NZ), arguably, is the most recent country in the world to be populated. This Indigenous population developed a distinctive and unique Māori culture that was based on ancestral affiliations and very strong spiritual connections to the land (whenua). In the early 1800s, Indigenous Māori participated in a rich array of physical cultural practices and games. Many of which have now been problematically formalized in *Health and Physical Education in the New Zealand Curriculum* (NZHPE) (MOE, 1999) and the more recent *New Zealand Curriculum* (NZC) (Ministry of Education, 2007). For many years following European colonisation, predominately British, in the 1800s, NZ lacked a formalised and specific PE curriculum that addressed the learning needs of young New Zealanders. Heavily reliant on British documentation, NZ schools offered physical training, formalised exercise for all, and military training for boys. As the colony developed, NZ, like many other Western democracies, shifted in and out of various PE curriculum value orientations (Jewitt, 1994). These shifts can be attributed to no formalised mandated NZ curriculum. Indeed, it was not until 1987 that NZ had a formalised government mandated PE curriculum that addressed the learning needs of its school population (5-15 yrs.). This 1987 curriculum document had a strong focus on the curriculum value orientation of motor skill development for individual personal and social growth. Despite this focus, other curriculum value orientations emerged because of specific government initiatives, perceived learner needs, the agendas of community agencies, the shifting of societal standards, political economies of health and sport and individual teacher value beliefs. Three curricula value orientations dominated the PE landscape in NZ right up to and including the 1990s. A fourth curriculum value orientation recently emerged at the turn of the century. The curriculum value orientations used over time are:

Motor skill development for personal and social growth.

This orientation assumed that a good education needed to address psycho-motor, cognitive, and affective dimensions of learning for all round development. The content areas emphasised technical proficiency in physical skills associated with large and small balls, aquatics, athletics, gymnastics, dance, fitness, and outdoor activities including camping and games. Critics of this

approach suggested this traditional approach is based on unsubstantiated assumptions about learning, skill development, active involvement, and adherence in active lifestyles – particularly in the young (Trost, 2004).

Physical activity and fitness development for personal health

The belief that regular and vigorous physical activity made significant contributions to students' physical health has long been an agenda of PE in NZ. Dating back to the 1940's, this orientation placed emphasis on rigorous physical fitness regimes designed to improve personal health, achieve body control, and body discipline (lingering military influence) and to develop physical skills for sporting performance (Culpan, 1996, 1997). The focus was overtly physical and often punishing in nature, promoting the 'no pain no gain' mentality. Scholars agree that PE has a key role to play in the public health agenda, particularly in the promotion of physical activity, but question the punitive nature of such punishing programmes. Evans and Davies (2004) provided an insightful perspective by stressing the importance of critically evaluating programmes of this nature and promoted the notion that students need to be encouraged in how to become critical consumers of health-orientated initiatives. They argued that PE lessons should be enjoyable and ensure that students are knowledgeable about the way health has been constructed and shaped by corporate and business interests. Evans and Davies argued that promoting physically taxing fitness programmes for health in unproblematic ways endorsed 'body perfection codes' which personify the body as:

- Imperfect (whether through circumstance of one's social class, or poverty or self-neglect).
- Incomplete and to be re-engineered through physical therapy (circuit training, fitness through sport, and a better diet).
- Endangered (by risk of modernity or lifestyle of overeating and inactivity and other non-communicable disease.).

This PE curriculum value orientation conceptualises the body as something that needs remediating results in an 'ill health pedagogy', which in turn ignores the multi-facet complexity of holistic health and leaves the students feeling powerless and alienated from their bodies (Culpan, 2011).

Sport education

Sport has been a regular, important, and ubiquitous aspect of teaching in PE in NZ for some time. Its presence is the result of the general pervasiveness of sport across the 'Kiwi culture'[1]. It was not until the 1980's that 'sportification' and scientisation of PE became more formally dominant. This was brought about by a raft of government initiatives (see Grant & Pope, 2000), the success of NZ sports performance internationally, and the development of two sport-related teaching models: Sport Education Model for PE (Siedentop, 1994), and Games for Understanding (Bunker & Thorpe, (1982). The 'sportification' and scientisation of PE was consistent with many European initiatives (see Naul, 2003) and initially the orientation was characterised by a 'sport for all'

[1] The national symbol of NZ is the kiwi bird.

philosophy, the spirit of competition, learning its culture, and the teaching of new types of sports like golf, korfball, and martial arts. However, as the sport orientation morphed into a scientised performative ideology, where young talent is identified, developed, and promoted at the expense of the majority, and schools began using elite sport success as a marketing tool, resistance within the academy emerged.

While each of the three orientations had their own internal educative coherence and provided PE with a diverse ideology(ies), the fragmented legitimacy, resulted in a destructive divergence of PE perspectives and practices across the country. There was no consensus or commitment to the educative and social worth of PE, occasioning in a laissez faire market mentality where *'anything goes'* and *'everyone gets a bargain'*. Essentially, the educative experience of the students was simply a crude manifestation of either consumer demand, or the interests of the teacher. Consequently, the educative potential of PE became marginalised. These orientations co-existed in a feigned harmony, and the edgings defining them blurred and became inter-changeable with relative ease. This 'no general consensus', was not a unique problem for PE, indeed, a lack of general consensus across the total school curriculum areas was commonplace. This no consensus culminated in resolute neo-liberal political and economic government reforms in the last decade and a half of the 20th century (Culpan, Cowan, Lindsay, and Stevens, 2018). The reforms saw the government instigate a massive curriculum overhaul to align the schooling system to economic and market driven agendas which had strong measures of accountability and control. Driven by this socio-political-economic agenda, the education sector experienced upheaval and changes focussed on the demise of centralised regulations for schools, universities, education providers and other government agencies. The dismantling of an arguable cumbersome bureaucracy across the whole state sector saw education providers given the mandate to be self-directed, self-managed and largely self-regulating, whilst required to follow government established guidelines e.g., national curriculum statements (Culpan, Cowan, Lindsay, & Stevens, 2018). This strong neo-liberal market orientation saw the emergence of education institutions (schools, universities, and non-government education providers) as self-maximising economic units requiring the adoption of business models of operation, clear accountability lines, with budgeted profit outcomes.

This disruption to the whole education sector required a complete rewrite of the total school curriculum and gave impetus for the development of the fourth curriculum value orientation for both health and PE in NZ. Indeed, this moment became the first time NZ adopted NZHPE and integrated Health and PE into a single curriculum document (Ministry of Education, 1999).

Socio-critical physical education.

A socio-critical value orientation for both health and PE necessitates a seismic shift and expansive thinking in the practice of teaching these subjects. This orientation aims to better capture health and PE as a more valued socially educative practice and to give more meaning for the students and legitimacy for the teachers. The approach highlights the shortcomings of past orientations particularly the problematics of rampant individualism, scientised and technocratic PE content laced with cogent sportive and fitness regimes, and an overindulgent menu of traditional

patriarchal games. These shortcomings were made evident by a plethora of government reports highlighting decreasing physical activity rates, increased obesity, poor decisions being made around nutritional choices, alcohol and drug usage, and other social ills affecting young people's healthy lifestyle habits. The socio-critical orientation required a strong focus on a socio-ecological perspective (Lawson, 1992). It emphasises the self*, others,* and *society*, where teachers use health and PE contexts to allow students to experience, discover and make lifelong health and PE choices related to themselves, their culture, and the society in which they live. Fundamental to the successful implementation of this orientation is the teacher's capacity and capability to provide movement contexts where students can learn health and PE content, *in, through* and *about* movement (Arnold, 1997). It encourages students to make meaningful connections and critically apply these experiences to wider aspects of their lives. This approach endeavours to give more coherence to PE and to promote more socially just, inclusive, and equitable practices through a vision involving actively participating in, and critically examining, the movement culture to achieve more holistic and valued lifestyle practices (Burrows, 2004).

This fourth curriculum value orientation has been made evident in the philosophical foundation of the *Health and Physical Education in the New Zealand Curriculum* (NZHPE), (Ministry of Education, 1999) and its subsequently revised health and PE area of the New Zealand Curriculum (NZC) Ministry of Education, (2007). The developers of the NZHPE, wanted to resist many of the government neo-liberal reforms, and address the shortcomings of previous health and PE practices. Consequently, they drew on four conceptual underpinnings to reinforce the adoption of this socio-critical orientation: Hauora (an indigenous Māori term for holistic wellbeing), Health Promotion, A socio-ecological perspective, and an integrated set of Attitudes and Values (see Ministry of Education, 2004). These conceptual under-pinning's (Ministry of Education, 1999) provide the foundation for a holistic focus encompassing the social, cultural, scientific, political, economic, ethical, and physical contexts of health and movement in people's lives. This approach in NZ promotes a clear move away from the historically dominant curriculum value orientations where physical activity, sport skill mastery, physical fitness, and sportive curriculum content, informed by issues of public health and notions of healthism dominated. Principally, this new approach sought to develop essential life skills central to notions of humanism drawing on a critical pedagogy (Culpan, Cowan, Lindsay & Stevens, 2018). Importantly, the concept of critical pedagogy is aligned with, and supported by, constructivist perspectives of teaching and learning (see Culpan & McBain 2012) that occur within multiple movement contexts. The critical pedagogy within the NZHPE and NZC is both emancipatory and empowering. Emancipatory, in the sense that critical pedagogy encourages students to accumulate knowledge, skills and power to develop increased control over their personal and collective lives**.** Empowering, where critical pedagogy supports individuals and groups to recognise and characterise hegemonic practices, and take social action to promote change (Dardner, Baltodano, & Torres, 2003; Evans, 2014).

Critical pedagogy within the NZHPE and NZC, has required teachers to not only consider it as a process of problem solving and questioning to promote higher order thinking skills, but more importantly to examine and question the educational assumptions, inequality and hegemonic practices occurring in a physical, social, political, and historical health and movement orientated

contexts (Burrows, 2004; Culpan & Bruce, 2007). In the employment of critical pedagogy (McLaren, 2003) in health and PE contexts, teachers and students must assume and accept potential difficulties. They need to be prepared to be responsible for destabilising and interrogating 'truths' about health and PE practices existing in schools and the wider community. This approach can be disruptive to the general orthodoxy of the past. NZHPE and NZC requires teachers to work with students to be the key agents in the development of, and transformation to more just and equitable health and movement orientated environments. There is a need for them to become critical intellectuals to advance the educative, social, and moral values of health and PE so to maximise the learning opportunities that this curriculum area can provide. Essentially, the socio-critical curriculum value orientation drawing on critical pedagogy has provided NZ with a new imagery for health and PE.

Physical Education today

The rich history of curriculum development and four value orientations have shaped current practices, and NZHPE and NZC are now positioned for another round of curriculum 'innovations' and 'refreshes'. This process, although in its infancy, will indefinitely see discussion and debate on curriculum orientations. How this looks is yet to be decided, however the extensive work done to dismantle 'truths', and address the shortcomings of past orientations will mean that this process will certainly begin from a socio-critical position. This hints towards the successfulness and permanency of a socio-critical value orientation for health and PE curriculum design. Arguably, some key considerations when it comes to the development of NZHPE in the NZC should be biculturalism, movement meaning and joy. Alongside addressing critique, these considerations would further drive audacious disruptions to practice, and further the work achieved by curriculum writers in 1999. To realise this, key movements in the political landscape would be essential.

Physical Education New Zealand (PENZ) is the not-for-profit organisation that supports the quality planning, teaching, and assessment of PE (Physical Education New Zealand, 2022a). They hold a rich history of challenging the status quo, in the hopes of continued development and understanding of PE and physical activity when it comes to the school setting (Culpan & Stothart, 2012). An example of this was in the late 1980's, and through the 1990's when PENZ developed te ao kori (the world of movement) programmes to support PE teachers to better understand and give indigenous meanings to the use of traditional Māori movement activities in their planning and programme offerings. Given that the predominant discourse in the education sector was Eurocentric, this was both a challenge, and an opportunity for the Ministry of Education. One could argue these initial commitments to Māori as Treaty Partners[2] in education, ultimately set the tone and path for PENZ values moving forward. There is authenticity across policy and practice that values mātauranga Māori (Māori wisdom/knowledge), te reo Māori (Māori language), te ao

[2] 'Treaty partners' is referring to the valuing and upholding of the formal document, *Te Tiriti o Waitangi*. Which is considered the founding document of New Zealand and was signed in 1840 as a formal agreement between Māori chiefs and representatives of the British Crown. The Treaty has legal principles and obligations pertaining to the rights and needs of Māori. Historically, there have been many misinterpretations and breaches of these documents, and these are still being recognised, addressed, and repaired.

Māori (Māori customs and traditions), and te ao kori (the world of Māori movement). This is notable in their current strategic plan that portrays an ongoing commitment to biculturalism, and socio-critical change:

> "Together as staff, members, volunteers, and physical educators, we are working towards an Aotearoa (NZ) where quality physical education is understood, valued and experienced. PENZ values and models Treaty-led planning and decision making; and continues to be a staunch advocate of bicultural curriculum, te reo Māori, te reo kori and te ao Māori. We confront and challenge physical education practices that provision ableism, racism, sexism or gender discrimination. We support professional learning, environments and encounters that are positive, creative, inclusive, antiracist, and gender diverse." (Physical Education New Zealand, 2022b, p. 2)

The work of PENZ as a national subject organisation is the embodiment of Evans' (2014) assertion that groups must recognise, characterise hegemonic practices, and take social action to promote change. This advocacy has become somewhat easier over time, as other governmental and national bodies concerning physical activity and sport have seemingly accepted and celebrated the disruption of 'norms'. Sport New Zealand | Ihi Aotearoa (Sport NZ), the government organisation tasked with leading the play, active recreation, and sport system in NZ (Sport New Zealand, 2022b) have begun to shift more radically towards equity in policy and practice. For example, there have been significant changes to Sport NZ's strategy and operations that encourage multiple worldviews and encompass broader definitions of play, recreation, and sport. The campaign #*itsmymove* was brought about in 2022 to raise awareness to the challenges young women face in sport and recreation as they age, that often lead to lower overall participation rates (Sport New Zealand, 2022a). Additionally, the organisation has also identified three strategic priorities of Te Aho, which are giving effect to Te Tiriti o Waitangi, increasing cultural capability and capacity, and prioritising contribution to Māori wellbeing (Sport New Zealand, 2022c). In committing to these actions, Sport NZ (as a Crown Entity) recognises that there is an accountability and responsibility to uphold the principles of Partnership, Protection and Participation as stated in Te Tiriti o Waitangi. Specifically, to uphold the rights and interests of Māori. It is not to say that Sport NZ previously did not strive to be a good Treaty partners or use bicultural or Māori expertise. Rather, to highlight the more recent overt strategic aims, campaigning, and promulgation of their organisational shift towards equity.

These explicit stands against inequity in physical activity spaces seemingly affirm a socio-cultural understanding of movement, and an authenticity towards social justice. A stand that acknowledges the construction of these dynamic and educative spaces, and their ability to shape the experiences that children have within them. However, although these examples of equity may seem to indicate an adoption of criticality, as governmental education and health sectors begin to understand the vital role they play in the shaping and use of knowledge, these acts of social justice do not naturally constitute a socio-critical approach. Fundamentally, in a socio-critical curriculum, it comes down to a willingness to relinquish control as knowledge experts, or providers, and avoiding the 'mandating' of knowledge. Simple acts of inclusion or change cannot replace the ongoing need for

disruption, progression of new knowledge's and the willingness to allow for criticality. It could be argued that there is still a very strong desire by government, and to some extent evidenced in NZC, to control how physical activity is positioned concerning its contribution to 'health', and therefore the usefulness of it in PE. In the case of Mātauranga Māori or gender equity, or any other identified inequity for that matter, the end goal is not merely the labelling and awareness of, or 'use' of these things to shape 'health' in policy and practice. Yet, this is ever-present. There is a notable absence of critically informed social action in the form of 'surrendering control'.

It is problematic and cumbersome to achieve (plan and implement) an authentic socio-critical value orientation, when health and PE was previously unwaveringly influenced by a value orientation predisposed to public health norms, shaping personal health, performance, body control, and body discipline. Even the current curriculum document falls back into neoliberal mannerisms by design. An example of this is the contradiction between the humanist philosophy of NZHPE in the NZC and the assessed progressive learning outcomes across the year levels. Despite NZHPE valuing movement meaning and Arnold's 'In, Through and About' movement, there is still an emphasis on the 'seriousness' of movement, health, and physical activity. This can be seen in the number of learning outcomes that promote performative, athletic or behavioural elements in place of joyful or meaningful ones, especially as the learners' progress through the higher levels of schooling (Stevens, 2017).

Outside of PE, despite the progress made, the health, physical activity, and sport sector still look upon the subject with a desire for PE to be the solution to public health problems and other social ills – hypothesising 'physical activity time' as a reason for its usefulness (Mizdrak, Shaw, Lynch, & Richards, 2021). For instance, the overtly scientised and technocratic approaches to sport propagates the body control ideology, elite sports performance, early talent identification, and the hopes of a nation**.** These aim to provoke nationalism, enhance professionalism and the political economy of sport. The current physical activity initiatives combating alleged ill health further illustrates this scientised technocratic emphasis. Such initiatives create debate and confusions within the profession and reduce the educative value, role, and potential of PE for lifelong well-being, to the explicit use of PE as a servant of public health policy. Another example of the governmental desire to regulate and use physical activity, as a panacea to address social need, was the introduction of the concept of Physical Literacy, and the desire of designing subsequent assessment tools to track one's physical literacy. Such a framework returns PE to the Motor skill development for personal and social growth value orientation that has been found to be inadequate for student's contemporary learning needs. The action of adopting Physical Literacy, though outwardly 'progressive', essentially saw an un-critical adoption of a Western framework for a bicultural country, and risked the trialling and adoption of measurement tools that could reduce the intent and scope of a socio-critical NZHPE. Such a move insinuates regression, distraction and a weakening of a socio-critical orientation. Moreover, it perpetuates the colonisation of NZ education (Stevens, Ovens, Hapeta, & Petrie, 2021). Pope (2014) suggests these reductionist and neoliberal approximates to PE are the longest standing challenges to the subject area in NZ. We argue these are contradictory to, and the antithesis of, a socio-critical approach to learning.

Moving on

Despite the clear, authentic policy changes that seek equity and social justice through criticality, there continues to be a need to 'mandate' knowledge rather than to liberate it. The tension between public health policy, physical activity and sport practices, and a socio-critical curriculum is still rife. The NZHPE in NZC has serious scope for evolution; however, those leading the charge need to be astutely aware of the purpose of a socio-critical curriculum, and the potential for development that preserves the document's liberating and emancipatory intent. While it is most pleasing to see the employment of a critical pedagogy, and the dismantling of truths thus far, it is important to note that there has been a dilution of critical pedagogy internationally. According to McLaren (2003) this "domestication" can be attributed to neo-liberal political ideologies, and the rise of liberal humanism. The effects of these political economies remain a concern for PE as understanding the range of truths that affect local and global decisions impact upon curriculum innovation.

As in all curriculum design and orientation, there are risks of the unconscious implementation of 'new truths' to replace the old curriculum progressions. NZ must hold true to their socio-critical value orientations throughout any curriculum 'refresh', not only to identify injustices and foster equity, but more importantly – to not rest on any 'truths'. This we argue is the new imagery that needs fostering and impetus in NZ.

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Physical Activity on Children and Youth – The Importance for a Healthy Lifestyle

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Abstract

This chapter brings a reflection about physical activity (PA) in individuals and in society, namely in children and youth. It starts with the importance and benefits of PA and Sport for children and youth, followed by recommendations about PA for these populations. The current situation of PA in children and youth around the world, and particularly in Portugal, and ways to measure it, it is also presented. The chapter ends with the theme PA and Sport as promoters of a healthy lifestyle, personal and social development, referring the ways to promoting them.

Key words: Sport; Personal and Social Development; Sustainability; Inclusion; Education; Values.

Importance and effects (benefits) of physical activities in children and youth

Physical activity (PA) can be defined as any movement produced by skeletal muscles that requires energy expenditure and improves physical, mental, social health and well-being, helps prevent disease and reduces the burden on health care systems (World Health Organization [WHO], 2020). It contributes to gender equity, social inclusion, increase longevity, employability and education. Examples of PA can be walking to work, going to school by bicycle, domestic tasks or doing some exercise or sports activities. These activities are contributors to multiple governments and global agendas including COVID-19 recovery, improving socio-economic development, reducing inequalities, addressing climate change, and contributing to the sustainable development agenda (WHO, 2018; United Nations [UN], 2015). For children and adolescents, PA includes games, playing, sports, transportation, recreation activities, physical education, or planned exercise, in the context of family, school, and community (WHO, 2020).

On the other hand, sedentary behaviour can be defined as any waking behaviour in a sitting, reclining, or lying posture with low energy expenditure (Tremblay et al., 2017). The majority of adolescents do not meet current PA guidelines (Guthold, Stevens, Riley& Bull, 2020), putting their current and future health at risk. So it is urgent to implement effective programs to increase PA in children and youth. Such action will improve the health of this and future young generations and supports achieving the 2030 Sustainable Development Goals (UN, 2015). A higher amount of sedentary behaviour is associated with some poor health outcomes like increased adiposity, poorer cardiometabolic health, fitness, behavioural conduct/pro-social behaviour, and reduced sleep duration and is recommended that children and youth should limit the amount of time spent being sedentary, particularly the amount of recreational screen time (WHO, 2020). According to Organisation for Economic Co-operation and Development (OECD, 2019) obesity report, "(…) *children in particular are paying a high price for obesity. Children who are overweight do less well at school, get lower marks, are more likely to miss school and are off school for longer than children with a healthy weight. Children with obesity are 13% less likely to report good school performances and, when they grow up, they are less likely to complete higher education. Children with obesity show lower life satisfaction and are up to three times more likely to be bullied, which may contribute to lower school performance*." (pp.14).

Several studies indicated that PA in children and youth has numerous health benefits (Physical Activity Guidelines Advisory Committee [PAGAC], 2018; Poitras et al., 2016) in relation to physical, psychological, social, and cognitive aspects, namely in:

- Body composition: Do PA resulted in a decrease in adiposity, and higher levels of activity may be associated with healthy weight in children and adolescents (Poitras et al., 2016), but overall, there is low certainty evidence that PA is associated with the control of a healthy weight, and more studies were needed to confirm these associations;
- Cardiometabolic biomarkers: PA is positively associated with cardiometabolic health outcomes, like for example improving blood pressure, lipid profile, glucose control and insulin resistance (PAGAC, 2018; Pozuelo-Carrascosa et al., 2018);

- Physical fitness: PA improved cardiorespiratory and musculoskeletal capacities in children and adolescents (PAGAC, 2018; Poitras et al., 2016);
- Bone health: Bone health in childhood and adolescence can help protect from osteoporosis and related fractures later in life (WHO, 2020). PA is positively associated with bone mass, higher bone mineral content or density and greater bone strength (PAGAC, 2018);
- Cognitive and metacognition functions & academic achievement: PA benefits several domains of cognition, like nonexecutive cognitive functions, core executive functions, including working memory, selective attention-inhibition and cognitive flexibility and metacognition functions, like cognitive life skills and executive functions (Álvarez-Bueno et al., 2017). Some evidence also suggests that there are positive associations between PA and academic achievement, but there are some aspects that remain to be explored, like the type, amount, frequency, and timing and more research is necessary to determine devices and long-term impact, as well as strategies to translate these findings to the school environment (Donnelly et al., 2016);
- Psychological and social factors: PA in children appears to be an inverse relation with depression and anxiety (Bélair, Kohen, Kingsbury & Colman., 2018) and may be comparable to psychological and pharmaceutical therapies in reducing symptoms. The self-esteem, social interaction and fewer depressive symptoms were the most referred by the literature (Eime, Young, Harvey, Charity & Payne., 2013).

Relations between PA and health indicators were more consistent and robust for higher versus lower intensity, but all patterns of activity (sporadic, short time, continuous) provided benefit (Poitras et al., 2016). Children and youth with some health problems have also benefit from PA. In children with autism spectrum disorder there were some evidences about providing entertaining and engaging training for whole-person development (Yu, Wong, Lo, So, & Chan, 2018) and in children with diabetes type 1 the regular practice of supervised regular moderate to vigorous PA was associated with several health benefits (Aljawarneh, Wardell, Wood & Rozmus., 2019).

Considering that in children and adolescents (aged 5-17 years) the adiposity (weight gain, weight change, weight control, weight stability, weight status and weight maintenance), adverse events, bone health, cardiometabolic health, cognitive outcomes, mental health, and physical fitness were considered critical for health and pro-social behaviour and sleep were considered important (WHO, 2020), the PA assume a very important and vital role for this population.

Recommendations for PA in children and youth

Over time, several organizations tried to establish guidelines for PA in children, based on scientific evidence (Okely et al., 2022; PAGAC, 2018). The WHO is an international recognized entity and has its guidelines translated into several languages, which facilitates its dissemination. In this way, the most recent recommendations for PA in children aged 0 to 17 years are presented below (WHO, 2019, 2020).

Table 1 Recommendations for PA in children and youth (WHO, 2019, 2020)

Age	Recommendations
Less than 1 year	Be active several times a day in a variety of ways, particularly through interactive floor-based play. In babies that doesn´t yet mobile, this includes at least 30 minutes in prone position throughout the day.
1-2 years	Spend at least 180 minutes for day in a variety of types of PA, from moderate to vigorous intensity.
3-4 years	Spend at least 180 minutes in a variety of activities, of which 60 minutes of moderate-to-vigorous PA.
5-17 years and children with disability (5-17) years	An average of 60 minutes per day of moderate to vigorous intensity, mostly aerobic, across the week. Vigorous-intensity aerobic activities, as well as those that strengthen muscle and bone, should be incorporated at least 3 days a week

Another good practice statement of WHO (2020) is that doing some PA is better than doing none and will benefit their health. Children and adolescents, particularly sedentary, should start doing small amounts of PA and gradually increase the frequency, intensity, and duration over time. It is also important that the PA is safe and there are equitable opportunities and encouragement to participate in enjoyable physical activities, offers variety and ensure it is appropriate for their age and ability (WHO, 2020).

The current situation of PA in children around the world and in Portugal

Worldwide, 1 in 4 adults, and 3 in 4 youths (aged 11-17 years) do not currently meet the global recommendations for PA of WHO, with some countries reaching about 70% of levels of physical inactivity, justify most of all by the changing patterns of transportation and the increased use of technology and urbanization, with the countries more developed economically obtaining lower rates of physical inactivity (WHO, 2020). In Europe, the proportion of the Europeans that never exercise or play sport continues to increase, with 46% of people above 15 years of age saying that never exercise or play sport (TNS Opinion & Social, 2018).

In children and youths more studies, about the lack of PA, are still needed, since available results are not consistent, in part due the variation in protocols and data management (Mota, Coelho-e-Silva, Raimundo & Sardinha, 2016). The Active Health Kids Report Card, from Canada, is an excellent instrument for presenting the data in a format that is operational by researchers, policy makers, and practitioners (Tremblay et al., 2014). This report includes ten indicators of PA and sedentary behaviour, namely: Overall PA, Organized Sport and PA, Active Play, Active Transportation, Sedentary Behaviours, Family and Peers, School, Community and the Environment, Government and Physical Fitness. In 2018, 30 countries applied this protocol, with a classification range of the indicators from F (success in less than 20% of children and young) to A (success in more than 80% of children and young). In Portugal, in 2018, Active

Health Kids Report Card (Mota, Santos, Coelho-e-Silva, Raimundo & Sardinha., 2018) the overall average was C+ (table 2), which means that approximately half of the Portuguese children and adolescents achieve the quality indicators. Nevertheless, concerning overall PA levels, only 34% of boys and 17% of girls, aged 11-15 years, were sufficiently active. Only 36% of 10 to 11 years old children, and 4% of 16 to 17 years old adolescents meet PA guidelines, and 49% of children and adolescents aged 12-18 years regularly participated in physical activities outside of school, 14% engaged at least once per week. That means that in this matter Portugal is succeeding with less than half of children and adolescents in card grades.

Table 2 Results from Active Health Kids Report Card in Portugal (Mota et al., 2018)

Indicator	Grade
Overall, PA	D
Organized Sport Participation	B-
Active Play	*
Active Transportation	C-
Sedentary Behaviours	C
Family and Peers	C
School	A
Community and Environment	B
Government	B
Fitness	C

*For this indicator no grade was assigned in Portugal because there is little literature related to active play and leisure activities among Portuguese school-aged children.

Comparing 30 countries (Aubert et al., 2018) the majority (18 of the 30) have an average of C in all indicators (considering C-, C and C+), like Portugal results, and 3 of the countries, namely Denmark, Japan and Slovenia have an average of B and the other 9 countries have an average of D. The main conclusion of this report is that is very concerning the situation regarding PA in children and youth, being expected that, unless a major change to a more active lifestyle happens quickly, an extreme rate of non-communicable diseases can be anticipated when this generation of children reaches adulthood (Aubert et al., 2018). Considering that the COVID-19 pandemic decreased even more the levels of PA, have we a new pandemic within the pandemic? (Wilke et al., 2021).

Healthy lifestyle promotion and physical education

In addition to the importance of PA to improve various health indicators, there are other equally important aspects to improve quality of life, well-being as well as being healthy. For example, the

recommendations for children under 5 years old of the WHO (2019) include, beyond PA, some suggestions about sedentary screen time (0 minutes for 1 year age and under; no more than 60 minutes for children with 2, 3 and 4 years old) and about good quality sleep (14-17 hours for 0-3 months of age; 12-16 hours for 4-11 months of age; 11-14 hours for children with 1-2 years; 10-13 hours for children with 3-4 years). There is another study that concluded that a healthy lifestyle promotion in child involves PA, nutritional patterns, sleep and mental health and wellness, suggesting a PERMA model (positive emotions, engagement, relationships, meaning, and accomplishment), that is a useful construct to approach improving PA, eating, and sleep to improved physical and mental wellness in youth (Hosker, Elkins & Potter, 2019). There are also some programs that promote a healthy lifestyle in schools. School is a very important place for the interventions, because children spend a long time in that place and it is easy to organize data and implement a multidisciplinary team. The program SI! (Salud Integral-Comprehensive Health) existed for a decade, in United States of America, Spain and Colombia, and has the goals for pre-schoolers understand and apply a good diet, PA, manage de emotions and understand how works the body and heart, with some step guides for this purpose, like organize health celebrations, promote active school break periods, encourage body awareness, involve school canteen in school activities and encourage children to come to school on foot or by bicycle, for example (Santos-Beneit et al., 2022).

The 1990's brought the idea of "WITH kids and not FOR kids", seeing children and youth as individuals to be nourished, having an emphasis on nurturing the potential of youth more than addressing their supposed deficits, and on addressing and helping to shape the roles of developmental contexts, especially that of the community and youth themselves as agents of their own development (Hellison & Martinek, 2006). This marked the beginning of the concept of "Positive Youth Development" (PYD), reflecting the desired outcomes for youth that encompass society's hopes and aspirations for a nation of healthy, happy, and productive individuals (Roth, Brooks-Gunn, Murray, & Foster, 1998). Sport, within the framework of PYD, is an asset-building approach to youth development research and practice that emphasizes enhancing strengths and developing potential in all youth (Lerner, 2017). The framework is child/youth-centered and aims to provide the opportunity for children/youth to learn and promote empowerment, autonomy, and opportunities to experience challenges and, above all, play sport and PA, never forgetting the playful component within an appropriate technical framework (training environment) and with an adequate educational back up (personal, and social development, and presence of supportive interactions). The sport context is one of the most popular organized activities for youth, across several countries. In the PA realm, Hellison's (2003) "Teaching Personal and Social Responsibility" (TPSR) model was influential in initiating these PYD ideas. This model provided a framework for empowering youth to be responsible for their actions and learning, and to transfer these behaviors outside of the gym (Hellison, 2003). The TPSR literature also discusses the importance of creating programs strengthened by personal characteristics, interpersonal relationships, cultural differences and practices (Li, Wright, Rukavina, & Pickering, 2008; Wright & Burton, 2008). The creation of a positive environment can also influence program goals, for instance, how opportunities and activities that are provided

can facilitate or inhibit student commitment and engagement (Hellison & Martinek, 2006), and moral development (Shields & Bredemeier, 2007).

Sports programs highlight the belief that sports participation has a positive impact on youth development because it does the following: a) Creates motor and sport-specific skills that are convertible into physical capital; b) Improves health, fitness, and an overall sense of physical well-being; c) Increases self-confidence, self-esteem, and positive body image; and d) Builds character in the form of discipline, teamwork, and responsibility (Carreres-Ponsoda, Escartí, Jimenez-Olmedo & Cortell-Tormo, 2021; Fraser-Thomas, Côté, & Deakin, 2005; Goudas, 2010; Holt & Jones, 2008). However, as Coakley (2011) claimed "*By itself, the act of sport participation among young people leads to no regularly identifiable development outcomes*" (p. 309). The PYD approach does not assume sports participation, by itself, leads to positive developmental outcomes, rather, it emphasizes the idea that sport can enhance personal growth and produce positive developmental outcomes when it is structured and delivered in the most appropriate ways (Coakley, 2011; Gould & Carson, 2008; Holt & Jones, 2008). Various models exist to classify PYD outcomes, but one of the most widely recognized outcome models is the "Five C's" of youth development (Lerner et al., 2005). The "Five C's" model delineates PYD outcomes across five domains: competence, confidence, connections, character, and caring. When all five C's are present, a sixth C (contribution) may occur, which enables youth to give back to their community.

Table 3 The "5+1 C's" of Positive Youth Development Adaptation from Holt and Neely (2011)

"C"	**Definition**
Competence	Positive view of one's actions in specific areas, including social, academic, cognitive, health, and vocational. Social competence refers to interpersonal skills (e.g. conflict resolution). Cognitive competence refers to cognitive abilities (e.g. decision making). Academic competence refers to school performance as shown, in part, by school grades, attendance, and test scores. Health competence involves using nutrition, exercise, and rest to keep oneself fit. Vocational competence involves work habits and explorations of career choices. Effective entrepreneurial skills may be one instance of vocational competence.
Confidence	An internal sense of overall positive self-worth and self-efficacy.
Connection	Positive bonds with people and institutions that are reflected in exchanges between the individual and his or her peers, family, school, and community, in which both parties contribute to the relationship.
Character	Respect for societal and cultural norms, possession of standards for correct behaviors, a sense of right and wrong, and integrity.
Caring/Compassion	A sense of sympathy and empathy for others.
Contribution	Enables youth to give back to their community and society.

Since sports participation provides a focus for social activity, an opportunity to make friends, develop networks and reduces social isolation, it seems well placed to support the development of social capital. As Weiss and Wiese-Bjornstal (2009) summarize, a series of connected dimensions of social inclusion (figure 1) can be a useful framework for considering sport's potential contribution to social inclusion/exclusion. First, the functional dimension of social inclusion relates to the enhancement of knowledge, skills and understanding. Second, social inclusion can be defined in relational terms, such as a sense of social acceptance. Sport might play a positive role here, by offering young people a sense of belonging - to a team, a club or a community. However, the fact that to engage in most sports in developed countries costs money (e.g. for special clothing and equipment, club membership, entrance fees for events, insurance, and travel), it may not be equally open for all individuals. Third, there is a spatial dimension, as social inclusion relates to proximity and the closing of social and economic distances. Certainly, there are frequent claims that sport brings individuals from a variety of social and economic backgrounds together in a shared interest in activities that are seen to be inherently valuable (Bailey, Hillman, Arent, & Petitpas, 2013). Finally, social inclusion assumes a change in the locus of power. In this respect, sport contributes to social inclusion to the extent that it increases an individual´s sense of control over their lives, as well as the "community capital" by extending social networks, increasing community cohesion and civic pride. The establishment of social networks is a key feature of socially inclusive practices. This is especially important, within the context of sport for at-risk youth and in low-income neighbourhoods, for whom social and organized settings can be sources of anxiety or disaffection (Escartí, Gutiérrez, Pascual, & Llopis, 2010).

PYD occurs when young people experience opportunities to develop competencies through interactions with important others in family, peers, school, and community settings - "Be active, healthy, and happy!". From the European and world guidelines (e.g. Eurobarometer on sport and physical activity [TNS Opinion & Social, 2018]; White paper on sport [European Commission, 2007]; WHO European Regional Obesity Report [World Health Organization, 2022]; Lisbon Treaty - Article 165 [European Union, 2008]) and the report from OECD (2019), it is clear that regular PA/sport leads to important physical, social, psychological, and academic competencies and healthy outcomes among children and adolescents.

PA/sport through positive youth development approach specifies the essential goals, contexts, and activities that optimize the achievement of these competencies and healthy outcomes. A caring and mastery-oriented climate, supportive relationships with adults and peers, and opportunities to learn social, emotional, and behavioral life skills—these are the elements for promoting positive youth development and a healthy lifestyle through PA/sport.

Provide Physical Activity Access & Opportunity for All Youth

Capacities	Policies	Supports	Stakeholders
Play spaces Program interventions	Cultural sensitivity Physical ability Inclusion	Financial tangible Marketing/dissemination of good practices	Coordinated efforts for all agents Strong partnerships Youth as active agents

Create Optimal Context for Physical Activity Engagement

Safety	Climates	Content	Methods	Relationships
Well-maintained spaces Supervision, first aids	Autonomy supportive Mastery-oriented "5+1 C's" of Positive Youth Development	Intentional programming Life skills activities	Experiential learning Effective pedagogy	Nurtured & sustained Caring, role models

Achieve Developmental Health Outcomes for Participants

Motor	Physiological	Psychological & Social	Academic
Movement literacy PA skills	Physical fitness Physical wellness Health-enhancing PA Decrease time spent in sedentary activities	PA identity Positive leadership Connection with others affect Social inclusion and equal access to sport for all Social networks	Cognitive functioning Energy & effort

Figure 1 Connected dimensions of social inclusion
(Adaptation from Weiss and Wiese-Bjornstal, 2009)

Conclusion

Physical activity (PA) and sports play an important role in health, well-being, physical, personal and social development, education and values of the individuals, and in inclusion, socio-economic and sustainable development of populations, namely in young generations.

In general, PA is low in populations, particularly in children and youth, being recommended for all ages, since birth, with necessary adaptations to the individuals' characteristics and preferences. Besides the increase of PA, is it also important the decrease of sedentary behaviours, and the potentiation of healthy nutrition, sleep and a positive mind-set? Several PA indicators can be used

to know the PA level of children, namely: Overall PA, Organized Sport and PA, Active Play, Active Transportation, Sedentary Behaviours, Family and Peers, School, Community and the Environment, Government and Physical Fitness. Parents at home, teachers in school and sports professionals in different sports contexts, have an important role in the education and promotion of a healthy lifestyle, for them and for new generations, particularly using PA.

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Obstacle Course Race in Physical Education Lessons: A Way to Contrast the Covid-19 Restrictions

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Abstract

In 2020 a wide range of attempts to develop PE lessons were done during the second way block of Covid-19 restrictions: guidelines for students on how to do PE at home, tips on how encourage students to do PA in the garden of their home, on the stairs of their building, outside in the park or even in the street. Web-based interactive learning platforms with several new educational materials (photos/videos, ppts, on-line PE format lessons...) for PE teachers were created by Capdi and LSM, the National Association of PE teachers in Italy, to help teachers who were faced the new challenge of organizing their teaching totally on line, or in presence (in the gym but with no contact between people or people and sport tools) or hybrid (at the same time with half class on line and half class in presence). Everybody, and especially young people, tend to be more active when they are outdoors rather than when they are inside (Nicol, 2014). The Outdoor Obstacle Course during PE lessons raised awareness to the possibility to use, beside all school facilities for PE like the gyms, all the spaces, in and out of the school, as places useful to move. Outdoor Obstacle Course lessons are safe and accessible to keep students active during PE classes, after school sport clubs, active breaks, recess, active lessons and other events that can be integrated into the school schedule. Using creativity and imaginations PE teachers could transform both indoor and outdoor spaces potentially as active spaces during the long school days. The Outdoor Obstacle Course triggers to involve the largest number of students of all ages, increase participations to the PE lessons in a holistic way, develop motor ability, motor coordination, psychomotor skills, cognitive skills and allow students to continue PA as a lifelong habit reducing the risk of possible health issue in their future (Dern, 2018).

Key words: Outdoor education, Physical education, Physical inactivity

Background

Since the World Health Organization (WHO) declared the Covid-19 Pandemic, there were serious emergency measures such as two world-wide lockdowns, self-isolation or quarantines, travel restrictions and closures of school, sport clubs, gyms, swimming pool and parks. Everybody experienced the isolation and the impossibility to go out and work out. Physical Activity (PA) was rarely admitted and only people who need physical rehabilitation were admitted to gyms and clinical structures. The period between March 2020 and September 2021 was characterized by the lack of free play for children and the absence of structured motor learning lessons delivered by PE teachers (Physical Education).

This circumstance aggravated the physical development of children/adolescent and improved the cases of mental difficulties with a plethora of unhealthy and un-social sequelae. This extraordinary situation pushed Capdi & LSM (Italian Confederation of Associations of Physical Education and Sport Science teacher) to support PE teacher category who has reorganised their teaching routine into online, in dual or rarely in presence. Thus, it become important share new and original strategies to lead lessons and disseminate as much as possible new materials for an extraordinary condition.

Obstacle Course Race (OCR) PE lessons: a way to restart moving in outdoor setting

At the begin of the 2020-21 scholastic year a new challenge meets the PE teacher: the practice according to Covid-19 sanitary restrictions. In particular; PE lesson indoor wearing masks, compulsory social distance, no team sport, no touching the same sport materials, disinfecting tools, on-line and dual form of PE lessons. PE teachers all over the world were forced to explore new and original way to engage the students avoiding the spread of the disease. Thus, become essential, during Covid-19 restrictions, re-organize the contents of the PE curriculum giving priority to outdoor sport, the basic motor skills development and highlight the cultural importance of investing in PA as a primary illness prevention (Davis 2010).

An obstacle training path was an attractive idea to re-start from robust basic motor abilities developing them in outdoor context (Bortolotti, 2019). Indeed, this kind of PA has more than 8.5 million participants and become popular in this past decade. The main purpose, beside improving the fitness level, was to carry PE in presence with classmates, both in outdoor gym context keeping the social distance but through a stimulating PA. This reinforced the spirit of belonging and get back the cohesion of each group class lost in the previous pandemic months.

In particular, the specific objective was the construction of a path to promote sports practice (Mullins, 2012) according to:

- promote a path of psycho-physical well-being to be used in all free moments of school life
- become an instrument of attraction for students who are not involved in the other most famous sport

- offer the possibility to perform PA outdoor
- use a challenge as a moment of self-verification and not as an opponent's comparison
- help spread the educational values of PE and PA
- develop in students the self-awareness to know their abilities and appreciate personal improvements
- enhance the school environment using every tool and space

Methods

By ensuring that methodological choices were profitable and functional to the contents (Rawdon, 2016), in September 2021, a total of 10 classes with an average number of 25-30 each student from 15- 18 years old were involved in an OCR intensive learning unit by a qualified PE teacher and also, OCR athlete. The learning unit were developed in a total of 10 hours during one month in the beginning of the school year. It was chosen a school in the south Italy with an indoor gym and a outdoor space (with a basketball court inside) located just in front of the beach and surrounded by 1km promenade. Students were involved in this project in occasion of the European Week of Sport in the last week of September 2021.

The obstacle path training was organized considering (Dexheimer, Schroeder, Sawyer, Pettitt, Aguinaldo, & Torrence, 2019):

- initial tests to evaluate the athlete's starting conditions
- resistance training
- strength training with natural load or with the help of tools
- training to overcome obstacles, through appropriate techniques and simulations
- functional training to improve functional strength, mobility, agility and balance
- training about the modulation of the race over short or long distances
- nutrition suggestion
- mental training suggestion

Depending on the aim of each lesson and the fitness level of the students a teacher- centred method together with a method of demonstration were the best at the beginning of the learning unit in order to let the teacher focus the attention of possible dangers of each obstacle and to give clear instructions about the basic obstacles and the organization of an OCR lesson.

Once students knew the basic knowledge of safety instructions to practice OCR and scaffolding exercises were developed, it was possible to let them to know new obstacles and experiment how to pass throughout adopting the cooperative learning method. In this phase, the division in small groups allowed students to build relationships, making connections and re-establish the sociality lost during the Covid 19 Pandemic. In the end of the school year, it was also useful and very exciting for the students to flip the classroom and let them to build their own obstacles path for their mates. It was very interesting to see how nice and creative were the results.

Students with some difficulties were often supported by pairs in a very natural way like often happen in team building activities. This happened very easily because in some specific lessons all obstacles were structured in a way that students reach the result only with the help of companions.

As regards the final evaluation of the OCR lesson, the PE teacher took into account:

- Commitment and active participation in all the teaching activities proposed according to the students' abilities
- Specific technical skills acquired taking into account the starting level
- Attention capacity
- Ability to make constructive and appropriate interventions and proper suggestions
- Willing to help and support classmates
- Awareness about not to be dangerous for themselves and for others

By ensuring a full compliance of the students it was taken into account the starting physical fitness level, the need to make them main leader of the learning process and the guarantee to ensure, even students with disabilities, the opportunity to fully participate and enjoy the indoor or outdoor activities (Macey, & Brown, 2014).

In particular, the main motor abilities developed in the OCR paths generally include running, climbing (fig. 1), crawling (fig. 3), walking through, balancing (fig. 9), carrying (fig. 5), jumping (fig. 4) and jumping down. This discipline has always to include a cross country or on mud path interspersed with natural and artificial obstacles. The running courses have to be different, various and unpredictable such as the distance between obstacles.

Another special feature of the OCR training are suspended obstacles in which the translocation of the body from one point to another is carried out using mainly the grip of the hands or the support of the feet on the same tools like rings or rope (fig. 2). Those kinds of obstacles are generally called "Monkeys" (fig. 6 and fig. 7). This type of exercises strengthens the muscle groups of the upper body which, together with running, it makes this sport one of the most complete. The performance in this kind of PA is clearly situational because the athlete has to adapt to new settings every time.

In class groups where this type of lesson has been carried out longer during the school year, it is also possible to introduce the system of "burpees" when an obstacle is not overcome correctly. A burpee is a powerful full body exercise divided in two phases: the push up and the jump. Starting from a standing position the body has to do a push up in a plank position on the floor followed by a vertical jump in the air with the hands over the head. Then the body has to return back to the standing position (fig. 8). The number of burpees can vary from competition to competition but above all, in the school context, the number must adapt to the age and physical condition of the pupils.

Figure 1 Climbing

Figure 2 Tyrolean Rope

Figure 3 Wire crawl

Figure 4 Wheel mat

Figure 5 Bucket carry

Figure 6 Monkey bar 1

Figure 7 Monkey bar 2

Figure 8 Burpees

Figure 9 Balance beam

From a metabolic point of view, the burpees during OCR trainings are very useful to improve the physical fitness levels of children and this system can also help to involve pupils in the class who cannot take part in physical training with control and support roles.

Anyway, the rational and wise distribution of the obstacles in the track made by the PE teacher generally help students to recover with short breaks between two obstacles, or eventually, from the burpees.

During the experience of OCR training in schools, managing correctly energies by the students during the track was thought through analysing the modulation of intensity of famous athletes during their competitions and through simple practical tests during mini competitions in schools.

Obstacle Course PE lesson at school

If well planned, an OCR path could be realized in a simple or in a more complex way in schools using tools (chairs, hurdles, benches, poles, wall bars, etc.) and natural/artificial obstacles in and outdoor (hedges, small hills, brooks or stairs, low walls, stair railings, etc.).

During PE lessons it is realizable the creation of obstacle courses associated with running laps around the gym also organized as a race (Bellar, Hatchett, Judge, Breaux, & Marcus, 2015). If the gym is large and there are lot of equipment, it is possible to prepare two similar routes to avoid queues or two different routines for different levels of abilities.

These types of trainings, especially at school, are attractive even if they are not carried out in the form of competition and, if done outdoor, they raise pupils' awareness of the local environment heritage, increase their autonomy and self-esteem (Baghurst, Prewitt, & Tapps, 2019).

Conclusions

Due to the alarming data about the decrease of PA between students of all ages it is important to look for new incentives outdoor. Nowadays the OCR project carried out by the Italian school

showed that the motivation to be physically active was very strong during this unconventional OCR course and the joy of over pass an obstacle activated every student at the most.

Becoming familiar with OCR techniques, the OCR course has also strengthened the courage in facing more or less demanding obstacles and helped students to overcome everyone's fears developing personality as a whole.

Together with "standard" sport such volleyball, basketball, football, track and field, etc, OCR has the ability to boost the health and well-being of students in a fun way, especially if it is taught outdoor, re-evaluating the contact with the nature (Waite, 2011).
OCR training contributes to discover, learn, adapt and relearn motor skills to various tracks proposed each time and lead to a new way of shaping the knowledge and engaging at the same way children, youth and adults in the perception of the own body.

In the future, a more structured OCR program with contents organized in a taxonomic order and a methodological planning divided for the different grades of school would be desirable, as none of this already exists.

Moreover, an accurate and official description of tested obstacles would avoid improvisations by PE teachers or instructors that could be sometimes dangerous for the pupils' safety. In the same way, a specific preparation with OCR teacher training courses should be organized to share the techniques of overcoming obstacles, the specific athletic preparation for develop running and grip strengthens and to ensure the respect for safety measures. Those considerations would also be appropriate for sports club's instructors which often collaborate with schools during extracurricular activities.

Finally, further active researches are envisaged with the used of pilot schools and illustrative examples of good practices.

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Physical Education and Physical Activities Attitude in the Preservice Physical Education Teacher in Primary School for Healthy Active Living Research

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Abstract

Background: The role of physical activity in enhancing health is well recognized. However, physical activity rates are declining in more industrialized countries. To fight against this phenomenon, institutions and organizations institute physical activity promotion projects in primary schools to sensibilize children with physical activity. Thus, this study aimed to describe the physical activity profile of a community of primary teaching students. **Methods**: Physical activity was assessed using the official Italian short form of IPAQ, intended for digital use. Participation was voluntary, and students could fill out the questionnaire simply by clicking on a specific link received by email**. Results**: The final sample size was 168 primary teaching students, male and female, with gender imbalance (86% female and 14% male). Analyzing the years of practice, 30% of the participants did not practice any sport or activities. On the opposite, 21% started practising from one to three years ago, 18% from four to seven years ago, 7% from seven to ten years ago and 24% declared to have started more than ten years ago. In addition, data showed a percentage of 13% of inactive subjects (MET<600), 54% of moderate active (MET 600-3000), and 33% of active people (MET>3000). Finally, the more experienced showed a higher MET consumption ($p<0.001$). **Conclusions.** Primary teaching students tend to be gender imbalanced and moderately active. Future studies should investigate if this behaviour will positively reflect children's attitudes.

Key words: Physical education in primary school; Physical activity attitude; Healthy active living

Introduction

The Benefits of an active lifestyle are nowadays well recognized by the World Health Organization (WHO) (World Health Organization, 2010). The WHO promotes reaching a 150 min/week goal of moderate-to-vigorous intensity physical activity such as walking, running, cycling, or swimming to prevent cardiovascular diseases and comorbidities, improve immune system functions and reduce the risk of infections.(Tofas et al., 2020; Jones & Davison, 2019; Warburton & Bredin, 2017). Not only adults but also children are recommended to move regularly. The Centers for Disease Control and Prevention recommend 60 minutes or more of moderate-to-vigorous intensity physical activity each day for children(Centers for Disease Control and Prevention, 2019). Children practising regular physical activity have many benefits from school advantages to better health-related quality of life (Bermejo-Cantarero et al., 2017; Szabo-Reed et al., 2017).

However, in the major industrialized countries, physical activity rates seem to decline instead of increase(Brownson, Boehmer, & Luke, 2005). A significant study on the population of leading European countries revealed that sedentary behaviour increased by 8% in the last two decades (López-Valenciano et al., 2020). This trend is alarming when considering the dangerous consequences on the health of physical inactivity. To fight against this phenomenon, institutions and organizations institute physical activity promotion projects in primary schools to sensibilize children with the practice of physical activity (Smedegaard, Christiansen, Lund-Cramer, Bredahl, & Skovgaard, 2016). Nevertheless, the efficacy of interventions is usually related to the intensity of project actors' beliefs. Thus, teachers' verbal and nonverbal behaviours related to physical education may affect children's approach to physical activity(Brey & Pauker, 2019).

The easiest way to understand if a teacher is positively or negatively oriented to physical activities consists in investigating their lifestyle and rate of physical activity. An excellent tool to analyze the physical activity rate in a large population is the International Physical Activity Questionnaire (IPAQ). It was developed by various researchers from different countries, with support from the World Health Organization (WHO) and the US Centers for Disease Control and Prevention (CDC). (Craig et al., 2003)(Lee, Macfarlane, Lam, & Stewart, 2011a) IPAQ's unique feature is that it assesses all believed health-related physical activities that can take place in different settings. Thus, it is an appropriate tool to evaluate the practice of physical activity. Therefore, the purpose of this study was to describe the physical activity profile of a community of primary teaching students using the short version of IPAQ(Lee, Macfarlane, Lam, & Stewart, 2011b) intended for digital use.

Research Question

Are our primary school future teachers physically active? A description of the physical activity rate in primary school teaching students using the International Physical Activity Questionnaire

Materials and methods

Study design and ethical considerations

This descriptive study reports data gathered between October 2021 and March 2022 using an online survey. The online questionnaire was created using the Google online survey platform (Google LLC; Mountain View, CA, USA). The link to the survey was sent to the participants via email. According to the manufacturer's privacy policy (https://policies.google.com/privacy?hl=it), all answers were anonymous and confidential. This form was IP address case sensitive; therefore, nobody could submit another questionnaire from the same IP address once completed. Participants could abort or leave the questionnaire before the submission process. Participants had to submit the form by clicking on the "*submit*" button, and a message with the sentence "*The survey was successfully submitted. Thank you for participating*" would appear. Unsubmitted questionnaires were not saved and not included in the database

Participants

Participants were recruited among fourth years students of the primary teacher education faculty of the University of Turin. Inclusion criteria were as follow: a) be registered at the University of Turin; b) attend the fourth year of primary teacher education; c) attend the course of physical education methodology. Therefore, Erasmus students, students not attending the fourth year of the primary teacher education faculty and the course of physical education methodology were excluded from this survey.

Three hundred and thirty subjects filled out the questionnaire. However, 162 answers have been rejected because participants did not meet the inclusion criteria. The remaining 168 answers were considered acceptable for further analysis.

Outcome measures

The questionnaire included an introductory section with the background, the purpose of the study, and the anonymity and confidentiality declarations. At the end of this section, participants were asked to provide informed consent to participate in the survey. The questionnaire would not begin if the participants did not provide informed consent.

In the first section, the following demographic information was collected: gender, date of birth, body height, body weight, year of attendance, sport practised (if any), and years of practice (if any). The second section of the survey included the Italian version of the International Physical Activity Questionnaire - Short Form (IPAQ-SF) (Minetto et al., 2018). The IPAQ-SF is a self-reported assessment of the time spent at different physical activity intensities in four domains: (1) work, (2) transport, (3) domestic and gardening, and (4) leisure time during the last seven days. This tool categorizes the levels of physical activity as low, moderate, and vigorous (days/week, hours, and minutes per day) and records daily sitting time. From these values, it is possible to calculate the total amount and intensity of physical activities per week in terms of Metabolic Equivalent Tasks (MET), according to the following formulae: low activity (walking) = (3.3 x walking minutes x

walking days); moderate activity = (4.0 x moderate activity minutes x moderate activity days); vigorous exercise = (8.0 x vigorous activity minutes x vigorous activity days (www.ipaq.ki.se). Outcomes were classified into three categories: inactive (< 600 MET-min/w), moderately active (600-3000 MET-min/w) and active (> 3000 MET-min/w), according to the scoring system provided by IPAQ (Craig et al., 2003).

Statistical Analysis

Data were exported from the online forms to a Microsoft Excel spreadsheet and checked for outliers according to IPAQ guidelines (www.ipaq.ki.se). All data were analyzed using SPSS, version 19.0 (SPSS Inc., Chicago, IL, USA). Questionnaires that did not meet the inclusion criteria were not considered for further analysis.

Descriptive statistics ((mean and standard deviation (SD)) and count and percentage were used to present demographic data and levels of physical activity (low, moderate or vigorous). In addition, an unpaired T-Test was used to assess differences in MET consumption between groups considering years of practice in sports or activities for fitness and health.

Results

Participants' anthropometric characteristics are represented in Table 1.

Mean age is 25±5 years, mean height 170±7,44 cm, mean weight 59,70±10,57 kg and mean BMI 21,2± 3,05 kg/m^2. Spitting for gender, males showed a mean age of 26±8 years, mean height 177±6,87 cm, mean weight 71,23±9,37 kg and mean BMI 22,81±2,09 kg/m^2. On the opposite, females show a mean age of 24±6 years, mean height of 166±6,40 cm, mean weight of 57,76±9,45 kg and mean BMI of 20,96±3,10 kg/m^2. Participants' gender analysis showed a significant imbalance between females (86%) and males (14%) (Table 1).

Regarding physical activity, 30% of the participants declared not to practice any sport or activities for fitness and wellness. However, the remaining 70% reported practising sports or activities for fitness and health, and they started to participate in physical conditioning from one to three years ago (21%), from four to seven years ago (18%), from seven to ten years ago (7 %). Finally, 24% declared to have started more than ten years ago (Table 1).

IPAQ outcomes are shown in Figure 3. We detected a percentage of 13% of inactive subjects (MET<600), 54% of moderate active (MET 600-3000), and 33% of active people (MET>3000) (Figure 1). In addition, a significant difference in MET consumption was observed considering years of practice in sports or activities for fitness and health (P<0.001; do not practice or practice less than three years versus more than four years) (Figure 2).

Table 1 Representation of sociodemographic variables. We collected gender, age, Body Mass Index (BMI), practised sport (if any), and the related years of practice. Data are represented with Meand ± SD and per centage (%)

Total sample (n = 168)												
Sex	Number	%	Age	Height (cm)	Weight (kg)	BMI (kg/m2)	Sport Practice	Number	%	Years of practice	Number	%
Male	24	14	26±8	177±6,87	71,23±9,37	22,81±2,09	Yes	114	70%	0	51	30
Female	144	86	24±6	166±6,40	57,76±9,45	20,96±3,10	No	54	30%	1--3	36	21
										4-7	30	18
										7-10	11	7
										10+	40	24

Discussion

This study aimed to describe the rate of physical activity in a community of future primary school teachers. IPAQ was massively used to obtain data on the rate of physical activity due to its versatility in submission and ease in data acquisition (Al-Hazzaa, 2007; Pedro Curi Hallal, Victora, Wells, & Lima, 2003; Saran, Owoc, & Bojar, 2018). For this reason, it was utilized to assess the rate of physical activity in a large group of subjects. Firstly, this study shows that the population is pretty young (age 25±5 years, height 170±7,44 cm, weight 59,70±10,57 kg and BMI 21,2± 3,05 kg/m^2), and the gender prevalence is female (84%). This outcome agrees with the Organisation for Economic Cooperation and Development (OECD). This organization affirmed that there had been a feminization of the teaching profession in all industrialized countries (OECD, 2016). In addition, several studies conducted on teachers' communities in different countries showed a systematical prevalence of females than males in their sample (Boström et al., 2020; Kreuzfeld & Seibt, 2022; Orejudo, Navarro, Vicente, & Cardoso, 2020). Therefore, this trend is also identified in the primary teaching faculty where females are prevalent and might be a sort of influence due to gender imbalance in the teaching profession.

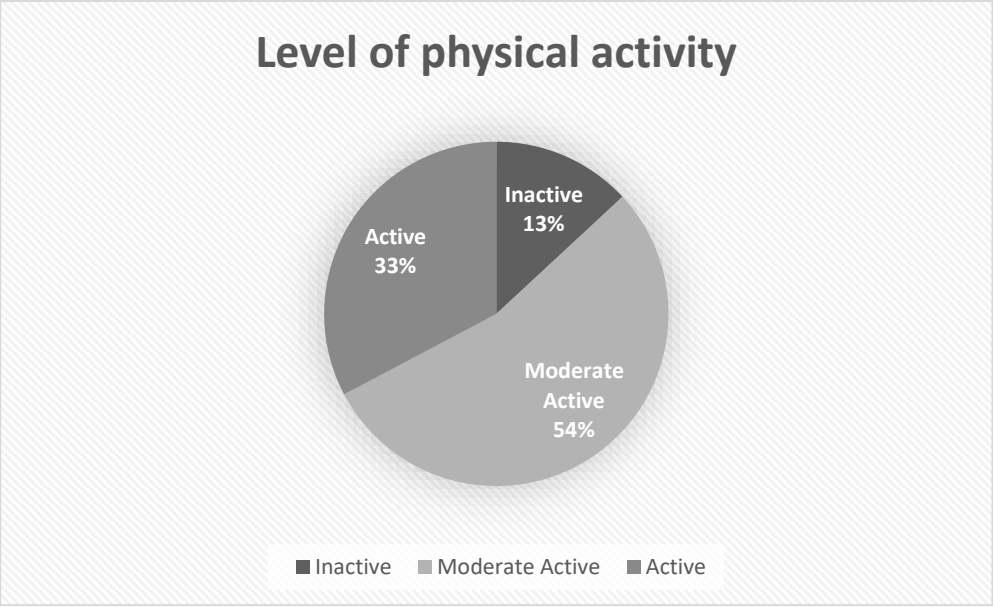

Figure 1 Physical activity rate using IPAQ. 13% of the responders are inactive, 54% moderately active and 33% active.

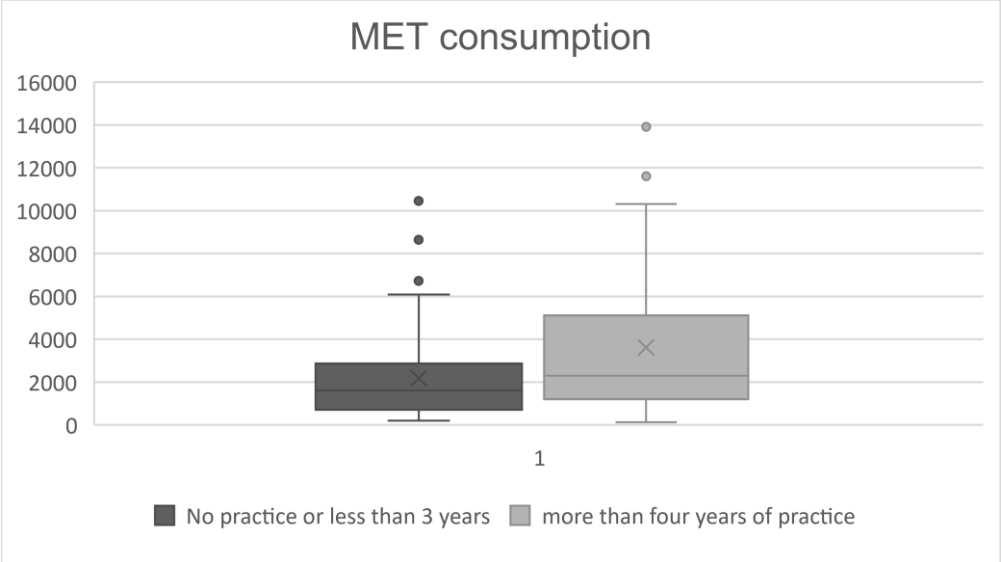

Figure 2 Representation of MET consumption among groups related to years of practice in sport or activities for fitness and wellness. Responders with more experience consume more MET a week than the less experienced (p < 0,001; no experience or less than three versus more than four years of practice).

Secondly, this study shows that just over half of the population reached by this survey declared to be moderately active (54%). Thus, people were moderate-active for at least 30 minutes or more a day, five days a week. Besides, the inactive population was 13%, while the active or very active part was 33%. These outcomes are interesting because they show a partial inversion of the alarming trend of a sedentary style in industrialized countries (Brownson et al., 2005). In addition, women are generally less active than men since childhood (Telford, Telford, Olive, Cochrane, & Davey, 2016; Trost et al., 2002). This behaviour belongs to psychosocial and cultural variables(Edwards & Sackett, 2016) that lead women to be less engaged in physical activity programs. This fact is probably related to women being more engaged in the household than men (Cerrato & Cifre, 2018). Therefore, having a prevalence of moderate active or active people in a gender-imbalanced population is encouraging for a future inversion of this trend. However, this study was conducted on students, and tendentially young people are more active than adults or the elderly (Hallal et al., 2012). Therefore, future studies should investigate the rate of physical activity in professional primary teachers' communities to understand better the role of activities for fitness and health in these gender-imbalanced populations.

Furthermore, responders had to indicate how many years of experience they had in their training program. Outcomes showed that 30% did not practise regular training programs. 21% had less than three years of experience, 18% had from four to seven,7% from seven to ten years of experience, and 24% had more than ten years. In addition, this study identified that the more experienced (4 years of experience or more) spent more significant time in training and consumed a higher amount of energy than the less experienced. Physical activity produces many benefic

effects on the body and mind and generates a wellness state that positively affects people's lifestyles (Fox, 1999; Heijnen, Hommel, Kibele, & Colzato, 2016). Therefore, those who used to exercise regularly internalize it and feel it as an essential need. Thus, they may be more inclined to share the importance of practising regular exercise. If this attitude belongs to teachers, they will reflect on their students (Trigueros, García-Tascón, Gallardo, Alías, & Aguilar-Parra, 2020).

Finally, the present study is subject to the following limitations. First, this report used the short form of IPAQ submitted by email. Thus, as with any questionnaire, the respondents could have suffered from multiple link sending or internet connection problems. Secondly, the sample in the present study was recruited only among students belonging to the University of Turin. Thus, the sample size was limited to this community. Therefore, a more significant sample may be necessary to describe better this scenario.

Conclusion

The present study's findings underline that a moderately active lifestyle is more consistent in primary teaching students. Also, responders with more than four years of experience in physical activities for fitness and wellness spent more time in training and consumed more energy. Therefore, an active lifestyle starts gaining consideration among primary teaching students. However, future studies among primary teachers and primary teaching students are necessary to investigate if this behaviour will positively reflect children's attitudes.

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French Articles

Influencée de l´angle cuisse-tronc sur la mobilité de la chaine posturale

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Resumé

Cette étude a pour objectif d'analyser le rôle que joue l'angle articulaire cuisse-tronc dans la mobilité du corps. Il a été démontré dans des études antérieures, que la réduction de la surface de contact ischio-fémoral avec l'assise favorisait une performance dans des tâches exécutées en position assise, Lino et Bouisset (1993) ; Goutal *et al.* (1994) ; Bouisset *et al.* (2002) ; Le Bozec *et al.* (2004). Deux conditions d'assise (100-IFC et 30-IFC) et deux conditions d'angle cuisse-tronc (C-T) (45° ou 0°) ont été étudiées. La diminution de la surface de contact ischio-fémorale de 100-IFC à 30-IFC combinée à la modification de l'angle cuisse tronc favorise une performance plus élevée dans la condition 30-IFC à 45° comparée aux autres conditions.

Mots clés : Mobilité articulaire, Surface de contact ischio-fémoral, Flexion du tronc, Performance

Introduction

Il a été montré que la réduction de l'aire de contact ischio-fémoral avec l'assise favorisait la performance. Les études antérieures de Lino *et al.* (1992), sur une tâche de pointage, Lino et Bouisset (1993) ; Goutal *et al.* (1994) ; Bouisset *et al.* (2002) ; Le Bozec *et al.* (2004), de Diakhaté *et al.* (2013) sur le Sit-to-Stand (StS) et celle plus récente de Diakhaté *et al.* (2014) sur une tâche de poussée l'ont tous montré. L'augmentation de la mobilité du bassin est observée dans des tâches exécutées aussi bien en position statique qu'en dynamique. L'augmentation de la mobilité du bassin améliore la performance dans des tâches exécutées en position assise. Les auteurs ont lié ces résultats à une modification de la mobilité du pelvis quand l'aire de contact ischio-fémoral avec l'assise est réduite.

Cependant, aucune de ces études n'a mis en évidence l'interaction qu'il y a entre le tronc et les cuisses, quand l'angle cuisses-tronc (C-T) est modifié, sur la mobilité du bassin et du rachis. C'est ce que nous allons tenter de démontrer dans cette étude.La modification de l'angle C-T changerait-elle la mobilité du bassin et du rachis. En effet, plus cet angle est fermé, plus la mobilité de l'un et de l'autre diminuent, même si la surface de contact ischio-fémoral a été réduite.

Même si la diminution de la surface de contact ischio-fémorale augmente la mobilité du corps. Est-elle la seule à influencer la mobilité articulaire ?

Cette étude a pour objectif principal d'analyser le rôle que joue l'angle articulaire cuisse-tronc (C-T) dans la mobilité du corps. En d'autres termes, de regarder comment la position articulaire de la hanche influe sur la performance. La modification de l'angle C-T sur la mobilité du corps a donc été étudiée. La démarche consistera à faire varier l'angle C-T au cours d'une tâche de sit-to-stand avec des surfaces de contact ischio-fémorale de 100-IFC et de 30-IFC.

Materiel et méthode

Sujet

Pour cette étude, nous avons testé 8 sujets masculins ne souffrant d'aucune pathologie musculo-squelettique et sensori-motrice. Tous les sujets étaient consentants et informés des objectifs de l'étude. Cette étude a été menée conformément à la déclaration d'Helsinki.

Matériel

Pour ce travail, nous avons utilisé une plateforme de force rectangulaire de (120 x 60) cm et d'un équipement en bois placé à côté de la plateforme qui nous permettait d'avoir un angle de 45 ° par rapport à la verticale. C'est un dispositif qui permet de placer le siège de force sur la plateforme de force, permettant ainsi de découpler les efforts verticaux au niveau du siège, des forces extérieures agissant sur le corps qui sont mesurées par la plateforme de force. La hauteur du siège est ajustable à la taille du sujet par un ajout de planche en bois. Cette adjonction est prise en compte dans

l'initialisation des capteurs avant chaque expérience. L'équipement en bois permettait au sujet d'aligner son tronc par rapport à la planche pour avoir un angle de 45 ° entre son tronc et ses cuisses. Le siège consiste en un carré en bois de 65 cm de côté solidaire d'un cadre métallique supporté par 3 pieds. Un capteur de force à jauge de contrainte travaillant en traction / compression, mesurant dans une gamme de 10 daN à 50 KN, est monté à chaque extrémité basse des pieds. A l'extrémité de chaque pied, une pointe métallique assure la bonne adhérence du siège sur le plateau afin qu'il n'y ait aucun mouvement relatif pendant l'exécution des séquences de levée, même pour les vitesses très élevées. (Son emplacement sur la plateforme est variable en fonction de la morphologie du sujet, et reste identique pour la même série d'essai, car systématiquement vérifié.

Protocole

Les sujets étaient assis sur le siège capteur de force, en posture inclinée à 45° ou 0° (c'est-à-dire, l'angle C-T fait soit 45°, soit 0°). Pour obtenir la posture à 45°, les sujets devaient aligner leurs troncs sur une structure en bois placée à 45° par rapport à l'horizontal. Les bras sont collés au corps et placés sur le dos du sujet pour éviter des oscillations pendant et à la fin du mouvement. L'écartement des pieds est de 30 cm, et sont placés à 15 cm du bord de la plateforme de force à l'aide de marquages, un au niveau du talon l'autre sur la plateforme de force.

Au signal de départ, le sujet devait se lever à la vitesse qu'on lui avait indiquée au départ. La durée des acquisitions était de 5 secondes, avec une fréquence de 250 hz. L'enregistrement des données commençait quelques secondes avant l'action de se lever et se terminait quelques secondes après le lever du siège. Le nombre d'essai par condition est de 10, ce qui faisait au total 40 essais par sujet pour les 4 conditions. L'ordre de passage dans les quatre conditions est fait de manière aléatoire, pour éviter l'effet de rang. La position des talons est identique pour tous les sujets. Deux conditions posturales sont considérées; assise sur toute la longueur fesses-cuisses (100-IFC) et assise sur 30 % de cette longueur (30-IFC) Ces deux conditions d'appui présentent le même polygone de sustentation, seule varie l'aire de contact avec l'assise (figure 1). Tous les sujets portaient le même short au moment des deux expériences.

Résultats

Les résultats ont permis de mettre en évidence l'importance de la mobilité articulaire dans la performance motrice. En effet, une modification de l'aire de contact ischio-fémoral couplée à une variation de l'angle C-T entrainent une modification des variations de performance. Nous nous intéresserons aux forces de réactions générées par la plateforme de force.

Détermination de la performance

Nous comparerons les caractéristiques cinématiques de la performance (vitesse et accélérations du centre de gravité) suivant les axes antéropostérieur et vertical, ainsi que l'instant du décollement des fesses.

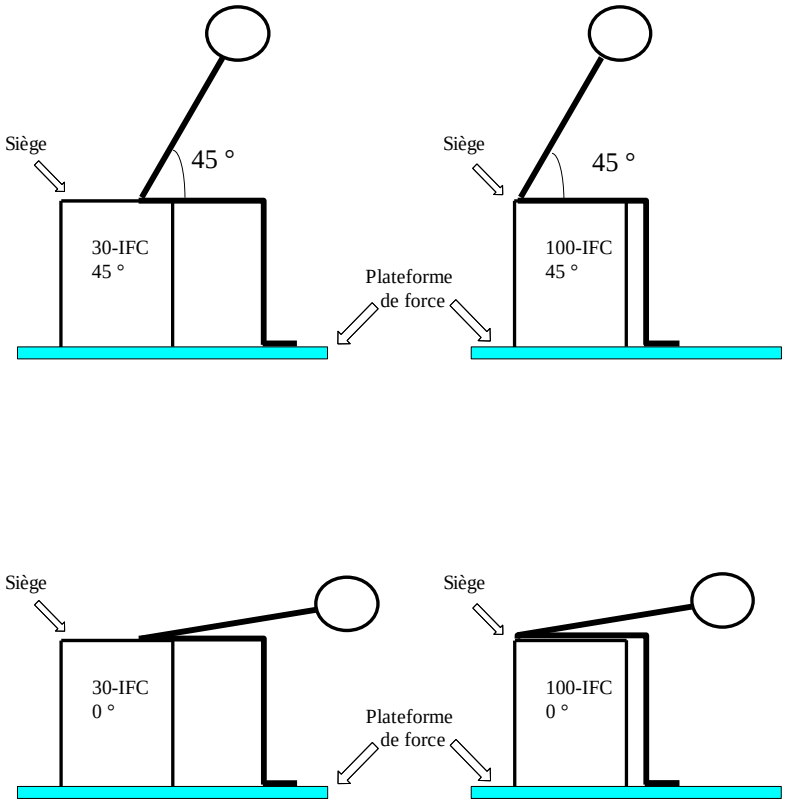

Figure 1 Conditions d'assise à 100-IFC 0 et 45°, et condition d'assise à 30-IFC 0 et 45°

30-IFC : 30 % de contact ischio-fémoral avec l'assise
100-IFC : 100 % de contact ischio-fémoral avec l'assise
0° : Angle formé par les cuisses et le tronc est de zéro degré
45° : Angle formé par les cuisses et le tronc est de quarante-cinq degrés

Les accélérations (Az et Ax), les vitesses (Vz et Vx), le long des axes verticaux et antéropostérieurs ; la vitesse antéropostérieure au moment du décollement des fesses (Vx_{df}), la durée nécessaire pour le décollement des fesses (DF) ainsi que le recul du centre des pressions (Xp) suivant l'axe antéropostérieur ont été relevés (figures 2, 3, 4, 5).

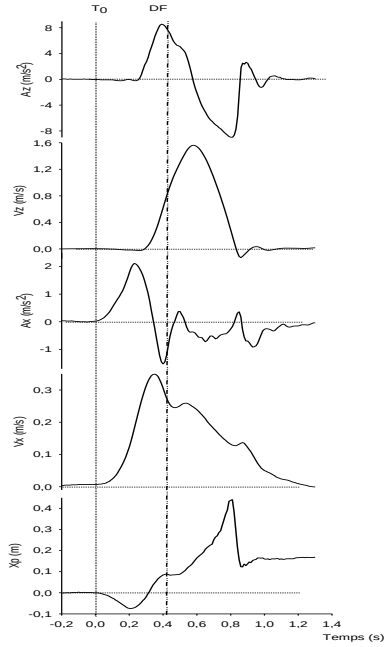

Figure 2 Tracés biomécaniques du sit-to-stand à 0° et 100 % d'assise pour un sujet et pour un essai

Az, Vz, accélération et vitesses verticales du centre de gravité ; Ax, Vx, accélération et vitesse antéropostérieure du centre de gravité ; Xp déplacement du centre des pressions, la ligne en pointillée indique le début du mouvement et la ligne en tiret indique le décollement des fesses (DF).

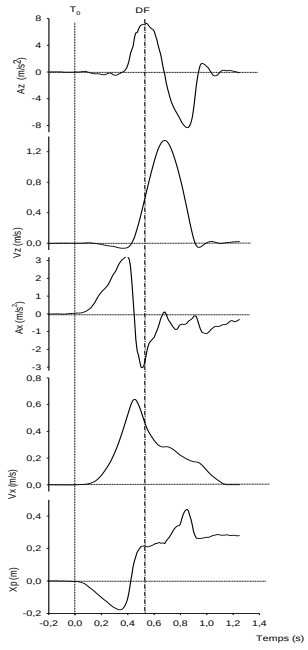

Figure 3 Tracés biomécaniques du sit-to-stand à 45 ° et 100 % d'assise pour un sujet et pour un essai

Az, Vz, accélération et vitesses verticales du centre de gravité ; Ax, Vx, accélération et vitesse antéropostérieure du centre de gravité ; Xp déplacement du centre des pressions, la ligne en pointillée indique le début du mouvement et la ligne en tiret indique le décollement des fesses (DF).

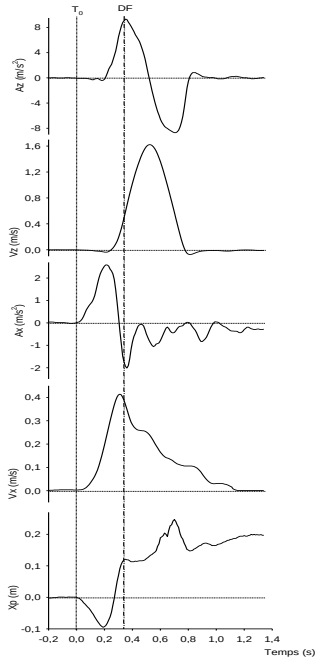

Figure 4 Tracés biomécaniques à 0 ° et 30 % d'assise pour un sujet et pour un essai

Az, Vz, accélération et vitesses verticales du centre de gravité ; Ax, Vx, accélération et vitesse antéropostérieure du centre de gravité ; Xp déplacement du centre des pressions, la ligne en pointillée indique le début du mouvement et la ligne en tiret indique le décollement des fesses (DF).

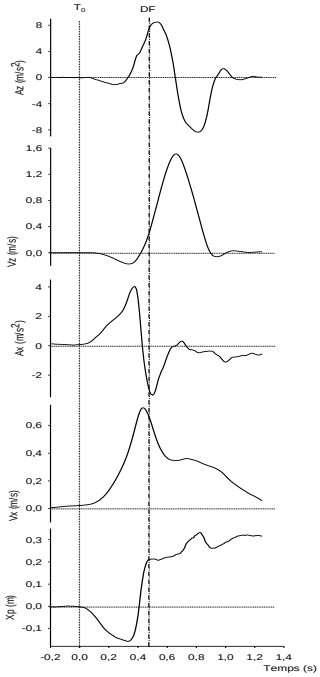

Figure 5 Tracés biomécaniques du sit-to-stand à 45 ° et 30 % d'assise pour un essai

Az, Vz, accélération et vitesses verticales du centre de gravité ; Ax, Vx, accélération et vitesse antéropostérieure du centre de gravité ; Xp déplacement du centre des pressions, la ligne en pointillée indique le début du mouvement et la ligne en tiret indique le décollement des fesses (DF).

Ces figures montrent des variations des tracés biomécaniques, qui sont reproductibles d'un sujet à un autre et d'un essai à l'autre. Les allures générales des courbes sont identiques avec des amplitudes différentes selon les conditions des essais. Le début du mouvement symbolisé par la ligne en pointillés commence par un recul du centre des pressions suivi au même instant d'une augmentation de l'accélération antéropostérieure pour atteindre son pic avant de décliner pour atteindre des valeurs négatives, avant de revenir sur la ligne de base. On note une cupule négative suivant l'axe vertical au début du mouvement, mais elle est moins importante dans la condition d'inclinaison du tronc à 45° et presque inexistante dans la condition 0°.

L'accélération antéropostérieure atteint son pic avant de redescendre à son minimum qui coïncide avec le maximum de l'accélération verticale. Les pics des vitesses verticales et antéropostérieures sont atteints au moment où les accélérations verticales et antéropostérieures changent de signe. L'instant du décollement des fesses survient peu de temps après le pic de l'accélération verticale. Tous ces paramètres reviennent à leurs valeurs initiales sauf pour la valeur du centre des pressions du fait du changement de posture. Le sujet n'étant plus assis, mais debout.

Accélérations verticales et antéropostérieures du centre de gravité

Accélération verticale

L'accélération verticale maximale dans la condition 0° est de 5 m/s^2 à 100-IFC et 5,16 m/s^2 à 30-IFC (figures 2,3 et tableau 1), alors que dans la condition 45 °, elle vaut respectivement 5,31 m/s^2 et 5,71 m/s^2 (figures 4, 5 et tableau 2). Dans la première condition, l'analyse de la variance montre qu'il n'y a pas de différence significative ($F(1,7) = 3,02$; $p > 0,5$), tandis que dans la deuxième condition, l'analyse de la variance montre une différence très significative ($F(1,7) = 12,77$; $p < 0,01$).

Accélération antéropostérieure

Suivant l'axe antéropostérieur, l'accélération vaut respectivement dans la condition 0° 2,32 m/s^2 et 2,49 m/s^2 respectivement à 100-IFC et 30-IFC (tableau 1). L'analyse de la variance montre une différence non significative avec un effet courant ($F(1,7) = 2,89$; $p > 0,5$). Dans la condition 45 °, l'accélération antéropostérieure est de 2,69 m/s^2 à 100-IFC et de 3,29 m/s^2 à 30-IFC (tableau 2). Cette différence est hautement significative avec un effet courant ($F(1,7) = 38,47$; $p < 0,001$).

Vitesse verticale et antéropostérieure du centre de gravité

Vitesse verticale

La vitesse maximale atteinte lors du StS est l'un des critères de la performance. Elle est dans la condition 0° de 1,03 m/s et 1,12 m/s respectivement à 100-IFC et 30-IFC pour un effet courant ($F(1,7) = 2,32$; $p > 0,5$) (tableau 1) donc statistiquement pas significatif. Mais dans la condition 45

°, cette vitesse est égale à 1,08 m/s à 100-IFC et 1,24 m/s à 30-IFC (tableau 2) pour un effet courant ($F(1,7) = 7,42$; $p < 0,05$). Le résultat montre une différence significative.

Vitesse antéropostér*ieur*e

Suivant l'axe antéropostérieure, la vitesse est de 0,44 m/s à 100-IFC et 0,32 m/s à 30-IFC dans la condition 0°. L'ANOVA montre une différence pas significative avec un effet courant ($F(1,7) = 1,29$; $p > 0,5$) (tableau 1). Alors que dans la condition 45°, l'analyse de la variance montre une différence significative avec un effet courant ($F(1,7) = 9,06$; $p < 0,01$) (tableau 2).

Déplacement du centre des pressions

Le déplacement du centre des pressions a été relevé suivant l'axe antéropostérieur. Le recul du centre des pressions est de 9 cm à 100-IFC et 11 cm à 30-IFC dans la condition 0°. On note une différence non significative d'après l'analyse de la variance ($F(1,7) = 1,84$; $p > 0,5$). Concernant la condition 45 °, le recul du centre des pressions à 100-IFC est de 14 cm et à 30-IFC de 23 cm avec une différence hautement significative ($F(1,7) = 61,122$; $p < 0,001$).

Durée nécessaire pour le décollement des fesses.

La durée nécessaire pour le décollement des fesses est beaucoup plus courte à 30-IFC qu'à 100-IFC dans la condition 0°. Elle est respectivement de 340 ms et 430 ms, une différence hautement significative, avec un effet courant ($F(1,7) = 46,87$; $p < 0,001$). Quant à la condition 45 °, cette durée est de 500 ms et 370 ms respectivement pour 100-IFC et 30-IFC. On note une différence statistique très significative comme dans la condition 0°. L'analyse de la variance donne ses résultats ($F(1,7) = 35,47$; $p = 0,001$).

Tableau 1 Moyenne et écart-type des différents paramètres relevés dans le sit-to-stand (StS) à 0°

	100-IFC 0°	30-IFC 0°	P
$Az_{sts}(m/s^2)$	5,00 (±2,27)	5,16 (±2,55)	Ns
Vz_{sts} (m/s)	1,03 (±0,38)	1,12 (±0,28)	Ns
Ax_{sts} (m/s^2)	2,32 (±0,73)	2,49 (±0,88)	Ns
Vx_{sts} (m/s)	0,44 (±0,34)	0,32 (±0,06)	Ns
Vx_{df} (m/s)	0,33 (±0,17)	0,30 (±0,06)	Ns
Xp_{sts} (m)	-0,09 (±0,03)	-0,11 (±0,02)	Ns
DF (ms)	430 (±70)	340 (±70)	**

Pic vertical (Az_{sts}) de l'accélération du centre de gravité et de sa vitesse (Vz_{sts}) ; pic antéropostérieur de l'accélération du centre de gravité (Ax_{sts}) et de sa vitesse (Vx_{sts}) ; Vx_{df}, vitesse antéropostérieure au moment du décollement des fesses ; Xp_{sts}, recul maximum du centre des pressions ; DF, durée

nécessaire pour le décollement des fesses ; ms : millisecondes. P : Probabilité ; ** P < 0,01 ; ns : non significatif.

Tableau 2 Moyenne et écart-type des différents paramètres relevés dans le sit-to-stand (StS) à 45°

	100-IFC 45°	30-IFC 45°	P
$Az_{sts}(m/s^2)$	5,31 (±2,46)	5,71 (±2,55)	**
Vz_{sts} (m/s)	1,08 (±0,28)	1,24 (±0,23)	*
Ax_{sts} (m/s^2)	2,69 (±0,72)	3,29 (±0,82)	***
Vx_{sts} (m/s)	0,53 (±0,23)	0,64 (±0,19)	*
Vx_{df} (m/s)	0,38 (±0,11)	0,45 (±0,11)	Ns
Xp_{sts} (m)	-0,14 (±0,02)	-0,23 (±0,07)	***
DF (ms)	500 (±70)	370 (±50)	***

Pic vertical (Az_{sts}) de l'accélération du centre de gravité et de sa vitesse (Vz_{sts}) ; pic antéropostérieur de l'accélération du centre de gravité (Ax_{sts}) et de sa vitesse (Vx_{sts}) ; Vx_{df}, vitesse antéropostérieure au moment du décollement des fesses ; Xp_{sts}, recul maximum du centre des pressions, DF, durée nécessaire pour le décollement des fesses ; ms : millisecondes ; P : Probabilité ; * : p < 0,05 ; ** P < 0,01 ; *** : p < 0,001 ; ns : non significatif.

Discussion

Les résultats montrent que la modification de l'aire de contact ischio-fémoral associé à une modification de l'angle articulaire entre le tronc et les cuisses a une influence sur la performance dans la tâche de StS. En effet, dans la condition 0°, on ne note pas de différence significative pour les différents paramètres relevés (tableau 1) (l'accélération verticale du centre de gravité, la vitesse verticale du centre de gravité, l'accélération antéropostérieure du centre de gravité ainsi que sa vitesse, la vitesse au moment du décollement des fesses, le recul maximum du centre des pressions) sauf pour la durée du décollement des fesses. Cependant dans la condition 45 °, on note des différences significatives à hautement significatives sauf pour la vitesse antéropostérieure au moment du décollement des fesses.

Comme le sujet adopte la même posture entre les conditions 100-IFC et 30-IFC. Le fait qu'il n'y a pas de différence significative dans la condition 0° contrairement à la condition 45° peut s'expliquer par la modification de l'angle articulaire entre le tronc et les cuisses. En effet, les études de Lino *et al.* (1992); Goutal *et al.* (1994); Bouisset *et al.* (2002) ; Le Bozec *et al.* (2004) et celle plus récente de Diakhaté *et al.* (2013), ont démontré que la modification de la surface de contact ischio-fémoral sur des tâches de poussée et de sit-to-stand favorisait la dynamique du corps et donc la performance qui en découlait. Le fait de ne pas observer de différence significative dans la condition 0° entre 100-IFC et 30-IFC, nous pousse à croire que cette position limite la mobilité articulaire au niveau du rachis et de l'articulation de la hanche. En effet, la position 0° limite la mobilité du rachis et

aussi celle de la hanche. Ici, le sujet ne profite presque pas de l'ouverture de l'angle entre les cuisses et le tronc. Dans le sit-to-stand normal où le sujet est en posture assise redressée, Diakhaté *et al.* (2013), le sujet déplace son tronc vers l'avant en adoptant un certain angle avant de se lever dans la verticalité. On note aussi une différence significative des vitesses (antéropostérieure et verticale) et des accélérations (antéropostérieure et verticale) entre les deux assises (100-IFC versus 30-IFC). De même, dans la condition 45°, la performance est toujours plus importante à 30-IFC. La diminution de l'appui ischio-fémoral ne change pas le polygone de sustentation, Diakhaté *et al.* (2013). Mais la vitesse est plus importante à 30-IFC et la durée nécessaire pour se lever du siège est diminuée.

En accord avec la littérature, Zattara et Bouisset (1988) ; Bouisset *et al.* (2002) ; Le Bozec *et al.* (1997) et Le Bozec *et al.* (2001), les résultats de cette étude ont montré que le corps est le siège de phénomènes dynamiques. La dynamique posturale observée serait favorisée par la mobilité lombo-pelvienne. En effet, d'après Vandervael (1956), la modification du bassin en fonction de l'assise serait favorable à une augmentation de la dynamique posturale. A 0° le bassin ne peut utiliser sa mobilité quelle que soit la condition d'assise, car le débattement possible en antéversion et en rétroversion comme précédemment souligné est quasi impossible du fait de la posture adoptée.

Toujours en accord avec la littérature, un recul plus important du centre des pressions suivant l'axe antéropostérieur a été noté dans les études de Le Bozec *et al.* (1997) et Lino *et al.* (1992) quand on passe de 100-IFC à 30-IFC. Les résultats dans la condition 45° vont dans le même sens, contrairement aux résultats dans la condition 0°. En effet à 45°, le recul qui était de 14 cm à 100-IFC sera de 23 cm à 30-IFC. C'est une différence absolue de 9 cm qui peut s'expliquer par le fait que les sujets sont penchés vers l'avant, ce qui peut contribuer à augmenter ce recul. Dans la condition 0°, le recul du centre des pressions est de 9 cm à 100-IFC et 11 cm à 30-IFC, une différence qui n'est pas statistiquement significative (tableau 1).

Ces études montrent que la variation de l'angle C-T réduit l'amplitude articulaire des articulations de la colonne vertébrale ainsi que celle de la hanche. Cette réduction entraîne une performance presque similaire, entre 30-IFC et 100-IFC, à 0°. Néanmoins une performance plus accrue est observée à 30-IFC par rapport à 100-IFC dans la condition 45° et une performance aussi grande à 30-IFC dans la condition d'assise redressée, Diakhaté *et al.* (2014).

Conclusion

Cette recherche a confirmé les travaux de Bouisset *et al.* (2002), Le Bozec et Bouisset (2004) et Diakhaté *et al.* (2014) sur l'importance de la mobilité articulaire dans la performance motrice.
En effet cette mobilité est favorisée d'une part par la réduction de la surface de contact ischio-fémoral avec l'assise dans des tâches motrices exécutées en position assise, et d'autre part par l'angle formé par les cuisses et le tronc toujours dans des tâches motrices effectuées en position assise. En effet, la variation de la surface de contact ischio-fémorale combinée à la modification de l'angle entre les cuisses et le tronc nous montrent que la réponse motrice dans des tâches exécutées en position assise est augmentée avec une mobilité plus importante du corps.

Ces résultats pourraient être utilisés pour la confection des sièges des voitures qui permettraient au conducteur d'avoir une meilleure réactivité en cas d'urgence et aussi dans la confection de sièges ajustables destinés aux personnes à mobilité réduite.

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Les activités physiques et sportives au Maroc: constats, contraintes et voies d'amélioration

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Introduction

Les mesures drastiques prises par les gouvernements, tout comme celui du Maroc, pour faire face à la propagation de la pandémie du Covid 19, en décrétant l'arrêt de toutes les activités non indispensables à la vie quotidienne, ont obligé les citoyens à se confiner dans leurs foyers. Cette situation exceptionnelle a soulevé des questions relatives à la santé physique et mentale de l'individu face à l'inactivité totale. L'objectif escompté, à travers cet article est de soulever des questions relatives aux Activités Physiques et Sportives (APS) au Maroc, notamment le degré d'intérêt du citoyen marocain à pratiquer les APS, ses motivations, les actions initiées par les pouvoirs publics, l'existence ou non d'une culture sportive ancrée au niveau de la population marocaine, et enfin les contraintes d'ordre socio-économique et culturelles qui peuvent entraver le développement des APS au Maroc. Pour apporter des réponses à ces questions, l'étude a eu recours à l'analyse de la documentation officielle, le benchmark avec des actions développées au niveau international et les résultats des enquêtes de terrain réalisées au niveau du Maroc autour du même sujet.

Mots clés Activités physiques et sportives, culture, enquête.

I) Approche théorique relative à la pratique de l'APS

Il nous parait judicieux de présenter dans un premier lieu, une définition des concepts qui seront utilisés tout au long de cet article. Dans un deuxième lieu, de mettre en exergue l'importance de la pratique des APS, ses apports à tous les niveaux, notamment pour faire face au phénomène de l'obésité.

1. Définition des concepts

Selon l'Organisation Mondiale de la Santé (OMS), l'activité physique est tout mouvement corporel produit par les muscles squelettiques qui requiert une dépense d'énergie. L'APS inclut des activités qui peuvent être pratiquées dans des contextes différents de la vie quotidienne – l'activité physique au travail, pendant les déplacements, à la maison, l'activité physique de loisir. « *L'activité physique et sportive est caractérisée par un certain nombre de paramètres mesurables (fréquence, durée, intensité, type de pratique), dont la combinaison permet de connaître le niveau d'activité physique d'une population donnée. Généralement la mesure de l'activité physique s'effectue à l'aide de paramètres partagés au niveau international. En effet, les professionnels de l'activité physique jugent le niveau de la pratique selon son contexte, sa nature, son intensité, sa durée, sa fréquence.* »[1]

2. Importance des APS

Selon, l'Institut National de la Santé et de la Recherche Médicale (INSERM)[2], il est aujourd'hui « *scientifiquement avéré que la pratique régulière d'une activité physique, même d'intensité modérée, peut constituer un élément de prévention ou de traitement de nombreuses maladies et améliorer le bien-être physique, mental et social* ».[3]

La pratique d'une activité physique régulière permet, selon le même rapport, de réduire le risque de la mortalité prématurée toutes causes confondues par rapport au fait d'être inactif notamment la mortalité cardiovasculaire. Elle est en effet un élément important de la prévention et du traitement des maladies cardiovasculaires. Aussi elle diminue le risque de développer certains cancers : diminution moyenne de 40% à 50% du risque de développer un cancer du côlon chez les sujets physiquement actifs, et probablement, de 30% à 40% pour le cancer du sein chez les femmes; elle pourrait aussi réduire le risque du cancer de l'endomètre ;

De même, elle constitue un facteur d'équilibre en santé mentale et peut constituer un élément de prévention et de prise en charge de la dépression et de l'anxiété. Elle améliore l'estime de soi, le bien-être subjectif et peut contribuer à la prévention de pathologies liées au stress.

[1] https://www.who.int/fr/news-room/fact-sheets/detail/physical-activity

[2] Créé en 1964, l'Institut national de la santé et de la recherche médicale est un établissement public à caractère scientifique et technologique, placé sous la double tutelle du ministère de la Santé et du en France (In : www.inserm.fr)

[3] Inserm (2008).Activité physique Contexte et effets sur la santé. Expertise collective p-p 682-728

Néanmoins, le rapport de l'INSERM souligne que ces bénéfices de l'activité physique régulière sont tributaires du respect de précautions élémentaires, un suivi médical adapté et un encadrement compétent. Dans ces conditions, les bénéfices d'une activité physique et d'une pratique sportive régulière l'emportent très largement sur les risques qui leur sont associés.

A remarquer, que les récentes études et recherches scientifiques présentent des chiffres alarmants, à savoir un déclin de l'activité physique chez les jeunes, tant aux pays développés que chez les pays en voie de développement. De plus, la nouvelle génération souffre du problème d'obésité chez les enfants.

3. Des statistiques inquiétantes

Les statistiques de l'OMS[4] tirent la sonnette d'alarme concernant le phénomène de l'obésité:

- 58 millions de personnes meurent chaque année d'une maladie non transmissible (diabète, l'obésité et le cancer...).
- Les maladies non transmissibles représentent approximativement 60% de tous les décès dans le monde chaque année, et 66% des 35 millions de ces décès surviennent dans des pays en voie de développement.
- L'obésité infantile est un problème croissant, avec près de 22 millions d'enfants de moins de cinq ans et 155 millions (soit 10%) en âge scolaire (5-17 ans) en surcharge pondérale, dont 30-45 millions d'obèses.

3.1 Au niveau mondial

En 2020, la banque mondiale a publié un rapport intéressant intitulé « ***health and economic consequences of an Imdepending global challenge*** «. Selon ce rapport, les maladies liées à la surcharge pondérale figurent aujourd'hui parmi les trois premières causes de mortalité dans toutes les régions du monde. L'obésité a presque triplé depuis 1975 et elle est désormais responsable de quatre millions de décès dans le monde chaque année.

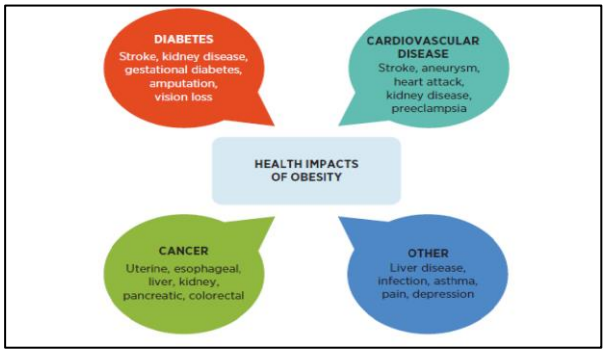


Figure 1 les répercussion sanitaires de l'obésité[5]

[4]O.M.S (2003). Obésité : prévention et prise en charge de l'épidémie mondiale rapport d'une consultation de l'OMS, Genève.

La généralisation des produits ultra transformés et sucrés, le recul de l'activité physique et la hausse des niveaux de vie, qui s'accompagne souvent d'une consommation plus importante d'aliments nocifs pour la santé, sont autant de facteurs qui favorisent la progression des problèmes de surcharge pondérale. En outre, les individus et la société devront non seulement supporter ce coût sanitaire, mais aussi des coûts indirects dus à la baisse de la productivité du travail, à l'absentéisme et aux retraites anticipées.

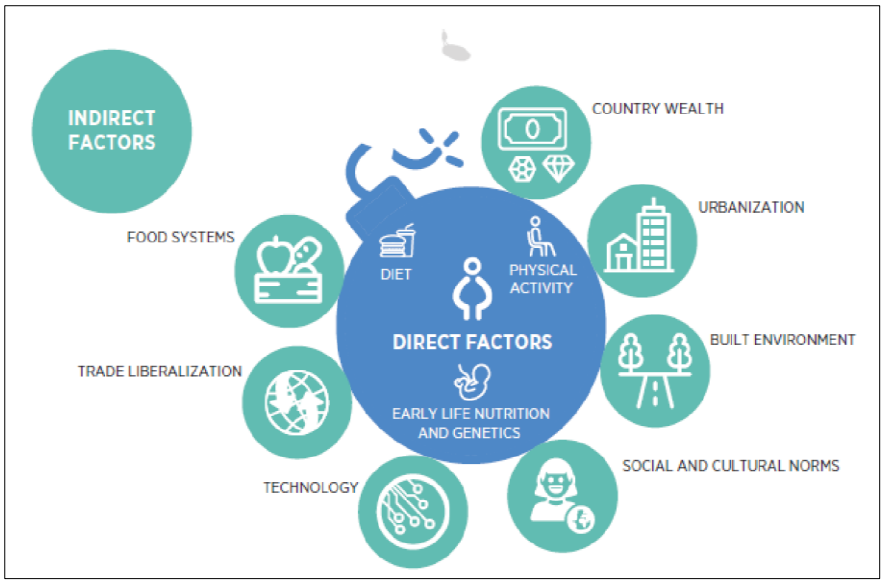


Figure 2 Facteurs affectant l'obésité : un cadre conceptuel[6]

Selon l'OMS, la promotion des APS et la lutte contre la sédentarité sont des objectifs majeurs de santé publique, (2013). A cet effet, elle recommande de concevoir des politiques d'amplification de l'activité physique qui visent à faire en sorte que :

- "La marche, le vélo et les autres modes de transport actif non motorisé soient accessibles et sûrs pour tous ;
- Les politiques du travail et des lieux de travail favorisent les déplacements actifs et les occasions d'être physiquement actif pendant la journée de travail ;
- Les garderies, les écoles et les établissements d'enseignement supérieur disposent d'installations et d'espaces sûrs et accueillants où les élèves et les étudiants peuvent se dépenser pendant leurs temps libres ;
- Les établissements scolaires (premier et second degré) dispensent des cours d'éducation physique de qualité qui aident les enfants à adopter des comportements qui les maintiendront physiquement actifs toute leur vie ;
- Les programmes communautaires et scolaires offrent à tous, quels que soient l'âge et les aptitudes de chacun, la possibilité de faire du sport ;

[5] Banque Mondiale (2020). « health and economic consequences of an Imdepending global challenge «. p 6.
[6] Banque Mondiale (2020). «health and economic consequences… Op cit p 8.

- Les installations sportives et récréatives offrent à chacun la possibilité de pratiquer une variété de sports, de danses, d'exercices et de loisirs actifs." [7]

3.2 Au Maroc

En 2011, le Haut-commissariat au Plan (HCP) a mené une enquête auprès de 2426 ménages. Selon ses résultats, près du tiers de la population du Maroc (soit environ 10,3 millions de personnes avec un adulte sur cinq) connaissent des problèmes de surpoids. Une question de santé publique qui prend de l'ampleur depuis dix ans. Chez les enfants de moins de cinq ans, l'insuffisance pondérale est ainsi passée de 9,3% en 2004 à 3,1% en 2011, ce qui met le royaume en très bonne position par rapport à la moyenne mondiale (16%). Pour les adultes de plus de 20 ans, ils ne sont plus que 3,3% à être concernés contre 3,9% en 2001. Les femmes sont les plus touchées (26,8%), en particulier en milieu urbain. Sur 10 ans, l'obésité grave et morbide a augmenté de 7,3% par an en moyenne, s'alarme le HCP, relevant que l'inactivité ainsi que les niveaux de vie et d'éducation influent sur ce phénomène. Ainsi, la prévention d'une prise de poids excessive passe-t-elle par l'adoption d'une alimentation équilibrée et la pratique d'une activité physique régulière.

II) pratique des APS au Maroc

Pour répondre à la question suivante : qui pratique le sport au Maroc ? Nous faisons souvent recours à deux techniques ou outils d'investigation de terrain :

- Les statistiques officielles émanant principalement du Ministère chargé du sport,
- Les sondages d'opinion effectués par des institutions spécialisées.

A reconnaitre que nous ne disposons que de peu d'informations sur les APS : leurs pratiquants, les facteurs qui influent sur leur développement, le nombre des encadrants, les différents métiers du sport et les filières scientifiques consacrées au sport, les équipements sportifs et leurs typologies, la participation directe et indirecte du sport dans l'économie nationale…etc. Ces informations revêtent un caractère stratégique, pour toute organisation sportive lui permettant d'assurer une veille stratégique sur son environnement interne et externe, de réduire son incertitude sur ce dernier et d'élaborer des stratégies adaptées au contexte.

D'un point de vue méthodologique, nous allons présenter une revue contenant les statistiques officielles émanant du ministère chargé du sport, ainsi que les différentes études de terrains menées durant des périodes séparées , selon une répartition qui présente , dans un premier lieu les constats relatifs à la réalité des APS au Maroc. Dans un deuxième lieu, les obstacles qui entravent la promotion des APS. Enfin des propositions permettant le développement des APS au Maroc.

[7] https://www.who.int/fr/news-room/fact-sheets/detail/physical-activity

Tableau 1 Les études menées relatives aux APS au Maroc

Date	Organisme	Population concernée	Echantillon étudié
1993	CNJA[8]	Jeunes 14-34	100 personnes
2008	LMS Conseil[9]	Jeunes(Casa, Rabat, Khouribga et Ait Ourir)	14 focus groups
2015	Recherche académique[10]	de 12 villes du Maroc	165 acteurs territoriaux
2017	Ministère chargé du sport	Les licenciés des fédérations sportives	L'ensemble des adhérents
2021	Recherche académique[11]	Ville de Salé	165 personnes

1- Constats relatifs à la pratique des APS dans le sport civil au Maroc.

Il sera question de présenter un état des lieux présenté par différentes études.

1.1 Statistiques du Ministère chargé du sport

Selon les statistiques émanant du Ministère chargé du sport [12], le nombre des adhérents aux Fédérations Sportives (au nombre de 55) ne dépassent guère 500.000 adhérents, toutes disciplines sportives confondues et à travers toutes les régions du Royaume. Si nous prenons le cas du Football, considéré comme discipline populaire, très répandue et compte tenu du fait que sa pratique ne nécessite pas un équipement spécialisé et couteux, le nombre de l'ensemble de ses adhérents avoisine 60.000 évoluant au sein de 903 clubs de football à travers le Royaume. Ce qui veut dire qu'il existe un seul club de football pour 70.000 citoyens marocains.

Ces mêmes statistiques nous permettent de relever les remarques suivantes :

- Les disciplines sportives qui attirent le plus les jeunes sont les sports de combats et notamment les arts martiaux : (Karaté, Full contact, Taekwondo…)
- Les chiffres très modestes, sont enregistrés par les sports nautiques à titre d'exemple, en 2021 le nombre d'adhérents à la Fédération Royale Marocaine d'aviron ne dépasse pas 350 adhérents (comportant sportifs, encadrants, arbitres et responsables) encadrés par seulement 13 clubs[13], dont la moitié est concentré sur la ville de Rabat !

[8] Conseil national de la jeunesse et de l'avenir (CNJA) organe consultatif et de propositions groupant l'ensemble des acteurs économiques : Administration, patronat, syndicats, ONG, secteur privé, créé par Dahir ses missions consistaient à mener des recherches, des études, des enquêtes, réflexions et proposer des avis et des incitations des mesures pour assurer la promotion de l'emploi.

[9] Cabinet privé de conseil et de formation.

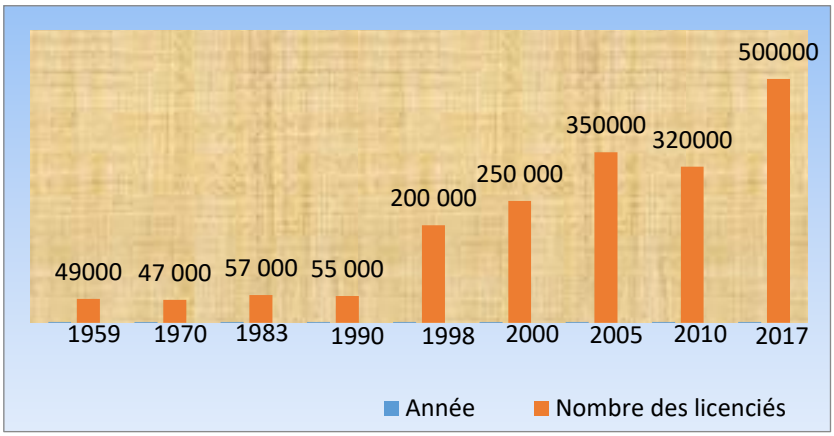
[10] El Akari.A (2015). «La gouvernance territoriale des politiques publiques sportives au Maroc ». Thèse de Doctorat. Faculté Sciences de l'Éducation.

[11] Azirar.B (2021). La pratique sportive au Maroc, cas la ville de Salé. Mémoire Master . IRFC

[12]Ministère de la Jeunesse et des Sports « Bilan des actions réalisées en 2017 et plan d'action 2018 » , présenté à la chambre des représentants décembre 2017.

[13] Rapport de mission de la commission provisoire chargée de la gestion de la F.R.M du canoë Kayak 12 Mars 2011

- La pratique sportive reste peu développée au Maroc, donnant ainsi l'impression que nous ne disposons pas d'une culture sportive bien ancrée dans le comportement collectif des marocains.



Graphique 1. Evolution des licenciés des fédérations sportives depuis 1959[14]

Le graphe 1, nous montre que le nombre de licenciés est de 0,6% du total de la population marocaine en 2010. Ceci nous interpelle profondément, du fait que la pyramide démographique témoigne de la présence d'une large population de jeunes (33% de la population est âgée de 7 à 19 ans).

Avant de procéder à des déductions donnant lieu à des interprétations erronées, il est impératif de souligner que les statistiques des adhérents du mouvement sportif et olympique au Maroc sont loin de refléter la réalité de la pratique sportive au Maroc, à ne retenir que les exemples suivants : Durant tous les jours de la semaine notamment le weekend, le nombre des personnes qui fréquentent les espaces publics, les aires de jeux et les installations sportives ne cessent d'accroitre touchant tous les âges et les sexes. Le sport, d'une manière générale, se pratique régulièrement dans un cadre informel pour des raisons ayant rapport avec la santé, le bien-être, et surtout comme moyen préventif et thérapeutique non médicamenteux des pathologies et aux maladies chroniques non transmissibles (diabètes, cardiovasculaire, et certains types de cancers….).

Aussi, à notifier le développement progressif de pratique sportive non encadrée par aucune structure fédérale, notamment les équipes de quartiers qui touchent la tranche d'âge de plus de 13 ans et qui organisent des championnats inter-quartiers. Selon des chiffres approximatifs le nombre de pratiquants dépasse70.000 qui adhèrent à plus de 1400 clubs de football de quartiers non affiliés aux instances de la F.R.M de football[15].

De même, le chiffre de 500.000 concerne seulement les adhérents du sport civil et précisément de l'action indirecte menée par les fédérations sportives. Ce chiffre ne comptabilise pas l'action

[14]Source : Atlas Graphique « 50 ans de développement humain au Maroc» et statistiques du MJS.
[15] Chiffres recueillies au niveau du Ministère de la jeunesse et des sports (rapport d'activités 2012)

directe menée par le Ministère chargé du sport par le biais de son réseau des services déconcentrés à travers le Royaume. De même, il ne prend pas en considération les pratiquants du sport au sein des établissements scolaires affiliés à la Fédération Royale Marocaine du Sport Scolaire, ni ceux du sport militaire qui constitue une composante essentielle du système sportif national.

1.2 Les sondages d'opinion

Le recours à la deuxième technique, à savoir les sondages d'opinion, pour identifier le nombre des pratiquants du sport, nous offre une autre possibilité d'interpréter différemment la réalité de la pratique du sport au Maroc. A reconnaître toutefois, que c'est une technique qui reste peu développée au Maroc. Elle est intimement liée au domaine économique et utilisée dans la quête d'une meilleure connaissance des besoins de la population pour offrir des prestations adéquates à la demande. Concernant le domaine sportif, peu de sondages ont été effectués. Nous en avons identifié seulement quatre.

1.2.1 Enquête en 1993

Réalisée par le CNJA sur un échantillon représentatif de jeunes marocains âgés entre 15 et 34 ans. L'objectif e cette enquête consiste à disposer d'informations sur leurs nivéaux d'instruction, leurs activités socioculturelles, et leurs relations avec leur famille. Le questionnaire comportait un item relatif à la pratique sportive, à savoir: Quelles sont les activités ludiques pratiquées, de manière régulière par les jeunes? Parmi les résultats de ce sondage:

- 15,7% des jeunes interviewés confirment pratiquer différentes activités physiques et sportives.
- le sport reste très développé aux villes avec un pourcentage de 21,7% du fait qu'elles disposent d'un nombre important d'infrastructures sportives. Quant au monde rural, seulement 7,8% de sa population déclare pratiquer le sport.
- le fait de disposer d'un niveau d'instruction supérieur constitue un facteur encourageant à pratiquer le sport. Plus de 31,8% de jeunes étudiants confirment réserver une partie de leur temps de loisir au sport.

1.2.2 : Enquête en 2008

Elaborée par un bureau d'études au profit du Ministère chargé du sport. Cet outil d'investigation a été utilisé en parallèle avec la tenue de neuf forums régionaux visant à diagnostiquer l'état du sport au Maroc dont les résultats devaient être présentés lors des assisses nationales[16]. Parmi les zones de fragilité identifiées par l'étude :

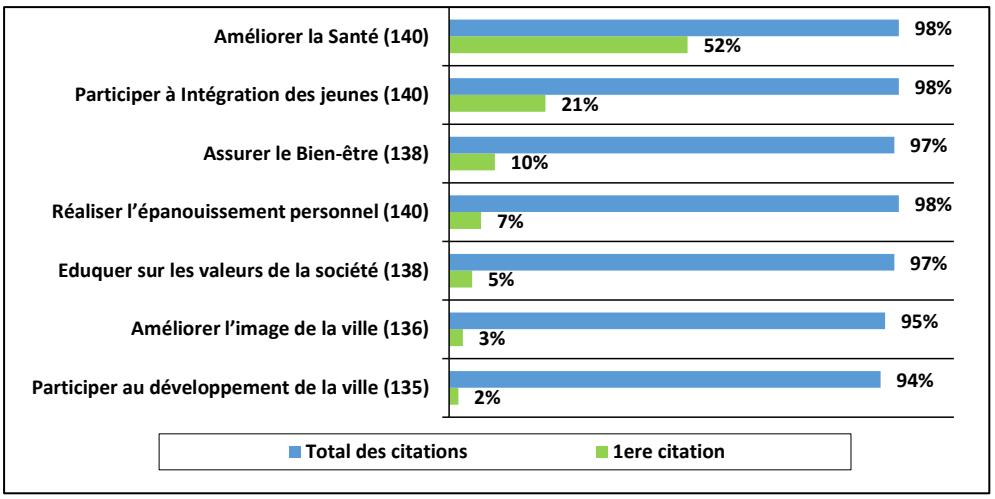
- Des terrains et clubs sportifs insuffisants et mal équipés
- Absence d'espaces publics aménagés pour développer le sport

[16] Assisses Nationales du sport tenues les 24 et 25 Octobre 2008 à Skhirat

- L'Éducation Physique est inexistante au primaire et très peu pratiquée dans les collèges et les lycées
- Des professeurs de sport pas suffisamment impliqués.

1.2.3 Enquête en 2014

Cette enquête fait partie d'une recherche doctorale relative à la gouvernance sportive territoriale. Elle a été effectuée durant la période-du 10 Novembre 2013 au 20 Janvier 2014 au niveau de 12 villes du royaume. Parmi les questions posées celle relative aux raisons de pratiquer les APS, est aussi, la perception des acteurs locaux quant aux rôles dévolus au sport au sein du territoire. De portée cognitive, cette question nous permet de déceler l'existence d'une conscience auprès des personnes-questionnées, des différents apports du sport au sein de la société de manière générale.



Graphique 2 Appréciation des acteurs quant aux rôles dévolus au sport dans le territoire

Selon les résultats de l'enquête, 52% des personnes interrogées ont mentionné que le premier rôle du sport consiste à améliorer la santé du citoyen. En deuxième position, le sport comme facteur de cohésion sociale avec 21%. En troisième position nous trouvons l'apport du sport pour améliorer l'image de la ville avec seulement 3% des réponses.

Si nous procédons à un regroupement par familles des sept réponses proposées, il en ressort trois grands blocs, à savoir la santé, la cohésion sociale et la promotion de la ville. Les statistiques confortent le choix de l'échantillon choisi à privilégier « La santé » comme étant le rôle primordial dévolu au sport. De ce fait, améliorer la santé, peut être considéré comme le premier argument avancé par le citoyen pour justifier la décision de pratiquer le sport. Si nous procédons à un croisement des données propres aux différentes réponses mentionnées, avec la qualité des personnes interrogées, nous aboutissons aux résultats suivants :

- « Améliorer la santé » est, souvent, mentionnée, comme premier « rôle » du sport, par le bloc composé des acteurs suivants : MJS, MEN et le mouvement associatif.

- « Assurer la cohésion sociale et améliorer l'image de la ville » constitue la première réponse émanant du bloc composé de l'Autorité Locale, Collectivités Territoriales, INDH et le secteur privé.

Tableau 2 Regroupement des réponses par affinités

	1ere citation	Total citations
Santé : **Améliorer la Santé** **Assurer le Bien-être** **Réaliser l'épanouissement personnel**	**69%**	**99%**
Cohésion sociale : **Participer à Intégration des jeunes** **Eduquer sur les valeurs de la société**	**26%**	**99%**
Image de la ville **Participer au développement de la ville** **Améliorer l'image de la ville**	**5%**	**97%**

Les trois rôles essentiels dévolus au sport reflètent, en réalité, les trois générations qui retracent l'évolution de l'histoire des activités sportives. Au départ, le sport a été utilisé pour l'amélioration de la santé de l'individu, très intéressé et soucieux de sa forme physique. Une forte conviction de l'existence de lien entre pratiquer le sport régulièrement et avoir un effet bénéfique sur le rendement et le comportement de l'individu au sein de sa communauté.Les différentes recherches et études récentes sont unanimes à confirmer qu'une pratique régulière d'une activité physique, même d'intensité modérée, peut constituer un élément de prévention ou de traitement de nombreuses maladies et améliorer le bien-être physique, mental et social de l'individu [17].

En deuxième étape, et dans un contexte historique précis, la société fera appel au sport, en tant qu'institution de socialisation permettant de remplir de nouveaux rôles notamment d'assurer le lien social et la cohésion entre les différentes couches de la société. L'utilisation du sport à des fins sociales trouve sa raison d'être dans les changements opérés au niveau des espaces urbains, devenus des lieux propices à la violence, à la ségrégation et à la pauvreté, dans son acception la plus large. De ce fait le sport est perçu comme un outil efficace permettant de véhiculer ses propres valeurs prônant la solidarité, le fairplay et l'abnégation de soi…

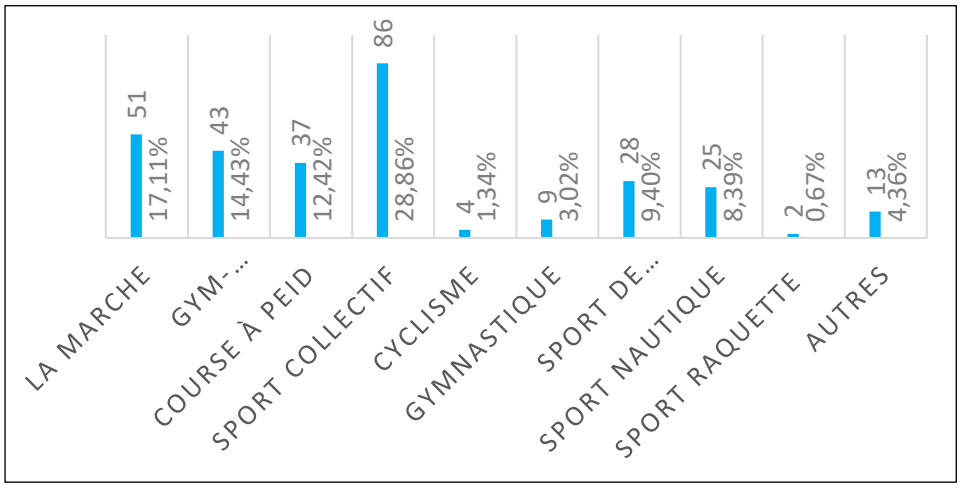
La troisième fonction du sport, en tant que facteur participant à la promotion de la ville, concerne la nouvelle approche du recours au sport et de son utilisation, qui coïncide avec un environnement caractérisé par le retrait progressif de l'Etat et un intérêt grandissant accordé au territoire. Dans

[17]Inserm (2008). Activité physique Contexte et effets sur la santé. Expertise collective p-p 682-728

cette logique une concurrence ardue se fait jour entre les villes cherchant à se positionner et à attirer le maximum d'investissement, tant interne qu'externe. Le sport est perçu par les acteurs territoriaux comme un facteur qui peut participer à structurer le territoire (Pociello 1999).

1.2.4 Enquête en 2021

Réalisée à la ville de Salé sur un échantillon de 165 citoyens. Les résultats—de cette enqêute montrent que l'APS est omniprésente chez la population de cet arrondissement dont 89% des personnes questionnées pratiquent une APS au moins une fois par semaine et principalement pour leur bien-être et le plaisir. Les sports collectifs, la marche et musculations sont les activités physiques les plus pratiquées, et représentent 61%. Bien que les résultats démontrent un certain niveau de conscience quant à l'importance de la pratique d'activité physique et sportive, ils mettent aussi en évidence des contraintes, notamment le manque du temps et de la motivation qui constituent un frein à la pratique sportive régulière.



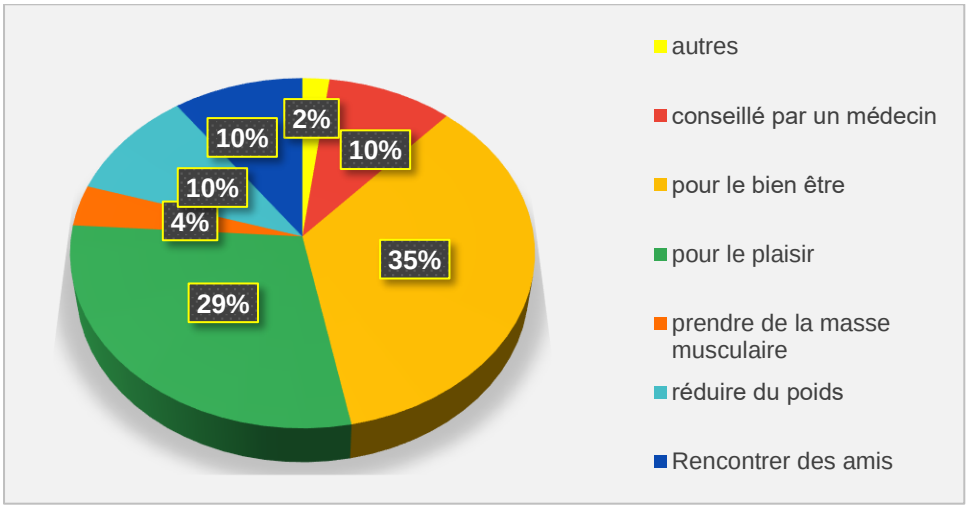
Graphique 3 Lles APS pratiquées au niveau de la ville de Salé

L'étude s'est intéressée à identifier les raisons qui encouragent les jeunes à pratiquer du sport. Il ressort que le facteur déterminant est la préservation de la santé, ce qui corrobore les résultats de l'étude doctorale menée en 2014. Le citoyen marocain est devenu très attentif à son bien être notamment préserver sa santé physique et mentale.

III) Limites du Système de promotion du Sport National

Nous allons présenter les facteurs, identifiés par ces études, qui peuvent expliquer l'état actuel de la pratique sportive au sein de la population du Royaume, tout en mettant l'accent sur les points suivants :

- Rareté d'informations fiables sur les APS au Maroc
- Intervention symbolique du Mouvement Sportif
- Apport modeste du Ministère de l'Education Nationale (chargé sport scolaire)
- Structure d'encadrement sportif peu connue



Graphique 4 Les raisons de la pratique d'APS à salé

- Manque d'infrastructures sportives
- Coût exorbitant des prestations sportives.

1-Rareté d'informations fiables sur le sport au Maroc

La connaissance exacte de la situation des APS et des tendances de la population est un atout majeur dans le choix de politiques nationales du sport à même de contribuer à l'établissement d'une santé cohérente à la hauteur des objectifs de développement de notre pays. Une vision globale des problèmes de ces pratiques réelles et de leurs déterminants permet aux décideurs de mettre au point et dans une action commune, des interventions appropriées et efficaces pour le bien-être de la population et pour un développement harmonieux et durable du Maroc.

Le premier obstacle qui a entravé la réalisation de ce travail, réside dans le manque d'informations crédibles concernant la réalité des APS au Maroc, notamment au niveau territorial. L'information recherchée concerne l'ensemble des données et statistiques ayant un rapport direct ou indirect avec le domaine du sport. Son utilité stratégique découle du fait qu'elle constitue la pierre angulaire permettant de réduire l'incertitude sur l'environnement, comprendre le système existant et ses acteurs, et surtout de prendre des décisions judicieuses.Nous évoquons, de nos jours, de plus en plus le concept de la «Veille Stratégique », qui peut être définie comme étant « un système d'aide à la décision qui observe et analyse l'environnement scientifique, technique, technologique et les impacts économiques présents et futurs pour en déduire les menaces et les opportunités de développement. Elle s'appuie essentiellement sur les informations ayant un caractère stratégique ou décisions importantes lui associant le terme de veille stratégique[18]. »

[18]Coudol. D&Gros S.(in : ttp://www.agentintelligent.com/veille/veille strategique.html#Définition, 03/12/2009)

Les informations utiles pour effectuer le diagnostic territorial sont souvent à caractère quantitatif (nombre d'adhérents et de pratiquants sportifs, les sites sportifs, les différents types d'installations sportives et leurs situations juridiques, le mouvement sportif local…)

Ces informations peuvent revêtir, également, un aspect qualitatif (spécificités du pratiquant sportif, caractéristiques des équipements sportifs, sociodémographique de la pratique sportive entre les différentes régions du Maroc, le potentiel propre à chaque région et sa prédisposition à investir dans une discipline sportive donnée…)

2- Intervention symbolique du Mouvement Sportif

Le système très compliqué mis en place par le mouvement sportif, constitue, en soi-même un obstacle pour attirer l'attention des jeunes et assurer leur intégration dans le système fédéral. Le mouvement sportif et olympique, reste enfermé, et n'essaye pas de développer des actions visant à faire connaitre sa discipline auprès du grand public, et d'entamer aussi des initiatives pour promouvoir et vulgariser la pratique du sport au profit de toutes les catégories d'âge à travers le Royaume.Rare sont les Fédérations qui recourent aux techniques du Marketing pour mieux communiquer autour de leurs services sportifs offerts, en organisant des portes ouvertes au profit des parents, des caravanes, des journées d'informations à destination des journalistes en tant qu'intermédiaires avec le grand public…

Un autre facteur qui peut expliquer cette situation, à identifier dans les statuts des fédérations sportives, c'est l'existence d'une relation entre l'augmentation du nombre de licenciés et le nombre de voies octroyées aux clubs leur permettant ainsi de disposer d'un pouvoir proportionnel dans le processus de prise de décision. Le fait d'accepter de nouveaux clubs, peut constituer une menace aux jeux électoraux, que seuls quelques clubs, détiennent ces ficèles. Ce qui peut expliquer, dans une grande partie, les raisons du changement perpétuel des statuts de certaines fédérations et les conditions draconiennes exigées pour accepter l'intégration d'un nouveau club.

A remarquer aussi, que le sport en tant que phénomène social, évolue et s'adapte à son propre contexte socio-économique et culturel, donnant lieu à l'émergence de nouvelles pratiques sportives, qui intéressent les jeunes, à titre d'exemple Skate board, Kit surf, Foot salle, Beach volley, VTT, Parapente….etc. Malgré l'engouement des jeunes pour ces sports «urbains », les responsables fédéraux n'essayent pas d'anticiper le changement inéluctable et persistent à refuser l'intégration de ces nouvelles pratiques.

3- Apport modeste du sport scolaire

Parmi les innovations importantes initiées par la loi 30-09 relative à l'Education Physique et aux sports, le fait d'avoir insisté dans l'article deux sur le point suivant "*L'enseignement de l'éducation physique et sportive est obligatoirement dispensé au sein des établissements*…".

Cette obligation contenue dans la Constitution (article 26) et dans la loi découle des constats alarmants mentionnés dans la Lettre Royale adressée aux participants aux assises nationales sur le sport et dans la nouvelle stratégie sur le sport. Selon l'enquête LMS (2008), parmi les zones de fragilité identifiées par l'étude, le fait que l'Éducation Physique est inexistante au primaire et très peu pratiquée dans les collèges et les lycées. Il faut reconnaître, faute de ressources humaines, que l'Éducation Physique ne se pratique que dans quelques écoles primaires, ce qui signifie, tout simplement que nos enfants, à un âge précoce, ne bénéficient pas d'un encadrement qui leur permet d'acquérir les éléments de base de la pratique sportive. Cette « déperdition sportive » ne permet pas au mouvement sportif de disposer d'une masse de jeunes talentueux qui peuvent constituer de futurs champions. Malgré les circulaires du département de tutelle, exhortant les responsables des services extérieurs, l'Éducation Physique est presque absente dans le primaire, et peu développée dans le deuxième cycle.

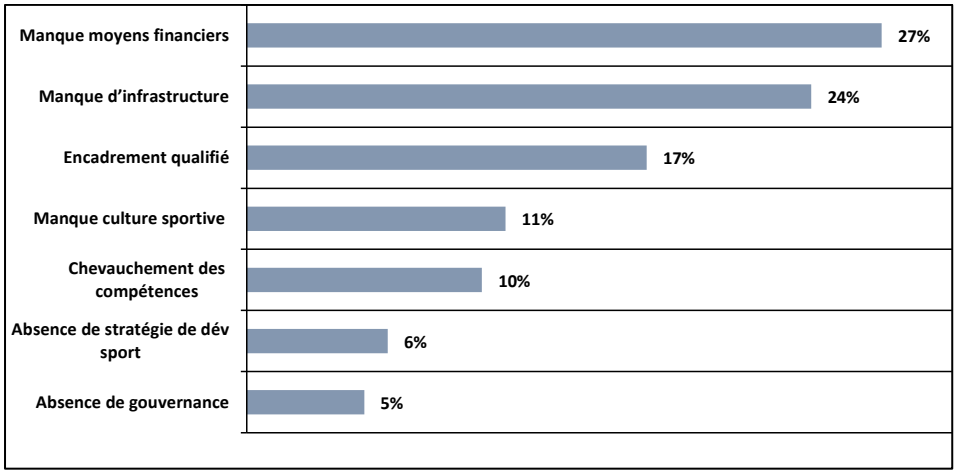
4- Structure d'encadrement sportif peu connue

Ce facteur est intimement lié aux actions menées par le Ministère chargé du sport, qui dispose d'un réseau important d'installations sportives et d'un encadrement qualifié, permettant ainsi de créer et d'offrir un service au grand public. A titre d'exemple, les écoles de sport destinées aux enfants de moins de 12 ans, l'encadrement des équipes de quartiers …etc. Néanmoins, l'absence d'une bonne communication autour de ces services, auprès du grand public, ne permet pas de toucher un plus grand nombre de pratiquants. De même, leur impact reste très faible sur la population concernée.

A signaler aussi l'absence de passerelle entre le sport de masse et le sport de compétition. Les actions de promotion de sport de masse initiées par le ministère chargé du sport destinées notamment aux enfants de moins de douze ans, ne peuvent en aucun cas atteindre les résultats escomptés, faute d'une étroite coordination entre les acteurs intervenants dans le domaine sportif pour attirer ces jeunes talents et leur assurer la formation et le suivi adéquat, conditions sine qua non pour former de futurs champions.

5- Manque d'infrastructures sportives

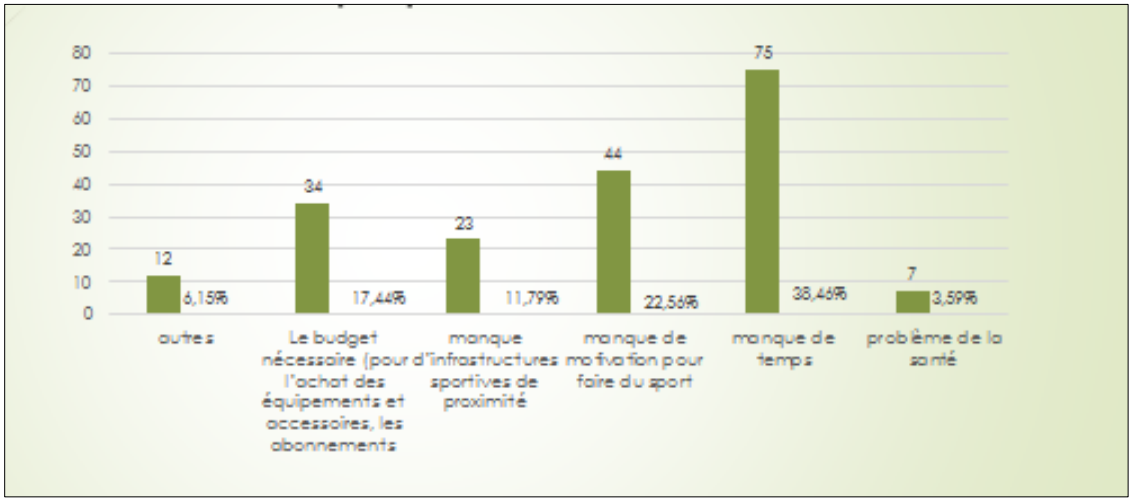
Les infrastructures sportives constituent un levier essentiel pour concrétiser le droit à l'exercice du sport et un outil de choix pour la promotion du sport et l'excellence sportive. Ils doivent satisfaire les besoins les plus divers de la population. En revanche l'équipement sportif participe à l'aménagement et au développement harmonieux et durable du territoire en jouant un rôle économique non négligeable, tout en étant un vecteur d'intégration sociale et d'affirmation de l'identité locale. L'enquête LMS (2008) a mentionnée parmi les insuffisances les terrains qui sont insuffisants et mal équipés. Aussi, l'enquête de terrain auprès de 12 villes en 2015 a a-t-elle identifié comme obstacle qui entrave la promotion du sport au niveau territorial, Manque d'infrastructures ;



Graphique 5 Les obstacles identifiés dans la promotion du sport

6- Coût exorbitant des prestations sportives

Deux autres facteurs de démotivation, ont été identifié par les enquêtes de terrain réalisées respectivement en 2014 et 2021, à savoir le manque de temps et le budget nécessaire pour l'achat des équipements indispensables à la pratique .



Graphique 6 Les obstacles à la pratique des APS

A constater, une nouvelle tendance chez les citoyens à s'orienter vers les salles de fitness et de remise en forme, qui offrent des services s'accommodant avec leurs attentes. De même, force est de constater la floraison et la multiplication de nouvelles offres de prestations sportives, à travers le royaume. Néanmoins les prix affichés restent exorbitants et sont au-dessus duniveau de vie du simple citoyen, confronté quotidiennement à des charges fixes.

IV) Voies susceptibles de promouvoir les APS au Maroc

Nous allons mettre l'accent sur trois facteurs, identifiés dans les études analysées et jugés indispensables pour le développement des APS au Maroc, à savoir :

- Accroitre le réseau d'infrastructures sportives
- Développer le sport scolaire ;
- Développer la culture sportive ;

Une lecture attentive, sous un angle comparatif, des avis de la population-cible, concernant notamment les obstacles identifiés et les actions phares susceptibles de promouvoir le sport au niveau territorial, fait émerger deux blocs/groupes de propositions :

Le premier bloc, à qualifier de traditionnel, regroupe des facteurs indispensables pour une pratique sportive, faisant référence aux moyens financiers, aux ressources humaines et à l'infrastructure.

Certes, ces facteurs revêtent un aspect stratégique dans le système sportif, mais ils sont repris de manière récurrente, dans toute la littérature ayant rapport avec le sport au Maroc, depuis l'indépendance.

Malgré l'effort déployé par l'Etat pour injecter des sommes importantes, en focalisant l'intérêt sur les trois facteurs précédemment cités, la situation du sport au Maroc, ne fait que s'empirer et demeure en-deçà des attentes et aspirations de la population.

C'est dans cette optique, que l'enquête a donné lieu à une autre série de propositions, englobant les éléments ayant rapport avec l'ancrage de la culture sportive ; la mise en place des principes de la bonne gouvernance et la création d'une structure englobant tous les acteurs permettant ainsi d'assurer la convergence des politiques sectorielles.

L'ensemble des propositions fait partie du registre propre à la gouvernance des organisations sportives. Ce qui reflète une conscience plus aigüe, que le développement des APS nécessite de revoir le mode de pensée et d'action en faisant appel à d'autres voies, qui ont donné pleine satisfaction dans le milieu des entreprises privées.

Nous pouvons, également, déduire, qu'une partie de ces propositions comporte le souci de rompre avec les pratiques d'antan qui ont démontré leurs limites (bénévolats, Amateurisme, …), et incitant, par la même occasion de s'inscrire dans la pensée stratégique qui favorise, entre autres, la planification stratégique, le diagnostic prospectif, et le recours à la démarche participative.

Dans le même ordre d'idées, il est à remarquer le galvaudage du concept de « Culture sportive » qui a été maintes fois pointé du doigt par les responsables de la chose sportive comme étant le facteur limitant la promotion du sport.

Cette notion fait référence à l'absence chez les acteurs locaux, d'informations, de connaissance et surtout une appropriation des valeurs propres à la pratique sportive, communément admises par la communauté.

Ancrer la culture sportive passe, impérativement, par un travail de longue haleine d'information, de communication, de sensibilisation et de formation à l'égard de tous les acteurs concernés autour des apports bénéfiques du sport pour le développement durable du territoire. Les effets de ces actions ne peuvent être appréciés que sur le long terme.

Conclusion

L'objectif escompté de cet article, à travers l'analyse des résultats des différentes enquêtes de terrain menées depuis 1993 jusqu'à 2021, relatives à la pratique sportive au Maroc, est de disposer de données concernant le degré d'intérêt du citoyen à pratiquer les APS, ses motivations, les actions initiées par les pouvoirs publics, l'existence d'une culture sportive ancrée au niveau de la population marocaine et enfin les contraintes d'ordre socio-économique et culturelles qui peuvent entraver le développement des APS au Maroc.

Le premier constat de taille, c'est le manque de données qui peuvent orienter et éclairer la décision publique. Ce qui nécessite que le haut-commissariat au plan, intègre dans son enquête nationale un volet relatif aux APS.

De cela découle, l'importance de la maitrise de l'information relative aux A PS, étape jugées indispensable pour mettre en place des politiques favorisant la pratique du sport, en tant que droit inaliénable de tous les citoyens. L'intérêt doit être focalisé sur la mise en place d'infrastructures de proximité avec une répartition géographique égale.

Aussi, les différentes recherches mentionnées ont-elle mis l'accent sur le rôle prépondérant des APS face aux multiples maladies de nos sociétés, intimement liées aux changements progressifs que connaissent les sociétés à tous les niveaux, culturels, urbains, vieillissement de la population…etc.

Le fait d'accorder un effort conséquent à la pratique du sport ne peut pas être perçu comme un gaspillage des deniers publics, mais plutôt, comme un investissement qui pourra avoir un impact positif direct et indirect sur la communauté.

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Realités infrastructurelles, activités de loisir et perspectives d´attraction au parc urbain Bangr-Weoogo de Ouagadougou

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Résumé

L'objectif de cet article est d'identifier les activités de loisir des usagers du Parc Urbain Bangr-Weoogo de Ouagadougou (PUBWO) et les contraintes de pratique qu'ils rencontrent. C'est l'analyse constructiviste de Pagès (1993) qui a été utilisée pour mieux comprendre les opinions des visiteurs, des gestionnaires du parc et des acteurs du développement des loisirs au niveau communal et national. Pour collecter les données, une enquête par questionnaire a été réalisée auprès de 150 visiteurs et une autre par entretien auprès de 17 personnes ressources. De l'analyse et de la discussion qui ont été faites à partir des résultats, il en ressort que les visiteurs du PUBWO, sont en majorité des jeunes qui aiment plus pratiquer les activités physiques de loisir par des promenades, des marches et des pratiques sportives dans le but d'atteindre leur bien-être. Mais, ces derniers sont confrontés à d'énormes contraintes avec en tête la vétusté des infrastructures et matériels de loisirs. Ainsi, en termes de stratégies d'attraction, il est donc souhaitable que l'Etat accompagne la commune pour la réalisation d'un nouvel aménagement et que les autorités communales élaborent une politique communale de loisirs axée sur la pratique des loisirs sportifs.

Mots-clés : Parc urbain Bangr-Weoogo - Activités Physiques de loisir - Stratégies d'attraction – Ouagadougou - Burkina Faso.

Introduction

Les loisirs sont des composantes de la vie des hommes, ils ont existé depuis les sociétés dites traditionnelles où elles occupaient une place privilégiée dans les moments de détente, de divertissement, d'épanouissement personnel, de créativité et de transcendance sensuelle (Hounga, 2013). Ils continuent de faire valoir positivement leur rôle dans les sociétés modernes. Pour certaines institutions comme la Conférence des ministres de la Jeunesse Et des Sports ayant le français en partage (CONFEJES), la pratique des loisirs est un droit pour chaque citoyen dans tout Etat au regard des différents avantages qu'elle renferme (CONFEJES, 2006).

En Afrique, et précisément dans sa partie sub-saharienne, le secteur des loisirs est peu développé (Kinda, 2014). Conscient de cette situation et connaissant le rôle combien important des loisirs dans la vie quotidienne des Burkinabè, le gouvernement a créé en 2002 le Ministère des Sports et des Loisirs (MSL) qui est chargé de la promotion des loisirs.

Il a aussi élaboré deux politiques nationales de loisirs, une première en 2009 et la seconde en 2017 et projetait la formulation de la troisième en 2022. Il ressort du diagnostic de ces politiques que les principales difficultés qui freinent le développement et la promotion des loisirs au Burkina Faso sont, le manque de compétence des acteurs en matière de gestion des loisirs et la mauvaise qualité et répartition spatiale des infrastructures et équipements de base (PNL, 2009). L'élaboration de ces deux documents politiques doit permettre de surmonter ces difficultés afin de contribuer au rayonnement international du pays et à l'instauration d'un bien-être social.

L'atteinte de ces objectifs doit se concrétiser par la réalisation d'actions comme le « *développement des infrastructures et équipements de loisirs, la création et l'opérationnalisation des structures de gestion des infrastructures de loisirs et par des actions d'appui aux collectivités territoriales dans le cadre de l'exercice des compétences transférées « (PNSL, 2017, P38).* Parlant de développement et de promotion des loisirs au niveau des collectivités territoriales, en guise d'appui à ces circonscriptions, le décret n°2014-925/ PRES/PM/ MATD/ MCT/ MJFPE/ MSL/MEF/MFPTSS/ MICA du 10 Octobre 2014 portant modalités de transfert de compétences et de ressources de l'Etat aux régions dans le domaine des sports et des loisirs donne droit aux communes et régions de prendre en charge la gestion des infrastructures de sports et de loisirs sous la supervision du Ministère de tutelle. La mise en œuvre de cette stratégie a connu d'énormes difficultés et n'a pas permis de redresser le niveau de développement des loisirs dans les communes.

La commune de Ouagadougou, plus grande commune urbaine du pays et possédant une population motivée par la pratique des loisirs ne reste pas en marge de ce sous-développement en matière de loisirs. En effet, les habitants de cette ville pratiquent divers types de loisirs sur les berges des barrages, visitent des musées (musée national, le musée de la musique, le musée du Moogh-Naaba, etc.), fréquentent des piscines, des boîtes de nuit, des aires de jeux, des stades, des plateaux omnisports, des salles de sport. Ils vont au dans les salles de cinéma dont certaines sont de standing international (Ciné Olympia) sans oublier les cyber-cafés, les places publiques, les centres aérés, les centres d'activités socio-éducatives, les bibliothèques, les maisons des jeunes etc. Les Ouagavillois

aiment aussi fréquenter les espaces verts, les jardins publics, les parcs d'attraction. Parlant de parcs, la ville de Ouagadougou possède un parc urbain, « le Parc Urbain Bangr-Weoogo de Ouagadougou (PUBWO) » qui renferme des opportunités de par sa situation au centre-ville, sa proximité avec les deux grandes routes nationales (RN3 et RN4) et l'immensité de son étendue soit 265 hectares clôturés.

Dans l'optique de promouvoir la pratique des loisirs, les autorités locales avaient commencé à aménager en 2001 des sites de loisirs (Association Internationale des Maires Francophones [AIMF], 2010) qui permettaient aux visiteurs de pratiquer quelques types de loisirs comme les loisirs sportifs, les loisirs culturels, les loisirs socio-éducatifs. Les visiteurs fréquentaient donc ce parc pour s'épanouir, pour maintenir et améliorer leur santé physique et mentale, donc, pour une cure de santé (Marion, 2014). En somme ce parc participait à l'amélioration des conditions de vie de ses usagers.

Dans ces dernières années, on constate que le parc est incapable d'enregistrer une bonne fréquentation, en effet, le niveau de fréquentation connait une baisse sensible. En 2014 le taux de fréquentation des visites par jour était estimé à 450, en 2015 il était estimé à 430 avant de chuter à 390 en 2017 (archive des statistiques du parc, 2017). Pourtant, Diallo (1998) avait montré que la population de Ouagadougou avait exprimé son besoin de voir cette forêt hérissée en parc urbain et avait donné son accord pour s'y rendre au moins une fois par semaine à condition que le prix soit compris entre 100f et 250f et jusqu'en 2017 le ticket d'entrée au parc était de 100f par adulte et de 50 francs pour les enfants. Quant à l'affluence des visiteurs, elle est fortement influencée par les paramètres temps et lieu, pendant la saison des pluies, certaines activités de loisir ne sont pas réalisables et le parc demeure presque vide. L'autre constat est l'intensification de manifestations de mécontentement des usagers qui se traduisent souvent par des plaintes auprès des responsables du parc. Ces derniers se plaignent car, ils n'arrivent plus à pratiquer convenablement leurs loisirs pour s'épanouir.

Il est donc important de rechercher l'origine des plaintes de ces visiteurs. C'est là, tout le fondement de cette recherche dont l'objectif général est de **contribuer à l'amélioration des conditions de pratique des activités de loisir des visiteurs du PUBWO**. Il s'agit spécifiquement d'identifier les loisirs prisés des visiteurs et les contraintes qu'ils rencontrent pour la pratique de ces activités afin d'en formuler les perspectives.

Cadre d´étude

Ouagadougou: ville des grands évènements de loisirs de tout genre et d'infrastructures de loisirs

La commune urbaine de Ouagadougou est située dans la province du Kadiogo au centre du Burkina Faso. Elle couvre une superficie de 21.930 hectares et sa population majoritairement jeune était estimée à 2.532.311 habitants en 2015 (INSD, 2006). C'est un centre urbain important où des rencontres politiques, économiques et culturelles avec de nombreux évènements de grandes

envergures dont entre autres le Festival Panafricain du Cinéma et de la télévision de Ouagadougou (FESPACO) et le Salon International de l'Artisanat de Ouagadougou (SIAO). Difficile d'oublier les événements sportifs comme les championnats nationaux des disciplines sportives ou de loisirs, les coupes et tournois organisés par des promoteurs privés ou des institutions. C'est une ville caractérisée par un climat nord soudanien avec des températures maximales comprises entre 40-41 voire 43°C en Avril et Mai (Schéma Directeur d'Aménagement du Grand Ouaga [SDAGO], 1996) favorables à la pratique des loisirs de plein air.

L'organisation administrative au sein de la mairie centrale donne une place importance aux loisirs et au sport avec la création d'une Direction de la Promotion des Sports et des Loisirs (DPSL) et d'une Direction des Aménagements Paysagers et de Gestion des Parcs (DAPGP) toutes rattachées au Secrétariat Général. Ces directions œuvrent pour le développement du sport et des loisirs au niveau communal. Elles sont appuyées par des commissions du conseil municipal telle la commission « environnement et développement local » qui s'occupe de la gestion d'espaces verts et de parcs communaux qui sont par excellence les lieux de pratiques de loisirs.

PUBWO: une propriété du Mogho Naaba devenue un bien communal

Le PUBWO est situé au cœur de la ville de Ouagadougou dans l'arrondissement n°5 entre la Route Nationale n° 4 et la Route Nationale n° 3 « *au côté Est de l'hôtel Silmandé sous la forme d'une aile d'oiseau à l'aval du barrage n°3 de Ouagadougou »* (Natura n° 3, 2008, P 8). Historiquement cette forêt fut une propriété du Mogho Naaba avant d'être érigée en 1936 en forêt classée (Bondaz, 2011). En 1995, débutera la construction de la clôture suivie de l'aménagement de l'intérieur en 1997. Le 05 janvier 2001, le parc fut baptisé "*Parc Urbain Bangr-Weoogo*" qui signifie littéralement en langue mooré, « *brousse du savoir* » ou « *la forêt de la connaissance* » (Kaboré, 2004). Actuellement, il s'étend sur une superficie de 265 ha, dont 240 ha clôturés et aménagés.

De 2001 à 2017, une direction autonome rattachée à la mairie, appuyée du Conseil Scientifique et Technique (CST), s'occupaient de sa gestion. Depuis février 2018, cette direction est érigée en Direction des Aménagements Paysagers et de Gestion des Parcs dont la mission est de planifier toutes les activités visant à améliorer la physionomie de l'aménagement paysager de la ville de Ouagadougou et d'assurer la gestion des parcs urbains. Elle comprend six services et dix-huit sections dont « une section détente » qui s'intéresse plus aux activités sportives, culturelles et les loisirs.

A la découverte de l'offre en activités de loisir du PUBWO

A l'intérieur du PUBWO se trouvent des espaces aménagés et des espaces naturels qui servent de cadre de détente, d'épanouissement et d'acquisition du bien-être pour les visiteurs.

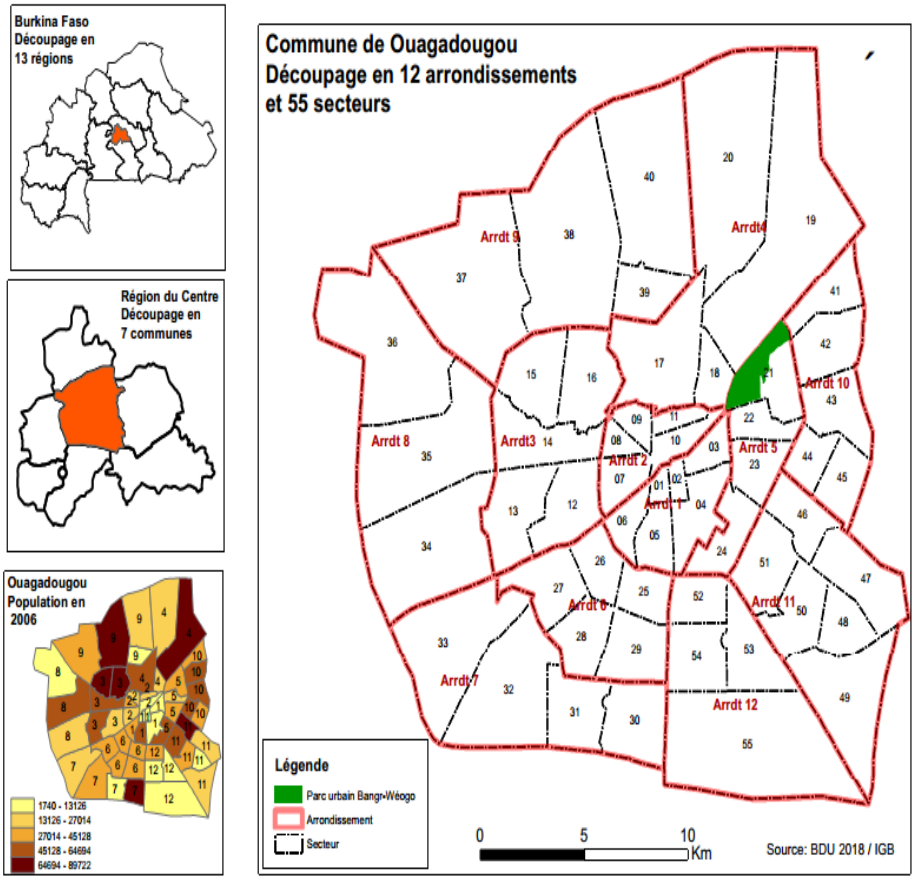

***Figure 1 Carte de la commune urbaine de Ouagadougou montrant la situation géographique du PUBWO par rapport aux arrondissements et* secteurs**

On peut pratiquer des loisirs touristiques en se rendant au parc zoologique (72 ha) abritant une faune abondante d'antilopes, de crocodiles, etc. ou au jardin botanique (8ha) constitué d'espèces locales et exotiques sans oublier la ménagerie où sont logés des animaux et oiseaux de tout genre (singes ; varans ; cailles ; poules d'eau ; pigeons). On y trouve aussi un musée à l'intérieur duquel sont exposés des trophées en entier, en capes, des trophées d'oiseaux, des bocaux de poissons formolés et autres objets d'arts.

Concernant les loisirs sociaux et éducatifs, on a « l'espace du bonheur » où des sorties détente sont organisées et sont des moments festifs. Sur ces lieux des « dassandaaga » (journées communautaires), des kermesses, des journées de retrouvailles sont organisées. La bibliothèque et les ombrages des arbres servent de lieux de lecture pour visiteurs sans oublier les bars-restaurants avec des paillotes qui constituent des lieux propices de rafraîchissement et d'échanges sociaux.

Les activités physiques de loisir et les loisirs de plein air qui semblent attirer plus l'attention de la majorité des usagers du parc sont entre autres : la pratique du football, la pratique du volleyball, du basketball sur le plateau omnisport. La marche et la promenade, les randonnées pédestres ou à vélo

(VTT) sont pratiquées sur les différentes pistes qui sillonnent tout le parc. Les visiteurs peuvent aussi faire des balades, juste pour contempler la nature, ou peuvent se reposer sur des banquettes qui sont disséminées à l'intérieur du parc.

Approche scientifique et théorique

Cette recherche a été appréhendée sous l'angle d'une double approche sociologique, la sociologie des loisirs et celle des Activités Physiques et Sportives (APS). C'est pourquoi des documents de ces disciplines ont été d'abord lus avant de choisir l'approche constructiviste du modèle d'analyse de Pagès (1993). L'identification des activités de loisir prisées des usagers et des contraintes qu'ils rencontrent ainsi que la recherche des solutions viables n'ont pu être possibles que de par la triangulation du contenu des différentes opinions des groupes sociaux.

Dispositif méthodologique

Cette recherche synchronique et analytique est de type quantitatif et qualitatif à dominance quantitative. Elle a eu pour populations d'étude 150 visiteurs du parc qui ont été accidentellement choisis après vérification de certains critères (être âgé d'au moins 18 ans, avoir visité le parc au moins trois fois). De même, 2 responsables des structures d'activités de loisir au PUBWO, 9 responsables et agents de la DAPGP, 2 membres du CST; 2 responsables et agents de la DPSL/Mairie et de 2 responsables du MSL ont été retenus par choix raisonné car ces derniers sont capables de donner des statistiques ou de fournir des renseignements relatifs aux visions de la commune et celles de l'Etat en matière de loisirs. Les données collectées par questionnaire auprès des visiteurs au sein du parc ont fait l'objet d'un traitement statistique avec le logiciel SPSS. 22.0 et celles recueillies par entretien auprès des sujets interviewés ont tout simplement fait l'objet d'une analyse thématique de contenu.

Interpretation, analyse, des résults et discussion

Des jeunes visiteurs plus friands d'activités physiques de loisir pour leur bien-être

Tableau 1 Ccaractéristiques des visiteurs selon l'âge, le sexe et la profession

Variables	Modalités	Effectif	Pourcentage
Age	**[18-36ans [**	**114**	**76%**
	[36-60ans [	33	22%
	60 ans et plus	3	2%
	Total	150	100%
Sexe	**Masculin**	**95**	**63, 33%**
	Féminin	55	36,66%
	Total	150	100%

Variables	Modalités	Effectif	Pourcentage
Profession	Elèves	13	8,66%
	Etudiants	**58**	**38,66%**
	Agent Public de l'Etat	30	20%
	Agent du Privé	32	21,33%
	Profession libérale	14	9,33%
	Retraité	3	2%
	Total	150	100%

Avant de nous intéresser aux activités de loisir pratiquées par les usagers du PUBWO, il est important que nous jetions un regard sur quelques caractéristiques sociodémographiques et socioprofessionnelles de ces derniers.

Se référant aux visiteurs ayant répondu aux questionnaires, il ressort que le PUBWO a une clientèle plus représentée par sa couche juvénile (Tableau I) dominée par les étudiants. En effet, les visiteurs du parc sont en majorité (76%) jeunes (18-35ans). Ces résultats sont similaires à ceux de Marchiset et Gasparini (2010) qui ont montré que dans les quartiers populaires de la France, parmi la population qui s'adonne à la pratique des loisirs sportifs, les jeunes sont les plus nombreux et que les femmes demeurent en retrait dans l'accès aux loisirs. Cette forte représentativité des jeunes peut s'expliquer par la jeunesse de la population de la ville de Ouagadougou. En effet, 80,2% de la population de cette ville-capitale a moins de 35 ans parmi laquelle 33,2% ont un âge compris entre 15 et 35 ans (Plan National de Développement Economique et Social [PNDES], 2016).

Paradoxalement au résultat de la variable sexe, la même source PNDES (2016) indique que les femmes représentent près de 52 % de la population burkinabé d'où une forte représentativité des visiteuses du parc était attendue. En lien avec la variable profession, le nombre plus élevé d'étudiants peut se justifier par le fait que le parc n'est pas distant de l'Université Ouaga I, par conséquent les étudiants peuvent s'y rendre facilement. La période de l'enquête a coïncidé avec le début des vacances des écoles professionnelles, période pendant laquelle, les étudiants de ces établissements organisent des sorties détente au PUBWO.

En termes d'activités pratiquées par ces visiteurs, le tableau II ci-dessous montre que les usagers du PUBWO aiment plus se promener, marcher en contemplant la nature et faire du sport. Ces trois activités caractérisées toutes par l'exécution d'un effort physique représente 73, 4%. Si ce résultat diffère de ceux de l'International Social Survey Program [ISSP] (2007), de Hounga, Tito et Akoueté (2014) qui ont respectivement trouvé que les Français et les personnes retraitées de la ville de Cotonou aiment plus « suivre la télévision », il faut noter qu'il est conforme à ceux de Hémon (2014) et de Palé (2007) qui ont tous investigués dans des parcs urbains. Toute chose qui fait penser que la zone d'étude est à l'origine de cette différence antérieurement mentionnée.

Les responsables de la DAPGP, de par leurs observations et connaissance du parc classent la promenade au premier rang et les pratiques sportives au deuxième, des résultats qui soutiennent davantage la forte pratique des activités physiques dans ce parc. Les écrits de Jackson (2022) ont aussi montré que les activités physiques de loisir comme la randonnée, les promenades dans la nature, le golf et le patinage sont quelques-unes des activités amusantes disponibles au réseau de parcs de la vallée d'Oldman au Canada. On est donc emmener à se demander, pourquoi une ruée des usagers du PUBWO sur la pratique des activités physiques de loisir ?

Tableau 2 Activités de loisir les plus pratiquées par les visiteurs au PUBWO

Activités de loisir	**Effectif**	**Pourcentage**
Visite du zoo	1	0,7%
Jeux de société	3	2%
Musique	3	2%
Lecture	15	10%
Pique-nique	18	12%
Sport	**22**	**14,7%**
Marche pour contemplation du paysage	**27**	**18%**
Promenade dans les artères du parc	**61**	**40,7%**
Total	150	100%

« *Notre groupe vient ici tous les mercredis et samedis matin pour pratiquer les activités physiques et sportives, juste pour se détendre et améliorer nos capacités physiques et mentales* » nous a confié un responsable d'une structure d'activités de loisir. Comme lui et les membres de son groupe, l'objectif poursuivi par la majorité (85%) des visiteurs en se rendant au PUBWO est la recherche de l'amélioration de leur bien-être. La complexité du sens de ce mot conduit à le considérer sous sa dimension holistique c'est-à-dire « santé », donc sur ses plans social, psychologique et mental. Une compréhension qui peut se rapprocher de celle de Bedet (2022) qui affirme que la pratique des activités physiques de loisir dans les parcs urbains permet aux usagers d'appartenir à une communauté d'amis et libère leurs endorphines, dont la dopamine qui est l'hormone naturelle du bonheur de l'être humain. Faire du vélo ou de la course au parc, active la production d'endorphines des pratiquants et leur offre une sensation de bien-être et de sérénité. Chaillet (2018) surenchérit dans la même lancée qu'une promenade dans un espace vert peut évoquer des souvenirs agréables contribuant au bien-être du promeneur.

Vétusté des infrastructures et matériels de loisirs, nœud de paralysie du bien-être des visiteurs

La pratique d'une activité de loisir ne saurait être possible sans l'existence de d'infrastructure de loisirs accessible, bien équipée et de bonne qualité. Les résultats de la figure 2 témoignent que près de 70% des visiteurs, ont laissé entendre qu'ils n'arrivent pas à pratiquer convenablement leurs loisirs prisés, ce qui signifie déjà qu'il existe des contraintes auxquelles ils font face. L'existence de ces contraintes a aussi été signalé par les responsables de structures de loisirs en ces termes : « *nous travaillons vraiment dans de mauvaises conditions* ».

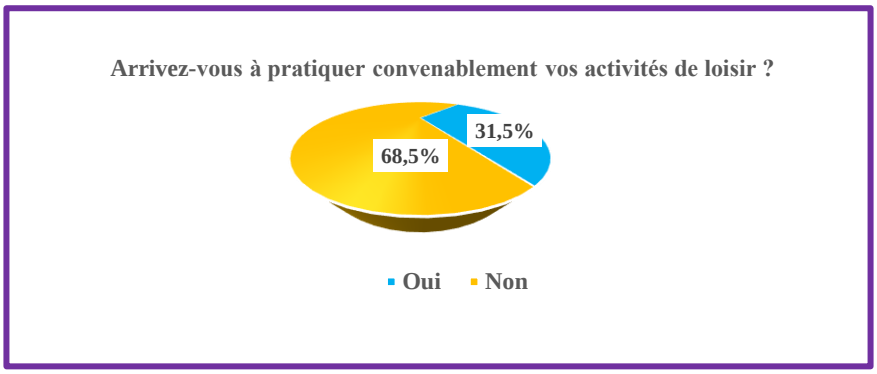

Figure 2 Secteur représentant la possibilité de pratique des activités de loisir

Pour mieux connaitre l'origine de ces mauvaises conditions, il a été établi un tableau d'hiérarchisation de différentes contraintes. Un tableau qui a placé au premier rang, la mauvaise qualité des infrastructures et des matériels de loisirs. Ce résultat ne se démarque pas de celui de GSI et ACPL (2016), qui ont trouvé que dans les collectivités canadiennes, la détérioration des infrastructures récréatives est la première cause qui empêche les citoyens de profiter des bienfaits qui découlent des activités physiques et récréatives. Ils sont partiellement similaires à ceux Levesque et al (2021) qui ont remarqué que même si le parc de Terrebonne au Québec connait une défaillance d'éclairage, l'insuffisance de sécurisation des espaces et des installations, la désuétude des composantes du parc et l'insuffisance des lieux de rafraîchissement sont les premiers éléments critiques qui minent la pratique des loisirs des usagers.

Cet état de détérioration d'infrastructures et de matériels comme principale cause a été fortement soutenu par les responsables des structures de loisirs. *« Les vieilles pistes sont impraticables à cause de la boue pendant l'hivernage ».* « *Ce parc a un vieux aménagement qui ne s'adapte plus aux réalités du moment, en fait les gestionnaires n'ont pas songé à renouveler leur système d'aménagement »* renchérit un autre. Les responsables et agents de la DAPGP tout en reconnaissant cette désuétude pointent du doigt le manque de moyens financiers pour l'entretien de ces infrastructures et matériels et pour faire face aux inondations. *« Les aménagements que vous voyez datent de 1995 ou 1996 ; beaucoup d'infrastructures sont détériorées et ne sont pas renouvelées, c'est le cas des pistes, des banquettes, des plateaux de sport, etc. ».* Le cas du PUBWO peut s'inscrire dans un contexte africain, les résultats des auteurs africains placent généralement la contrainte infrastructurelle (disponibilité, qualité, quantité) au premier lieu.

Alors que faire pour une pratique plus large des loisirs au PUBWO ?

Eu égard aux résultats obtenus et à leur analyse, et en considérant la discussion, il est important de formuler des suggestions pour une meilleure pratique des activités de loisir et redresser le niveau de fréquentation du PUBWO.

Penser à une réhabilitation de l'existant avant un réaménagement du parc sous l'intervention de l'Etat

Le niveau de dégradation des infrastructures et matériels à l'intérieur du parc est critique, les responsables du parc ont toujours soulevé le manque de moyens financiers, il est souhaitable que l'Etat burkinabè accompagne la mairie de Ouagadougou pour la réalisation d'un nouvel aménagement. En attendant un tel réaménagement, il est urgent de réhabiliter quelques infrastructures de loisirs sportifs en l'occurrence, les pistes, les plateaux et terrain des sports, les banquettes de soupir.

Ce type de stratégie qui a été murie par la charte africaine de la jeunesse va permettre de redonner un éclat au parc. Cette réhabilitation doit être suivie d'un apport de matériels et équipements adéquats pour inciter plus les visiteurs à la fréquentation de ce parc.

Combler un vide juridique par l'élaboration d'une politique communale de loisirs

« *Pour le moment nous n'avons de politique communale de loisirs, nous utilisons le programme du mandant du maire, on se réfère souvent à la PNSL pour l'organisation de nos activités de loisir, cela ne nous facilite pas la tâche* » a laissé entendre le Directeur communal de la Promotion des Sports et des Loisirs. L'acquisition d'un tel instrument juridique permet de défendre certaines prises de position dans des instances décisionnelles.

Accorder plus d'attention aux activités physiques de loisir et veiller à leur pratique saine

Les résultats montrent clairement que les activités physiques de loisir sont les plus prisées des visiteurs. Il serait plus commode de mettre plus d'accent sur ces types de loisirs en pensant à des stratégiques innovatrices. Le bitumage de certaines pistes surtout les voies principales, la création d'un parcours de santé, l'aménagement d'une piscine à l'intérieur du parc, l'insertion de balades avec des chevaux, la mise à disposition des vélos (VTT) aux visiteurs peuvent faciliter plus la pratique de ces loisirs sportifs.

Conclusion

La pratique des loisirs n'est jamais superflue, elle conduit toujours à un développement que celui-ci soit social, psychique ou mental. Les lieux de prédilection de pratique de ces loisirs pour certains adeptes sont les espaces verts en l'occurrence les parcs. Pour des raisons et des motifs divers ces derniers s'y rendent pour pratiquer une gamme d'activités. Les usagers du PUBWO, en majorité des jeunes, eux sont friands des activités physiques de loisir comme les promenades, les marches et les pratiques sportives qui représentent jusqu'à 73,4% des activités. La pratique de ces activités leur apporte au-delà du divertissement un bien-être tant sur le plan social que sur le plan de la santé. Dans ces dernières années, près de 70% des usagers de ce parc éprouvent de nombreuses difficultés dans la pratique de leurs loisirs, toute chose qui les prive de leur bien-être tant adoré. Les résultats de la hiérarchisation de ces difficultés a placé au haut du tableau l'état vétuste des infrastructures et matériels de loisirs.

Vu, l'importance de la place qu'occupent les loisirs dans la vie quotidienne des populations de Ouagadougou, il urge que l'Etat vienne en aide à la commune pour une réhabilitation du parc avant que les responsables municipaux ne pensent à une éventuelle élaboration d'une politique communale des loisirs. Ce document doit accorder une part belle aux activités physiques de loisir qui sont plus prisées dans les parcs comme le montre notre recherche. La persistance de l'insalubrité du parc ces derniers temps nécessite d'être prise au sérieux par les responsables de la DAPGP qui peuvent envisager faire la promotion de l'éco-loisirs, ce qui va permettre d'impliquer tous les acteurs dans la recherche de la salubrité.

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Détermination des normes de la valeur physique liée à la santé en milieu scolaire en Algérie - 13 – 19 ans catégorie garçons

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Résume

Cette étude à pour objectif de déterminer la santé des élèves algériens à partir d'une série de tests et mesures d'évaluation relatifs à la valeur physique et par conséquent de déterminer des normes sur le plan des indices cardio-respiratoires, de la force musculaire et des paramètres biométriques. Un échantillon de 1200 élèves de sexe masculin dont l'âge varie entre 13 et 19 ans à participer volontairement à cette étude. L'analyse des résultats montre globalement, que la valeur physique liée à la sante de notre échantillon se situe à un niveau moyen voir faible. En effet, l'indice pondéral traduit un retard dans le développement de la valeur physique liée à la sante. Ceci entraine des problèmes de santé à posteriori, notamment, la surcharge pondérale, la tension artérielle et des séquelles au niveau de la colonne vertébrale.

Mots clés : Normes, Valeur physique, Santé, Milieu scolaire.

Introduction

La sédentarité est un réel problème de santé publique au niveau mondiale (Briand, 2016a). L'OMS (2020) affirme que le lieu idéal pour sensibiliser les jeunes sur un mode de vie actif et leur enseigner les connaissances pour adopter des choix favorables à la santé est l'école, car c'est le milieu dans lequel les jeunes passent une grande partie de leur temps, et qui est accessible (Sauret, 2008). Plusieurs travaux réalisés sur la prévention et la protection des citoyens de différents âges dans les pays développés ont confirmés ces résultats (Dumont & Fischer, 2015a; Edouard et al., 2011). En effet, des résultats obtenus aux USA montrent clairement que la bonne santé est intimement liée à l'activité physique (Gérard & Haffray, 2018a). Par ailleurs, une récente étude relevant de l'organisme mondial de la sante (OMS) est arrivée à la conclusion que le manque d'activité physique est la cause principale de la surcharge pondérale facteur de décès (Erbüke&Todesco, 2021; Petitgenet, 2012; Tchicaya& Lorentz, 2009). Il s'agit dès lors, de prendre à bras le corps ce problème. Tous les indicateurs et les témoignages en tout temps relèvent qu'il faut accorder une importance primordiale à l'activité physique pour le bien être de l'individu tant sur le plan physique que psychique (Gagnon, 2011; Perrin &Mino, 2019; Poirel, 2017a). Ils mettent l'accent sur les dangers de la sédentarité et son impact néfaste sur les fonctions de l'organisme (Labie, 2006a; Tchicaya& Lorentz, 2009). Même si les bienfaits de l'activité physique sont un fait reconnu depuis bien longtemps, l'homme est confronté actuellement à beaucoup de maladies d'origine cardiaque (Poirel, 2017a), lediabète, l'arthrose, l'obésité…, qui réduisent son autonomie (Laberge, 2007).

Il a été démontré que plus l'activité physique est pratiquée, plus le niveau d'aptitude de l'activité cardio-respiratoire et l'amélioration des fonctions de l'organisme entrainent une amélioration du potentielle santé (Adda & Ali, s. d.; Laroppe, 2010).
En accord avec (ARGUIN, s. d.; Coisne, 2007; Filiatrault, 2014; Riesco, 2009) , l'activité physique demeure l'un des remèdes les plus pertinents pour favoriser le potentiel énergétique et réguler le poids du corps.

En Algérie, le Ministère de la Santé en 2010, à avancé que la proportion des maladies liées au manque de l'activité physique augmente d'une année à l'autre. Dans l'ensemble des Instituts et laboratoires de recherche, les résultats convergent à leurs tour vers cette thèse (KAMBOUCHE, DJEKAOUA, & BENLALDJ, 2017). Les pourcentages proposés par l'Organisation Mondiale de la Santé situe le taux de sédentarité en ALGERIE à 56% pour les hommes et 53% pour les femmes, d'où son impact sur la surcharge pondérale et l'obésité (Hammiche & Brahamia, 2012). Ce fléau touche un enfant sur six (Filiatrault, 2014; Zerguine, 2002)

Méthodes et Moyens

Les chercheurs ont utilisés la méthode descriptive. L'échantillon de cette étude est de 1200 élèves choisi volontairement parmi les garçons scolarisé au cycle moyen et secondaire dont la tranche d'âge varie de 13 à 19 ans, il correspond à 69,72% de la population relevant des établissements scolaires..

Batterie de tests utilisés

Après avoir consulté l'ensemble des ouvrages traitant des concepts clés similaires à notre recherche, nous avons appliqué une série de batterie de tests et mesures physiques (test de COOPER) concernant la vo2max, le (Fitness gram) test le plus indiqué pour évaluer la valeur physique liée à la santé. La batterie comprend les tests suivants:

- L'IMC (INDICE DE MASSE CORPORELLE)
- La course –marche (01 mile soit 1609,34m)
- Abdominaux (de la position couchée relever les jambes en pliant les genoux)
- De la position assise, relever le tronc vers l'avant
- Pompes
- Dynamométrie (force de la main)

Résultats

Tableau n° 1 Indice de masse corporelle

âge	Poids (kg)	Taille(m)	maigre	chétif	Poids normal	Surpoids	obèse
13ans	**43.11**	**1.51**	0.00%	31.43%	54.29%	8.57%	5.71%
14ans	**47.02**	**1.55**	0.00%	0.00%	50.00%	11.29%	8.06%
15ans	**57.86**	**1.65**	0.00%	36.84%	47.37%	2.63%	13.16%
16ans	**61.43**	**1.70**	0.00%	31.25%	52.08%	10.42%	6.25%
17ans	**62.05**	**1.74**	0.00%	9.30%	81.40%	9.30%	0.00%
18ans	**64.21**	**1.74**	3.51%	24.56%	49.12%	19.30%	3.51%
19ans	**64.73**	**1.74**	2.00%	26.00%	**48.00%**	20.00%	4.00%
moyenne	57,20	1,66	**0.79%**	**22.77%**	**54.61%**	**11.64%**	**5.81%**

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L'indice de poids du corps en relation avec la taille nous apporte une appréciation du taux de graisse. L'échantillon étudié se caractérise par un poids au niveau de la moyenne (54,61%). Ce pourcentage met également en relief la faiblesse des élèves sur le plan pondéral: 11,64% ont un surpoids et 5,81% sont obèses. Nous savons que les proportions anormales du corps sur le plan adipeux , la faiblesse de la masse musculaire ainsi que les proportions en eau réduites ont une incidence fâcheuse sur l'activité physique et entraine des répercussions sur le plan cardio-respiratoire et donc sur toute activité physique même si cette activité à elle seule n'a pas tendance à faire disparaitre toute présence de graisse au niveau du corps (graisse indispensable).

Tableau n° 2 : Normes relative au test du mile

		13ans	14 ans	15ans	16ans	17ans	18ans	19ans
Evaluation	**Normes**	**Normes – Unité de mesure : la minute**						
16.00--20.00	**Excellent**	Moins de 06.87	Moins de 06.58	Moins de 05.72	Moins de04.89	Moins de 04.42	Moins de 04.22	04.58 Moins de
12.00--15.99	**Bon**	-08.25 06.87	-08.07 06.58	-07.32 05.72	-06.24 04.89	-05.99 04.42	-05.95 04.22	-05.93 04.58
08.00—11.99	**Moyen**	-09.64 08.26	-09.57 08.08	-08.93 07.33	-07.59 06.25	-07.58 06.00	-07.69 05.96	-07.28 05.94
04.00—07.79	**Faible**	-11.03 09.65	-11.07 09.58	-10.54 08.94	-08.95 07.60	-09.16 07.59	-09.43 07.70	-08.64 07.29
00.00—03.99	**Très faible**	11.04- et plus	11.08- et plus	10.55- et plus	08.96- et plus	09.17- et plus	09.44- et plus	08.65- et plus

.

45.66% ont un niveau moyen, 27.54% ont un niveau faible

Les résultats ont montrés, un pourcentage de 45,66% dans le niveau moyen. Seuls, 27,54%% présentent un niveau acceptable. ce résultat est un pourcentage relativement bas concernant cette catégorie d'âge puisque, les études (CARPET,1985) précisent que cet âge est le moment le plus propice du développement de l'endurance aérobie (amélioration du système cardio-respiratoire) compte tenu du développement rapide du muscle cardiaque (développement des vaisseaux et augmentation de l'activité sanguine. La capacité musculaire dépend de la force musculaire, de l'endurance et de la souplesse musculaire (Dumont & Fischer, 2015b; Filiatrault, 2014; Poirel, 2017b).

Tableau n° 3: Pompes

		13ans	4ans1	15ans	16ans	17ans	18ans	19ans
Evaluation	**Normes**	**Normes**						
16.00--20.00	**Excellent**	29-et plus	26-et plus	44-et plus	40-et plus	48-et plus	49-et plus	50-et plus
12.00--15.99	**Bon**	28-19	25-18	43-30	39-27	47-34	48-35	49-35
08.00—11.99	**Moyen**	19-10	17-11	29-15	26-14	33-19	34-21	34-21
04.00—07.79	**Faible**	09-01	10-03	14-01	13-01	18-04	20-07	20-06
00.00—03.99	**Très faible**	0.00	02 et moins	0.00	0.00	03et moins	06et moins	05et moins

43,49% ont un niveau moyen, 33,19% ont un niveau faible

En revanche, la partie abdominale a tendance à prendre du volume (embonpoint). Cette proéminence à des répercussions fâcheuses sur le dos et entraine des séquelles avec l'augmentation du poids d'où l'apparition de l'obésité et de nombreuses maladies qui coutent à l'état des dépenses onéreuses (Briand, 2016b; Gérard &Haffray, 2018b; Jany-Catrice, 2016; Labie, 2006b).

Le test de pompes et le test de dynamométrie évaluant la force musculaire des membres supérieurs (cette force joue un rôle majeur dans la vie de l'individu puisqu'elle est utilisée quotidiennement (prise d'objets, poussées, tractions) . L'échantillon pour les pompes a obtenu les résultats suivants: 43,49% (niveau moyen à faible) ; 33,19 %5(niveau faible)

Tableau n° 4: Plier le tronc vers l'avant , position assise

		13ans	**4ans1**	**15ans**	**16ans**	**17ans**	**18ans**	**19ans**
Evaluation	**Normes**	**Normes**						
16.00--20.00	**Excellent**	33.80et plus	35.88et plus	40.22et plus	39.12et plus	38.84et plus	41.27 et plus	39.89 et plus
12.00--15.99	**Bon**	33.79-26.98	35.87-28.44	40.21-31.37	39.11-30.88	38.83-32.06	41.26-31.71	39.88-31.46
08.00—11.99	**Moyen**	26.97-20.17	28.43-21.00	31.36-22.51	30.87-22.65	32.05-25.28	31.70-22.14	31.45-23.02
04.00—07.79	**Faible**	20.16-13.35	20.99-13.56	22.50-13.65	22.64-14.42	25.27-18.50	22.13-12.58	23.01-14.58
00.00—03.99	**Très faible**	Moins de 13.35	Moins de 13.56	Moins de 13.65	Moins de 14.42	Moins de 18.50	Moins de 12.58	Moins de 14.58

42.97% ont un niveau moyen, 27,77% ont un bon niveau

Discussion

La promotion de l'activité physique et réduire les comportements sédentaires représente un enjeu majeur de santé publique. Il est plus que nécessaire d'augmenter la pratique de l'activité physique et de diminuer la sédentarité. En effet, afin d'améliorer les qualités physiques liées à la santé, qui sont des facteurs majeurs de la santé de la personne et de la population, il devient nécessaire d'une part, d'évaluer le niveau des qualités physiques des élèves scolarisés de 13 à 19 ans et d'autres part, de comparer ce niveau avec les normes de l'organisation mondiales de la santé (OMS). Cette évaluation des qualités physiques permet d'établir un bilan afin de proposer des programmes d'activités physiques adaptées aux caractéristiques de la tranche d'âge étudiée. Les résultats ont montrés un niveau juste moyen aux différents tests et mesures cités auparavant. Cette identification du niveau de notre échantillon et sa comparaison avec les normes de l'OMS, montre qu'il est impératif de mettre en place dans les différents paliers de la scolarité, un

programme d'activité physique afin de réajuster ou de modifier les comportements pour prévenir les maladies cardio-respiratoire ou l'obésité qui commence à prendre une ampleur effrayante au ni

Par ailleurs, la piste de la mise en place de programmes d'activité physique adaptée en milieu scolaire selon le type de région du pays, visant à promouvoir la santé devra montrer des effets bénéfiques sur la santé de manière particulière. Afin d'approfondir davantage cette thématique, une prochaine revue de littérature viserait à évaluer l'impact de ces programmes sur les qualités Physiques et par extension, sur la santé des enfants et adolescents par région (littoral ; hauts-plateaux-Sahara). Ces interventions devront influencer la santé actuelle et future, particulièrement en termes de prévention des MNT.

Conclusion

L'organisation Mondiale de la Santé a consacré de gros efforts à la prévention et à la santé de l'homme contre les maladies telles que la surcharge pondérale, l'obésité, les maladies cardio-vasculaires et les maladies liées à l'inactivité. De nombreuses recommandations sont évoquées par les organismes internationaux pour lutter contre ces fléaux des temps modernes, différents moyens de dépistage sont mentionnés. Un des moyens les plus significatifs reste l'activité physique continue et quotidienne. Il ressort de notre étude que l'activité physique liée à la santé reste très peu répandue, notamment en ce qui concerne l'adolescent. Il s'agit de tirer la sonnette d'alarme si nous ne prenons pas les mesures nécessaires à cet effet. Nous recommandons :

- La prise en charge de l'activité physique liée à la santé dans les établissements scolaires en augmentant le volume horaire afin de lutter contre l'obésité
- Le réaménagement des programmes d'éducation physique liés à la santé
- Le développement et la multiplication de l'activité physique adaptée à chaque âge
- Amélioration de l'activité cardiaque au début de l'adolescence
- Développement de la force musculaire pendant le milieu et la fin de l'adolescence
- Application de la batterie à titre individuel pour évaluer la santé de l'élève durant sa scolarité et de proposer un programme en fonction de ses capacités et des différentes régions du pays.

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Le boom du fitness au Sénégal : le développement de l'activité physique pour tous à partir d'initiatives privées

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Résumé

Une prise de conscience des problèmes de santé liés à la sédentarité et l'inactivité physique semble pousser beaucoup de sénégalais vers la pratique des activités de fitness. Ce phénomène qui se traduit par la multiplication des salles de sport nous amène à chercher le profil et la motivation des pratiquants, ainsi que la nature des activités et leurs cadres de pratique. Notre méthodologie s'est basée d'une part, sur approche qualitative « à échelle multiple » épousant les contours d'une démarche ethnographique qui s'appuie, pour l'essentiel, sur l'enquête par entretien, l'observation participante, et d'autre part, sur une enquête par questionnaire administrée en ligne. Les résultats montrent que même s'il est pratiqué en majorité dans les salles de sport, le fitness est également fait en plein air dans différents espaces publics. Les jeunes âgés de 20 à 40 ans constituent l'essentiel des pratiquants de fitness au Sénégal. Les motivations tournent autour des préoccupations de santé, même si la recherche de la performance et le besoin de rencontre apparaissent dans les motifs invoqués.

Mots clés: Fitness, Aerobic, Remise en forme, Activité physique et sportive

Introduction

Une dépense énergétique insuffisante combinée à une alimentation trop riche constituent des facteurs de risque pouvant entraîner une augmentation des cas de surcharge pondérale et les maladies cardiovasculaires (OMS, 2017). Ces dernières sont responsables de 17 millions de décès annuels dont 7,5 millions sont attribués à l'hypertension (OMS, 2006). A cela, s'ajoutent au moins 2,8 millions de décès annuels causés par l'excès pondéral ou l'obésité. Cette situation est une préoccupation dans beaucoup de pays développés au point d'être l'objet de stratégies et de plans dans leurs politiques de prévention en santé publique.

Le Sénégal, à l'instar des pays de l'Afrique subsaharienne, présente les mêmes facteurs de risque : 15,8% de la population présente un surpoids, 6,4% une obésité, 14% à la sédentarité ou une activité physique insuffisante et 5,1% ont une alimentation riche en sel[1]. Or, la promotion des activités physiques à visées sanitaires reste l'une des grandes oubliées des politiques publiques, car ne figurant dans aucun programme ministériel et, de surcroît, les données sportives sont absentes des statistiques nationales du Sénégal. Pourtant, un accroissement de la pratique des activités physiques s'observe dans les villes, et même, dans des coins les plus reculés du pays. La préoccupation grandissante pour la santé et le bien-être pousse les populations vers la pratique régulière d'une activité physique ou sportive. Cette tendance bénéficie pleinement au secteur de la remise en forme en général, du fitness en particulier, qui connait un boom spectaculaire depuis quelques années[2]. Même s'il n'y a pas de statistiques officielles sur la pratique du fitness, l'augmentation fulgurante des salles de remise en forme montre que ce phénomène est d'une vitalité sans précédente au Sénégal. Si le pays ne comptait que deux salles de sport dans les années 1970 (Diatta, 2007), aujourd'hui, rien qu'à Dakar, on dénombre plus d'une centaine de salles de remise en forme. Cette étude exploratoire s'efforce d'apporter des éléments de réponses aux interrogations suivantes : Quel est le profil et la motivation des pratiquants de fitness au Sénégal ? Quelles activités et dans quel cadre les pratiquent-ils le fitness ?

L'objectif de cette contribution est d'étudier le phénomène du fitness au Sénégal, à travers ses offres, ses acteurs, ses cadres de pratique.

Fitness : itinéraire d'un concept « importé »

Si aujourd'hui, on utilise souvent, par simplification, le concept de « Fitness », les pratiques auxquelles il revoit ont connu plusieurs appellations au cours du temps : gymnastique d'entretien, sport de maintien, (re)mise en forme ou aerobic. Le concept aerobic a été inventé par Kenneth Cooper, un médecin lieutenant-colonel de l'US Army qui l'a introduit pour la première fois dans son ouvrage intitulé « Aerobic » devenu un best-seller[3]. Il a conçu une série d'exercices visant à améliorer la condition physique des soldats américains à travers l'entraînement du système cardio-

[1] *Plan stratégique de lutte contre les maladies non transmissibles 2017-2020, Sénégal, Ministère de la Santé et de l'Action Sociale du Sénégal, avril 2017*
[2] https://terrasenegal.com/societe/salles-de-fitness-sport-senegal/
[3] Cooper K. Areobic, Mass Market Paperback, 1968.

vasculaire. L'engouement pour cette nouvelle pratique est tel que l'actrice américaine Jane Fonda l'a adopté et rendu populaire à travers ses nombreuses vidéos diffusées à la télévision dans les années 1970[4].

Cette « vague aerobic » (Bessy, 1987) débarque en Europe vers les années 1980 et devient un phénomène dans les salles de sport. En France, ce sont Véronique et Davina qui, à travers leur émission de télévision « Gym Tonic » sur l'Antenne 2, ont contribué à développer l'aerobic dans les années 1980. Le terme aerobic est entré dans le Petit Robert en 1981. En 1986, Gin Miller invente les cours popularisant encore un peu plus l'aérobic qui, au fur et à mesure de la multiplication des variantes, se transforme en fitness. En effet, des cours collectifs voient le jour et le terme aerobic disparait au profit du mot Fitness (mot anglais signifiant « forme physique » que l'on utilise encore actuellement, un peu sous toutes les formes. L'aérobic est d'ailleurs devenue une activité parmi d'autres dans le fitness[5] qui désigne, selon Le Larousse (2009), « *l'ensemble des activités de (re)mise en forme comprenant de la musculation, du stretching et du cardio-training* ». Il ne s'agit pas d'une discipline précise mais d'un ensemble d'activités physiques permettant de maintenir, d'améliorer sa condition physique et son hygiène de vie dans un souci de bien-être physique et ou psychologique. D'ailleurs, Frugier et Choque (2008) estiment qu'il s'agit d'un concept et non d'une activité physique elle-même.

En 1968, Leslie Roy Mills, ancien athlète néo-zélandais surnommé Les Mills, avait créé des cours collectifs de remise en forme qui sont pratiqués aujourd'hui par plusieurs millions de personnes dans le monde. Dans les années 2000, le Colombien Beto Perez crée la Zumba, le Japonais Izumi Tabata met en place une méthode d'entrainement qui porte son nom « Tabata ». Aujourd'hui, les formes de pratiques ont évolué et de nouveaux concepts ont redynamisé le secteur du fitness. Il s'agit notamment de Boot camp, le HBX ou le HIIT qui sont un ensemble de méthodes d'entrainement regroupant des exercices issus de la gymnastique, permettant d'obtenir un entraînement complet et performant, tout en pratiquant une activité collective et ludique.
Grâce à une offre diversifiée, l'attrait pour le fitness a grimpé en flèche au point de compter600 millions de pratiquants à travers le monde en 2015, dont 150 millions dans de 200 000 clubs de santé et de remise en forme[6]. Dominée par États-Unis, l'Allemagne et le Royaume-Uni, la taille totale du marché de l'industrie mondiale des clubs de fitness est de plus de 87 milliards de dollars[7]. Avec 2,46 milliards d'euros de chiffres d'affaires (en 2016), une croissance de 5% : le marché du fitness français ne cesse de progresser, jusqu'à devenir le troisième en Europe (IHRSA)[8]. Selon Le Bourgeois (2016), 15 millions de français font du fitness (soit 2 fois plus que le nombre de coureurs à pied) dont 6 millions sont inscrits dans des salles (soit 3 fois plus que le nombre de licenciés en football !).

[4] https://www.lequipe.fr/Coaching/Fitness/Actualites/Les-origines-du-fitness/742530 - publié le 4 mai 2015 à 11h32
[5] https://www.lequipe.fr/Coaching/Fitness/Actualites/Les-origines-du-fitness/742530
[6] Dossier special Fitness, Direct Matin n° 1849 du 18/03/2016.
[7] https://www.statista.com/topics/1141/health-and-fitness-clubs/
[8] International Health, Racquet & Sportsclub Association

Méthodologie

Dans le cadre de cette étude, une méthodologie mixte basée à la fois sur une approche qualitative et une méthode quantitative a été utilisée. Ainsi, des observations ont été effectuées dans plusieurs salles de sport mais également sur plusieurs sites où des activités de fitness sont menées (les corniches, les places publiques, sur des terrains de basket, à la plage, au niveau des parcs naturels) et lors des événements liés au développement et/ou à la promotion du fitness, particulièrement les sessions de formation et les Fitness-show.

Nous avons mené également des entretiens semi-directifs individuels auprès de plusieurs acteurs : 8 moniteurs de fitness dont le président de l'Association sénégalaise des moniteurs de fitness, 6 gérants de salles de sport, 17 pratiquants de fitness. Tous les entretiens ont été effectués en face à face à l'aide d'un guide d'entretien, préparé à l'avance et ajusté après quelques entretiens pilotes. Le guide comprend des questions qui portent sur les types d'activités pratiquées dans les salles de sport, le profil et les motivations des pratiquants, ainsi que leurs habitudes de consommation des services liés au fitness. Les entrevues d'une durée de 30 à 90 minutes ont été enregistrées à l'aide d'un dictaphone numérique pour assurer l'authenticité des propos rapportés. Les données qualitatives ont été traitées selon une analyse de contenu thématique (Bardin, 1977).

Des données quantitatives sur les pratiquants ont été obtenues eu égard une enquête sous la forme d'un questionnaire très simple cherchant à connaître, entre autres, le profil et les motivations des pratiquants, les activités et cadres de pratique. Le questionnaire a été confectionné dans l'application *Google Forms* avant d'être testé auprès d'une dizaine de pratiquants de fitness et administré en ligne en début d'année 2022. Le lien a été partagé dans le groupe WhatsApp de l'Association sénégalaise des moniteurs de fitness à qui on a invité à partager avec leurs clients. Nous avons pu recueillir 557 réponses traitées automatiquement par l'application Google Forms qui dresse les statistiques.

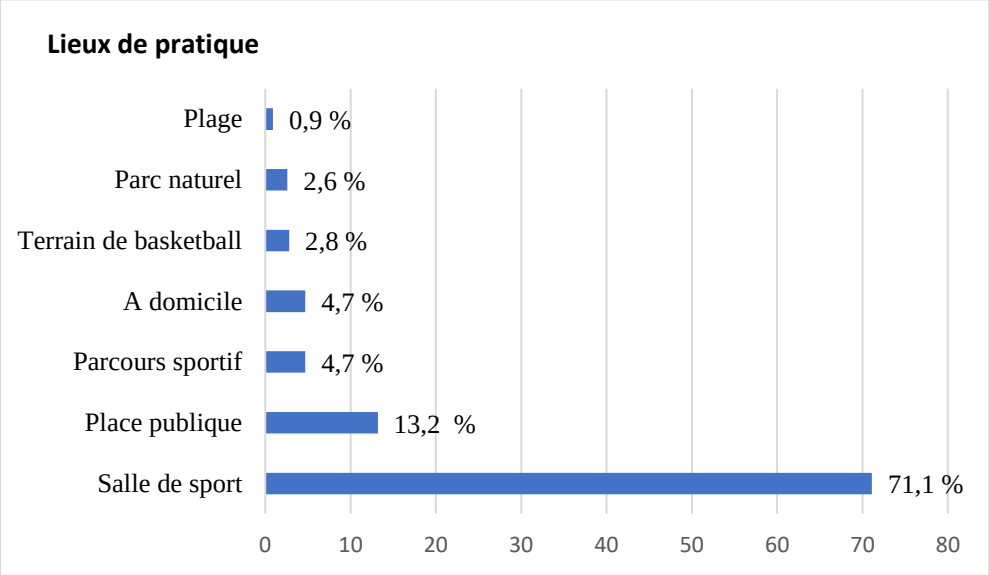
Le cadre de la pratique du fitness au Sénégal

En tant que pratique physique, le fitness s'effectue dans différents lieux et contexte au Sénégal. Le tableau montre 1 que les salles de sport ne sont plus l'unique endroit où se pratiquent les activités de fitness au Sénégal. Les lieux de pratiques se sont également diversifiés : à domicile, les espaces publiques, les parcs naturels et autres sites en plein air reçoivent de plus en plus des adeptes du fitness.

Les salles de fitness

Le premier cadre de pratique des activités de fitness au Sénégal est la salle de sport dont le nombre a explosé dans les principales villes du Sénégal. En effet, 71.1 % des pratiquants interrogés affirment qu'ils l'exercent dans les salles de fitness, même si, il faut le reconnaitre, plusieurs termes sont utilisés pour désigner ces salles. Par le passé, elles étaient généralement (et le sont toujours)

désignées sous les termes de « salles de sport », de « salles de gymnastique », « salles de musculation », « salles de remise en forme ». Toutes ces appellations semblent suivre l'évolution du concept de fitness et désignent la même réalité, à savoir un lieu mettant à disposition du public des équipements, un environnement et des prestations d'encadrement visant à l'amélioration de la condition physique, de la détente et du bien-être de ses clients (SNEF, 2004).



Source : enquête Fall I. 2022

Figure 1 Représentation des répondants en fonction des lieux de pratique du fitness

Une enquête réalisée par Djiba (1998) a montré qu'il existait 27 salles de remise en forme qui sont l'œuvre de privés, celle de Fall (2009) a recensé plus de 58 centres de remise en forme dans le département de Dakar. Aujourd'hui, rien que dans la région de Dakar, on compte plus de 171 salles de sports (voir tableau 1), de dimensions variables. Elles sont localisées dans différentes structures.

- *Les casernes militaires* : le complexe sportif de la gendarmerie de Colobane, la salle de sport du camp Leclerc, la salle de fitness de la gendarmerie de Ouakam, la salle du camp Dial Diop…
- *Les entreprises privées et parapubliques* : salle de sport de l'Agence nationale de la BCEAO, les salles de sports de agences de la, Sonatel, la salle Samba Gueye de la Lonase.
- *Les Administrations publiques :* salle de sport du Ministère de l'Intérieur
- Les *Universités et écoles de formation* : salle de l'IAM, de l'Université Gaston Berger (UGB), de l'Université Cheikh Anta Diop (UCAD), de l'Ecole Supérieure Polytechnique (ESP)….
- *Les structures sanitaires* : salle de sport de l'Hôpital Général de Grand Yoff, la salle du Centre National d'appareillage et d'orthopédie (CNAO).

La multiplication des salles de sport au sein des organisations professionnelles montre qu'au Sénégal, une tendance en faveur de l'activité physique pour la santé sur le lieu de travail se développe de plus en plus. Les directions de quelques grandes entreprises ont inscrit la pratique

des activités physiques et sportives au programme de leurs œuvres sociales. Ce modèle paternaliste s'inscrit souvent dans une gestion globale et contrôlée des salariés de l'entreprise (Fall, Tine et Gassama, 2021).

A côté de ces pratiques de fitness sur les lieux de travail, on retrouve une offre commerciale d'initiative privée. Il s'agit notamment, des nombreuses salles privées qui font du fitness une activité commerciale rentable. En se basant sur la typologie de Sandy (2002), les salles de fitness de la région de Dakar peuvent être classées dans plusieurs catégories, selon les critères suivants : la superficie du Centre, le nombre d'adhérents, le nombre d'encadrants et les produits et services proposés (activités). A cela, il convient d'y ajouter l'existence ou non d'espaces de pratique différenciés, à savoir : une salle de musculation, un espace cardio-training, une salle de cours collectifs pouvant servir également de cours de danse. Ainsi, on aura : les grandes, les moyennes et les petites structure et les très petites structures qui constituent une catégorie spéciale fréquentée.

- ***Grandes structures*** *:* Superficie supérieure à 1000 m² ; 61 % de ces clubs ont plus de 1500 adhérents ; 12,6 salariés en moyenne ; plusieurs espaces de pratique (Salle de musculation - Espace cardio-training - Cours collectifs - Cours de dance) ;
- ***Structures intermédiaires*** ou *structures Moyennes* : Superficie comprise entre 500 et 1000 m², ¾ ont plus de 500 adhérents ; 6,6 salariés ; une seule salle pour la musculation et les appareils cardio-training, un espace de cours collectifs ;
- ***Petites structures*** *:* Superficie inférieure à 500 m² ; Elles ont moins de 500 adhérents ; environ 1,7 encadrants ; une seule salle pour accueillir tous les pratiquants de musculation et de cours collectifs ;
- ***Très petites structures*** (c'est une catégorie spéciale de salles que l'on retrouve dans les quartiers populaires et en banlieue au Sénégal) : superficie inférieure à 100 m² qui se résume en une petite salle dans laquelle quelques appareils sommaires de musculation sont installées pour les besoins des jeunes lutteurs et pratiquants de bodybuilding, sans la présence d'un encadrant.

Tableau 1 Le nombre de salles de fitness dans la région de Dakar

Départements de Dakar	Nombre de salles total	Grandes Structures	Moyennes structures	Petites structures	Très petites structures
Dakar	46	2	11	14	19
Pikine	61	0	17	21	23
Guédiawaye	45	1	9	18	17
Rufisque	19	0	2	6	11
Total	171	3	39	59	70

Source : enquête Fall I. 2022 (recensement effectué avec l'aide des moniteurs de fitness)

Chaque catégorie de salle propose des tarifs adaptés aux conditions économiques des pratiquants qui la fréquentent. En effet, les grandes structures qui exigent un abonnement mensuel dépassant 60 euros sont fréquentées en général par des cadres supérieurs, tandis que les très petites structures permettent à leurs abonnés (aux possibilités financières plus réduites) de payer moins de 7 euros par mois et, très souvent, moins d'un euro la séance à ceux qui n'ont pas un revenu stable.

Si le fitness est associé la plupart du temps aux salles de sport, force est de constater qu'il investit désormais de nouveaux territoires et prend parfois de nouvelles formes de pratique au Sénégal. En effet, pratiquer le fitness est également devenu possible en-dehors des salles de sport classiques.

Les espaces de pratique en plein air

On n'est sans doute plus dans les temps où le fitness n'était pratiqué que dans les salles de sport traditionnelles. Désormais les pratiquants se tournent vers des espaces en plein air, sur des terrains vagues, des places publiques ou tout le long des corniches.

- ***Les parcours sportifs***

La figure 1 montre que 4,7 % des personnes interrogés pratiquent le fitness au niveau des circuits aménagés au niveau de différents parcours sportifs (notamment celui de la corniche ouest, des HLM et de Diamalaye) et 2,6 % au niveau de parcs naturels comme celui de Hann. Le premier parcours sportif de Dakar est celui de la corniche ouest de Dakar qui est né de l'initiative de deux professeurs de l'INSEPS[9] qui, bénéficiant de l'appui financier de la Mission Française et de la commune de Dakar. Leur projet est concrétisé en avril 1986 avec l'autorisation de la Mairie de Dakar (Keita, 1988). Aujourd'hui, on assiste à une multiplication des parcours sportifs dans la ville de Dakar. Il s'agit par exemple des parcours sportifs des HLM, de Guédiawaye, des Parcelles Assainies (Diamalaye), de la Foire (CICES), etc. A cela, il convient de souligner l'existence de parcours sportifs créés dans les espaces naturels comme le Parc de Hann, le Technopole ou la forêt classée de Mbao qui connaissent, depuis quelques années, une grande affluence.

- ***Les places publiques***

A côté des salles de fitness et des parcours aménagés pour la pratique sportive, de nombreuses places publiques servant de plateaux de cours collectifs de fitness sont envahis tous les soirs par des centaines de personnes désireuses de s'adonner à des activités physiques en plein air. Ainsi, 13.2 % des enquêtés pratiquent le fitness au niveau de places publiques, 2.8 % sur des terrains de basket-ball appartenant aux collectivités territoriales. C'est ainsi que la place de l'Obélisque, les Allées Seydou Nourou Tall, le Rond-point des HLM Grand Yoff, sont autant de lieux de regroupement de pratiquants sous la direction de moniteurs de fitness.

[9] Alain Monsellier et Georges Grave, deux enseignants de l'INSEPS, ont eu l'idée de créer des espaces naturels opérationnels permettant à la population dakaroise de s'adonner à une pratique plus rationnelle de leurs activités

Les cours de fitness à domicile

Nombreux sont les sénégalais qui pratiquent le fitness à domicile, soit seuls en imitant le plus souvent des vidéos sur YouTube, soit à l'aide d'un coach personnel (appelé « personal trainer » dans le langage du secteur). Ce phénomène de cours à domicile s'est accentué avec le confinement imposé par les mesures de restrictions prises pour lutter contre la propagation du coronavirus responsable de la pandémie Covid-19. Ainsi, malgré la réouverture des salles de sport, certains adaptes du fitness continuent de pratiquer leurs activés favorites à domicile (4.7 % des enquêtés dans le cadre de notre étude).

Que ce soit dans les salles de sports ou en plein air, le profil et les motivations des pratiquants sont divers.

Profils et motivations des pratiquants des fitness au Sénégal

Le fitness séduit de plus en plus de sénégalais, sans distinction de sexe, d'âge ou de catégorie socioprofessionnelle, mais avec des motivations différentes.

Le profil des pratiquants de fitness au Sénégal

Les activités de fitness sont plus pratiquées par les hommes (59,7 %) que par les femmes (40,3 %). Toutefois, il convient de souligner que la participation des femmes s'est accrue depuis une quinzaine d'années, puisque le taux était de 30,84 % en 2007 (Diatta, 2007). Cette situation s'explique par l'arrivée de nouvelles formes de pratiques beaucoup moins accès sur le développement de la force, et plus orientées vers des formes dansées comme la zumba et le body balance.

Plusieurs recherches ont montré que les salles de fitness sont fréquentées en majorité par des célibataires (Diatta, 2007 ; Dièye, 2011 ; Sané, 2014).
Globalement, c'est chez les jeunes que s'observent les niveaux de pratique les plus importants. Plus de la moitié des pratiquants (51,7 %) ont un âge compris entre 20 et 30 ans, tandis que 27,8 % sont âgés de 31 à 40 ans. Les mêmes tendances ont été observées dans des études antérieures menées au Sénégal.

Les moins de 20 ans et les plus de 60 ans se singularisent par un niveau plus faible de pratique. Avec l'avancée en âge, on observe une diminution de l'activité de fitness qui deviennent de plus en plus intense avec l'arrivée des cours de bady-attack et de body combat, au profit d'un niveau d'activité physique modéré comme la marche. La grande majorité des pratiquants a un niveau d'étude supérieur (78 %) et exerce des activités professionnelles en tant que cadres supérieurs (35,6 %). Le deuxième taux de pratique de fitness se retrouve au niveau des individus ayant atteint le niveau d'étude moyen/secondaire et des employés (tableau 2).

Tableau 2 Profil sociodémographique des pratiquants

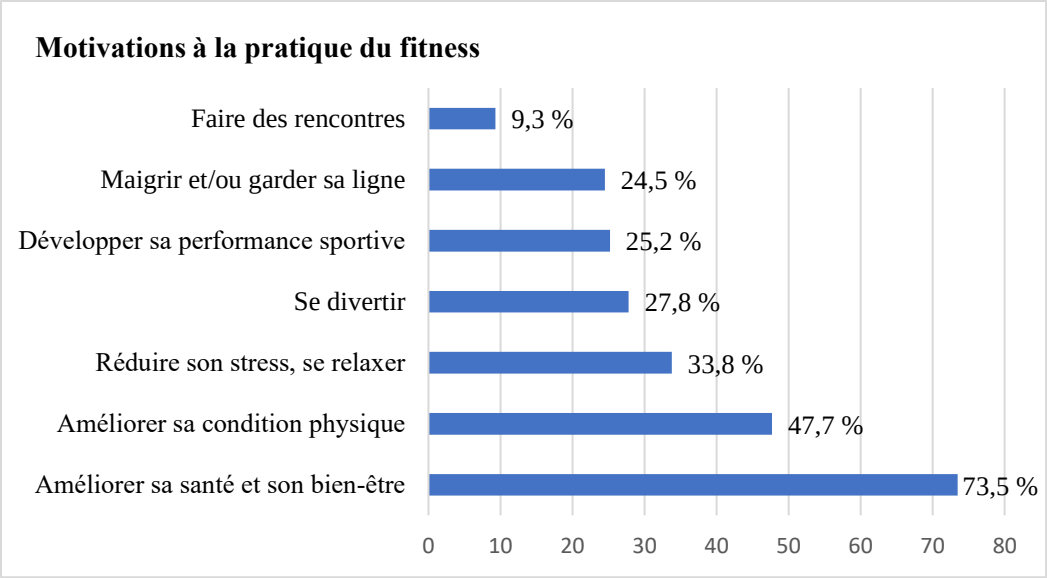
Genre	**%**
Femme	40.3
Homme	59.7
Catégories d'âge	**%**
- de 20 ans	0.7
20-30 ans	51.7
31-40 ans	27.8
41-50 ans	15.9
51-60 ans	2.6
61-70 ans	0.7
+ de 70 ans	0.7
Niveaux d'étude	**%**
Non scolarisé	0.7
Elémentaire	1.3
Moyen/Secondaire	20
Supérieur	78
Occupations professionnelles	%
Cadres supérieurs	35.6
Employé	23.5
Profession libérale	12.7
Élèves et étudiants	11.4
Femme au foyer	0.7
Cadre moyen	7.7
Recherche d'emploi	4
Sportifs	2.3
Artisan	2.1

Source : enquête Fall I. 2022

La motivation à la pratique du fitness

La figure 2 présente les motifs de pratique évoqués par les personnes interrogées et indique la variété des motivations qui poussent des sénégalais à pratiquer du fitness.

Les résultats montrent à l'évidence la place prépondérante qu'occupe l'amélioration de la santé et du bien-être comme motif de la pratique le plus cité (73,5 %) chez des personnes interrogées. L'amélioration de la condition physique se positionne à la deuxième place des motivations évoquées par nos enquêtés (47,7 %).



Source : enquête Fall I. 2022

Figure2 Motivations à la pratique du fitness au Sénégal

La dimension esthétique est présente dans les motifs de 24,5 % de pratiquants qui veulent « maigrir et/ou garder la ligne ». En effet, si l'apparence occupe une place importante dans les sociétés occidentales (Amadieu, 1990) où la silhouette plus ou moins fine ou empâtée est considérée comme une facilitatrice d'intégration sociale (Vigarello, 2012), au Sénégal, beaucoup de femmes cherchent également à ressembler à ce modèle ou « idéal » qui est en réalité une norme de corps « importée ». Toutefois, une étude menée par Tine et Fall (2015) a pu montrer le dilemme de certaines sénégalaises pratiquantes de fitness de vouloir à la fois maigrir sur certaines parties de leur corps tout en gardant le reste inchangé. « *Je fais du fitness parce qu'on m'a dit qu'il peut me permettre d'avoir un ventre plat, je veux seulement maigrir du ventre mais pas les fesses* » (une pratiquante).

Les scores élevés des items « améliorer sa santé et le bien-être » et « « réduire son stress, se relaxer », ajoutés à celui relatif aux préoccupations esthétiques montrent l'importance, chez les sujets interrogés, de la pratique du fitness pour la santé physique et mentale. Les mêmes tendances ont été trouvées dans des études réalisées chez des pratiquants de fitness au Sénégal où, la recherche du bien-être et de la santé domine dans les motivations des pratiquants de fitness (Diémé, 2006 ; Sané, 2014).La dimension hédoniste qui se manifeste à travers la recherche du plaisir par le divertissement (27,8 % de réponses) montre.

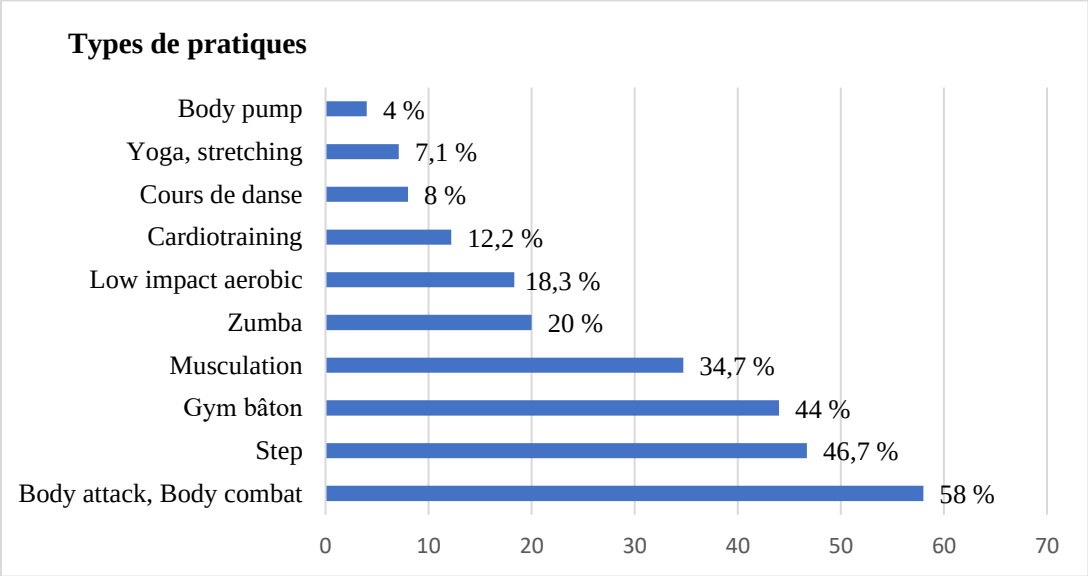
Même si l'amélioration de la performance sportive (25,2 % de réponses) apparaît aujourd'hui relativement secondaire par rapport aux motivations relatives au plaisir ou à la préservation de la santé, la compétition et le challenge est d'une grande importance pour les sportifs qui souhaitent développer leurs qualités physiques à travers des programmes de musculation. L'entretien du corps « athlétique » devient un objectif primordial chez les pratiquants de la banlieue composés dans leur grande majorité de lutteurs en quêtes d'un corps hypertrophié comme chez les culturistes (Gillet &

White, 1992). « *La grande majorité des salles de sport de la banlieue n'offre que des séances de musculation. Ce sont des salles qui reçoivent beaucoup de jeunes qui pratiquent la lutte. Ils cherchent à développer leur musculature, ils font de la gonflette* » (un moniteur).

Par ailleurs, on note l'affirmation d'une forme de sociabilité chez certains pratiquants qui espèrent « faire des rencontres » (9,3 % de réponses, loin derrière les autres motifs de pratique). En effet, l'adhésion à un club de remise en forme favorise en outre les contacts sociaux, raison pour laquelle les salles de fitness sont considérées comme de véritables lieux de rencontre[10].

Les offres de prestations dans les salles de fitness

Le fitness est une activité commerciale, un moyen de générer des profits par la mise en place d'un service qui vient satisfaire les besoins et attentes des clients.



Source : enquête Fall I. 2022

Figure3 Les activités de fitness pratiquées au Sénégal

Dresser un panorama de l'ensemble des activités de fitness pratiquées au Sénégal semble difficile. Le fitness renvoie concrètement à des pratiques extrêmement diverses : de la course à pied aux cours collectifs en aerobic, en passant par des pratiques douces (yoga, tai-chi, etc.) en groupe ou bien des séances de Rando-fitness (marche en groupe qui se termine par un cours d'aerobic). Cette situation est accentuée par la grande diversification des « concepts »[11] qui rend délicate leur observation et qui renvoie à de fortes évolutions des pratiques ces deux dernières décennies. En fait, 58 % (figure 3) des enquêtés pratiquent le Body-combat et le Body-attack, des concepts créés par LesMills adoptés par des millions de pratiquants à travers le monde[12]. Ces cours devraient être

[10] https://senego.com/salles-de-sport-a-dakar-les-muscles-de-lamour_483151.html
[11] Il faut entendre ici « Concept » comme étant une forme de pratique créé par les grandes industries du Fitness comme LES MILLS, HBX, etc.
[12] https://www.lesechos.fr/2002/06/les-mills-ou-le-fitness-clefs-en-main-694744

pratiquées uniquement dans les salles ayant acheté la licence et dispensées par des coachs en contrat avec la société LesMilss. Toutefois, on remarque que la quasi-totalité des salles de Dakar les affichent dans leurs programmes, en plus du body pump qui récoltent respectivement les scores de 8 % et 4 % dans notre étude. Si le body pump est apparu très peu dans les réponses c'est certainement dû au fait que sa pratique nécessite du matériel (barres, haltères, step) et d'autre part son intensité qui décourage les personnes en âge avancé.

Les cours de step viennent en deuxième place des activités les plus pratiquées (46,7 % de réponses) par les personnes interrogées. Inventé par Gim Miller, ce cours nécessite un matériel particulier : les « step », dont le prix n'est pas accessible par la quasi-totalité des Petites structures qui sont obligées d'utiliser des « bancs » en bois commandés chez les menuisiers du coin.

Conclusion

En l'absence de politiques publiques sportives pour la santé, de nombreux sénégalais en général, les citadins en particulier, s'adonnent à la pratique des activités de fitness qui, au cours des dernières années, s'est considérablement accrue. Cette contribution s'est attachée à étudier le profil et la motivation des pratiquants, les différents cadres de pratiques ainsi que les types d'activités qu'ils exercent. Au Sénégal, le portrait type du pratiquant de fitness pourrait se décrire comme suit : un homme âgé de 20 à 30 ans, avec un niveau d'étude supérieur, ayant un statut d'employé dans ses occupations professionnels. Les principales motivations tournent essentiellement autour des préoccupations de santé et de bien-être des pratiquants, même si par ailleurs, des motifs liés à la performance sportive sont invoqués.

Les salles de sport restent le lieu privilégié de la pratique du fitness, ce qui explique, en partie, leur floraison dans toutes les villes du Sénégal. Cependant, force est de constater qu'aujourd'hui les lieux de pratiques du fitness se sont diversifiés. En effet, la fréquentation des nombreux espaces publics et des parcs naturels par les adeptes du fitness est un phénomène social de grande envergure qui traduit, dans une certaine mesure, une logique de démocratisation de l'accès à ces nouvelles formes de pratiques, jusque-là rester la chasse gardée des entrepreneurs.

Par ailleurs, les formes de pratiques du fitness ont fortement évoluées et se sont diversifiées. Elles vont des activités traditionnelles comme la musculation avec haltères et la gymnastique d'entretien, aux nouvelles pratiques importées, à l'image des nombreux concepts tels le body-attack, le body combat, la zumba et le tabata. Le fitness couvre aujourd'hui un large champ de pratiques hétérogènes qui concourent au bien-être de l'individu, avec une demande qui semble évoluer davantage vers des services annexes : massage, hammam, sauna, soins du corps.

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La lutte de KÃGOR-YÕ du peuple "SAN" de Nayala au Burkina Faso: une pratique saine des enfants a sauvegarder

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Résumé

Dans la province de Nayala au Burkina Faso, se pratique la lutte de *kãgor-yõ*, une activité ludomotrice ancestrale du peuple "*san*" qui met en branle un corps à corps direct entre les enfants. Peuple de lutteur, les "*San*" entreprennent leurs activités de lutte dès le bas âge et le *kãgor-yõ* constitue un des premiers cadres initiatiques dans la trajectoire sociale de l'individu "*san*". A travers ce noble art, les enfants "*san*" se frottent, s'affrontent, se forment, apprennent et intériorisent la culture "*san*" dans le but de gravir les échelons de la socialisation. Pour saisir la part contributive du *kãgor-yõ* à l'édification de l'être "*san*", un séjour a été effectué dans la province de Nayala où une observation participante a été réalisée sur la pratique physique de tradition. De l'analyse des résultats, il ressort que le *kãgor-yõ* est une activité physique qui offre un mode de vie saine aux enfants "*san*" tout en favorisant leur intégration socioculturelle dans le milieu d'appartenance. Cependant, les résultats exposent également que ce patrimoine ludique du peuple "*san*" est menacé de disparition par les mutations physiques et socioculturelles du milieu "*san*". Ainsi, la recherche suggère une redynamisation de la lutte de *kãgor-yõ* à travers sa codification en une discipline sportive suivie de son intégration dans les programmes scolaires en vue d'assurer sa sauvegarde.

Mots clés : kãgor-yõ, "san", Nayala, lutte, pratique physique saine.
Keywords: kãgor-yõ, "san", Nayala, wrestling, healthy physical practice.

Introduction

Le *kãgor-yõ* est une lutte de tradition pratiquée par les enfants en pays *"san"*. Peuple du Nord-ouest du Burkina Faso, les *"san"* ou les *samo* sont connus par cette pratique ancestrale transmisse de génération en génération et qui fait la fierté du pays depuis la nuit des temps.

Incarnant l'ossature sociale et l'identité culturelle *"san"*, cette lutte représente l'une des premières étapes importantes à gravir par les enfants dans le processus de la socialisation de l'être *"san"*. Elle permet dès le bas âge la transmission des valeurs cardinales de la société *"san"* à l'image de la solidarité, du fair-play, de l'intégration, du patriotisme, du vivre ensemble, etc.

En effet, bien que la lutte de *kãgor-yõ* soit une activité de combat, sa contribution à la promotion d'un mode de vie saine chez les enfants ne réside pas dans la dimension martiale mais plutôt dans la transmission de valeurs physiques et morales telles que l'endurance, la prudence, la patience, l'aménité, la politesse, etc.
A
ce sujet, Dohin (2003, p. 23) souligne que l'idée principale des luttes traditionnelles est d'ailleurs cette notion d'affrontement à mains nues, le combat fraternel où l'objectif n'est pas de mettre l'adversaire à mort, mais au contraire, d'accepter l'opposition comme fondement de l'unité du groupe, comme une garantie de sa bonne santé.

Cependant ce cadre d'éducation par excellence de l'enfant *"san"* est menacé de disparition par les mutations physiques et socioculturelles que connait actuellement le milieu *"san"*. En se penchant sur le *kãgor-yõ*, notre objectif est d'analyse sa part contributive à la promotion d'un mode de vie saine en milieu *"san"* ; une analyse qui pourra jeter les bases de sa sauvegarde au profit de la génération future.

Cette recherche s'articule autour de trois points essentiels à savoir le cadre conceptuel et méthodologie qui en constitue le premier, l'analyse des résultats le second et la discussion le troisième.

Cadre théorique et méthodologie

Cadre théorique

La théorie est un moyen de donner un sens à des connaissances (Palé, Bassolé et Sawadogo, 2020, p. 379). Elle part d'un intérêt pour certains phénomènes sociaux et de la reconnaissance de problèmes qui demandent une explication. Le grand défi de la théorie est sa pertinence, à savoir sa capacité de refléter la réalité. Dans l'analyse de la part contributive de la lutte de *kãgor-yõ* à la promotion d'un mode de vie saine chez l'enfant, nous avons estimé que la théorie du jeu pourrait appréhender cette réalité. Découlant essentiellement des champs psychologiques et sociologiques, l'étendue des approches sur le jeu dans ces domaines de recherche montre un foisonnement d'investigation de la part de plusieurs chercheurs. Mais notre choix théorique se porte sur celle du

"Jeux, sport et société" de Pierre Parlebas (1999). Cet auteur a analysé les fonctions physiques, sociales et culturelles des jeux dans la formation de l'être et affirme dans la même lancée que Mauss (1934), que les techniques du corps seraient particulières à chaque société. A de multiples cultures différentes correspondent une multitude de jeux dissemblables: chaque jeu physique constitue une ethno-motricité dont la société d'appartenance oriente et fait évoluer en fonction de ses besoins spécifiques.

De cadre théorique, découle un modèle d'analyse axé sur la structure et la fonction du *kãgor-yõ*. Sa branche structurelle expose les éléments cinétiques qui composent la pratique, les pas de danse, les techniques de combat et de chutes conduisant à la victoire, le rapport techniques entre le lutteur et de son corps et du corps de son adversaire, etc. En un mot, cette analyse tente de décomposer le *kãgor-yõ* en unités indivisibles. Sa sphère fonctionnelle examine le contenu de jeu, sa fonction physique, sociale, culturelle et environnementale qui concourt à l'édification de la vie saine des enfants en milieu *"San"*.

La démarche méthodologique

Pour saisir les différentes articulations de cette pratique endogène du peuple *"san"*, nous avons adopté une démarche anthropologique notamment, l'observation participante comme méthode et technique de collecte des données. Ainsi, nous nous sommes introduit dans la province de Nayala, le terroir du peuple *"san"* et le berceau de la de la lutte de *kãgor-yõ*.

Située à 190 kilomètres au Nord-ouest de Ouagadougou la capitale du Burkina Faso, la province de Nayala se trouve dans la région de la Boucle du Mouhoun. Elle a pour chef-lieu Toma. Elle est délimitée au Nord par la province du Sourou, au Sud par la province du Mouhoun, à l'Est par les provinces du Sanguié et du Passoré et à l'Ouest par la province de la Kossi. Elle compte six communes (Gassan, Gossina, Kougny, Yaba, Ye, Toma), 109 villages et couvre une superficie de 3923 km^2 avec une population estimée à 223090 habitants dont 110639 hommes et 112451 femmes (INSD, 2020, p. 36).

L'observation participante dans ce peuple de lutteur a consisté en une immersion au cœur et avec la population étudiée afin d'observer l'objet de recherche de l'intérieur. Cette démarche *in situ* nous a permis de prendre part aux différentes rencontres de lutte, d'interagir et de discuter autant que possible avec les acteurs de son monde. Cela a été possible grâce à l'apprentissage de la langue locale et des séjours d'une durée globale d'une année dans les communes et les villages abritant la lutte de *kãgor-yõ*.

Les outils de recueils de données ont été le journal de bord ou le carnet de terrain. Nous l'avons utilisé pour noter toute sorte d'informations utiles au cours du séjour. Outil professionnel de base de l'anthropologue, le carnet est le lieu où s'opère la conversion de l'observation participante en données ultérieurement traitables (Oliver de Sardan (1995). Ainsi, nous avons transformé les interactions pertinentes en données dans le carnet le plus souvent aux moments de se coucher ou immédiatement après le réveil.

Nous avons également utilisé une grille d'observation systématique et compartimentée en plusieurs rubriques pour identifier les différentes dimensions et composantes de la pratique. Le remplissage de la grille d'observation s'est fait de façon discrète et l'exploitation des séquences de lutte que nous avons filmées avec notre appareil IPhone a facilité la tâche.
Quant au traitement des données qui sont purement qualitatives, nous avons choisi l'analyse de contenu de Bardin (1977) comme méthode de traitement. Ainsi, nous avons élaboré un format d'analyse en fonction de nos objectifs de recherche. Les trois étapes de l'analyse de contenu à savoir la retranscription, le codage des informations ou les tri-thématiques et le traitement proprement dit ont donc été abordées.

Résultats

Qu'est-ce que la lutte de kãgor-yõ ?

Pratique lointaine, transmise de génération en génération, les origines de la lutte traditionnelle du peuple *"san"* semble être méconnues de nos jours. Cette situation est commune à la plupart des sociétés sans écriture qui grave, le plus souvent, leur histoire dans des sources orales généralement détenues par les griots dont la disparition d'un des leurs peut faire perdre le fil des récits.

Mais la majorité des thèses avancées, admet que la pratique ancestrale aurait une origine externe qui remonte depuis le Mandingue (actuel Mali) où les ancêtres des *"San"* ont émigré vers la première moitié du XIIIe, pour s'installer dans le Yatenga en pays moose (Nyamba, 1992, P. 32). Malgré cette origine lointaine et méconnue, la lutte traditionnelle s'est parfaitement adaptée aux conditions socioculturelles des différentes époques traversées pour devenir une pratique sociale de référence chez les *"San"*.

En effet, on y dénombre plusieurs types de luttes traditionnelles qui rythment le quotidien des *"San"* et qui remplissent des fonctions particulières dans leur société. Certaines sont sacrées c'est-à-dire réservées aux initiés et d'autres, profanes, sont ouvertes à tous (adulte, enfants, étrangers, etc.). C'est dans cette dernière catégorie de lutte que se trouve la lutte de *kãgor-yõ* qui s'effectue généralement en saison sèche et suivant l'accomplissement des besoins ludiques des enfants. Elle se réalise aussi dans la journée que dans les nuits de clair de lunaire.

La lutte de *kãgor-yõ* est un combat de corps à corps direct et à mains nues qui opposent les enfants dont l'âge est compris entre cinq (05) à douze (12) ans. Le but du combat est de terrasser l'adversaire en se servant de son potentiel physique et technico-tactique.

Le mot *kãgor-yõ* attribué à cette pratique ancestrale tire son origine de la radicale "*kã"* qui veut dire "son de mil" et du suffixe *"yó"* qui signifie "lutte" en langue locale. Le lieu de prédilection de cette forme de lutte est l'espace où les femmes du village se retrouvent, le plus souvent, pour piler le mil. Généralement, il se situe devant les concessions ou au centre du quartier ou du village.

Chez les *"San"*, les femmes pilent le mil à l'aide de gros mortiers faits à base de troncs d'arbres. Elles enlèvent les grains et rejettent les débris et le son de mil qui s'entassent pour former une couche épaisse au sol, rendant ainsi le cadre propice à la pratique de la lutte chez les enfants. En effet, plus l'épaisseur de la couche du son au sol est grande, plus sa capacité d'amoindrir l'effet des chutes est élevée. Cela permet de réduire au maximum les risques de blessures et d'attirer davantage les enfants à la pratique de la lutte de *kãgor-yõ*.

L'organisation de la lutte *kãgor-yõ* repose sur la structuration spatiale du milieu *"san"*. Dans cette disposition spatiale, l'unité de base est la concession qui regroupe l'ensemble des maisons appartenant à une même famille. Après cette unité de base suit le quartier qui constitue un regroupement de plusieurs concessions et l'ensemble des quartiers forment le village. Généralement le quartier porte le nom du lignage qui l'occupe. Ce qui fait du village *"san"* un regroupement de plusieurs lignages ayant des liens avec d'autres villages proches ou éloignés.

Ainsi la lutte de *kãgor-yõ* s'organise d'abord entre les enfants d'une même concession, ensuite d'un même quartier et enfin du même village entier. A l'étape du quartier, la lutte de *kãgor-yõ* prend déjà l'allure d'une véritablement compétition en ce sens que ce sont des enfants d'une même concession qui se sont affrontés pour déterminer les plus fort qui partent à la conquête du quartier (compétition inter-concession ou au sein d'une même lignée) ou du village (compétition inter-quartier ou inter-lignagère). A l'image de la trajectoire sociale de l'individu *"san"*, la trajectoire du lutteur traditionnel *"san"* a également le quartier ou le lignage comme point de départ.

Le déroulement de la lutte de *kãgor-yõ* se débute par une exécution des pas de danse autour de l'arène, entrecoupés par des sauts de lutte. Après cette démonstration de force, les adversaires se désignent et les combats directs de corps à corps peuvent commencer. Chaque lutteur peut lutter autant de fois qu'il souhaite.

Après ces multiples affrontements de la lutte de *kãgor-yõ* suivant l'ossature spatiale qui ont rythmé l'atmosphère ludique des villages, viennent d'autres types de luttes auxquels font face les enfants de la zone *"san"*. Il s'agit des luttes de *tõlèdouan-yõ* ou la lutte des bergers, de *pĩnti* ou la petite arène de *bɔɓgule* ou la grande arène, etc. Le *kãgor-yõ* représente à ce titre le premier cadre d'initiation à la lutte chez les *"San"*.

Contribution de la lutte du kãgor-yõ à la promotion d'un mode de vie saine chez l'enfant « san »

L'analyse de la lutte de *kãgor-yõ* laisse apparaître de multiples vertus qui concourent à la promotion d'une vie saine chez les enfants en milieu *"san"*. Cette promotion de la vie saine se lie dans ses fonctions physiques, socioculturelles, de divertissement, etc.

D'abord, au plan de la distraction, la nature ludique de la lutte de *kãgor-yõ* offre un cadre de divertissement sain aux enfants. Ne dit-on pas que l'enfant et le jeu sont intrinsèquement liés ? Dans cette offre saine, vient en premier lieu le cadre d'exécution de la pratique qui, délimité par la

couche épaisse de son de mil, amoindrit les effets de la chute et réduit les risques de blessure. Ce cadre sain pousse les enfants à s'adonner sans reserve à leur pratique ludique. En deuxième lieu, le corps à corps direct de la lutte de *kãgor-yõ* permet aux enfants de se frotter, de se mesurer, de prendre connaissance de soi et de l'autre. Cette exploration de soi et de l'autre favorise développement de l'altérité, du schéma moteur, de la maîtrise de soi et de l'espace.

Ensuite, au plan social, la lutte de *kãgor-yõ* constitue toute une école dont le contenu pédagogique est tiré du milieu d'appartenance. En effet, se dégagent dans cette offre éducatives, des séquences d'apprentissage tels les sauts de lutte, les pas de danse, les techniques de combats et de chute, le discours instrumental, etc. tous relevant du milieu socioculturel *"san"*. Outre cette affinité éducative au milieu d'appartenance qui facilite les transactions didactiques, la pédagogie utilisée dans la transmission du savoir est active et centrée sur l'apprenant en ce sens que l'enseignant et l'apprenant font corps dans la lutte de *kãgor-yõ*. Cela ne pouvait en être autrement dans la mesure où cette lutte est une création exclusive des enfants qui, à force d'assister aux combats des adultes dans les grandes arènes de lutte, ont fini par transposer cette pratique ludomotrice dans leur espace de jeu. A ce titre, la lutte de *kãgor-yõ*, à l'image des joutes adultes favorise la transmission des valeurs cardinales de la société *"san"* telles la fraternité, le fair-play, l'entraides, le patriotisme, etc. Ces valeurs qui renforcent l'intégration, la cohésion sociale, les liens communautaires, la culture de la paix sont transmisses lors des oppositions inter-concessions et inter-lignagères organisées par les enfants.

A cette socialisation des enfants *"san"* par la pratique ancestrale, s'ajoute le registre culturel où la lutte de *kãgor-yõ* constitue un des canaux d'expression identitaire dans lesquels les enfants intériorisent et exposent la richesse culturelle de leurs peuples. Cette exposition s'observe dans l'exécution des pas de danse, des sauts de lutte, la façon spécifique de lutter, etc.

Enfin au plan physique, la lutte de *kãgor-yõ* reflète un combat de corps à corps direct, opposant deux individus dont le but est de terrasser l'autre, en se servant de son potentiel physique et psychologique. En d'autres termes, c'est une mobilisation des énergies musculaires de part et d'autre des deux combattants, produisant ainsi des forces importantes, des attaques et des contre-attaques dont l'objectif est d'aboutir à la chute de l'adversaire. Dans ces charges successives de forces opposées, plusieurs mouvements sont exécutés, notamment ceux des tirades, des esquives, des fixations du corps, des feintes, des placements, des déplacements, des rotations, des sauts, des sursauts, des fauchages, etc. La réalisation de ces mouvements nécessite le développement des qualités physiques de force, d'endurance, de mobilité, de souplesse, de vitesse, de coordination, etc. La lutte de *kãgor-yõ* contribue à ce titre à la formation physique intégrale des enfants. Cependant, face aux mutations physiques et socioculturelles que vit le milieu *"san"*, ce cadre ludomoteur de la promotion de la vie saine des enfants est de nos jours menacé de disparition.

La pente raide de la lutte de kãgor-yõ

Le niveau de pratique de la lutte de *kãgor-yõ* est en régression dans la province de Nayala. L'ampleur de cette régression varie d'un village à un autre et d'une commune à une autre. Elle est faible dans

les communes et les villages reculés et plus accentuée dans la commune urbaine de Toma. En effet, certains villages de cette commune urbaine comme Goussi, Kion et Kolan situent la phase de déclin de leur lutte de *kãgor-yõ* il y a une quarantaine d'année c'est-à-dire dans les années 1980. Tandis que dans les villages des communes rurales de Yaba, de Gossina et de Yé, la régression de la lutte de *kãgor-yõ* se situe vers les années 2000. La pratique de la lutte traditionnelle *kãgor-yõ* est donc en décadence dans la province de Nayala. En effet, dans les localités enquêtées, elle souffre d'un problème de mobilisation d'enfants lors des rencontres. Sa disparition est envisageable si aucune action n'est entreprise. « *La pente est vraiment raide ici à Toma et on a peur que cette lutte ne disparaisse* » Kawané, un ancien lutteur de 76 ans de Toma. Quel peuvent être alors les facteurs explicatifs de la situation chancelante de la lutte *kãgor-yõ* dans la province de Nayala ?

Dans les localités explorées, la plupart des enquêtés reconnait que la pente raide de la lutte de *kãgor-yõ* est lié aux à plusieurs facteurs dont le système éducatif formel, introduit dans la société *"san"* par la colonisation peut être d'abord cité. L'école formelle dont la période d'apprentissage couvre la majeure partie de l'année (neuf mois sur douze) écarte considérablement bon nombre d'enfants de la lutte de *kãgor-yõ*. Au Burkina Faso, l'école est obligatoire pour tous les enfants de moins de 16 ans. Ce qui limite leur participation aux rencontres de luttes de *kãgor-yõ*. En effet, ceux-ci sont contraints de déserter les rencontres au profit des cours à l'école ou de l'apprentissage des leçons pendant les temps libres. En plus de cette désertion, les curricula du système scolaire inculquent aux élèves une culture physique étrangère, à travers l'enseignement de disciplines sportives importées (athlétisme, handball, football, etc.). Ce contenu d'enseignement, n'étant pas en adéquation avec la culture du milieu, contribue au gommage des prérequis de la pratique ancestrale inculqués dès le bas âge.

Ensuite, les mobiles de la décadence de la lutte de *kãgor-yõ* se situent dans les Activités Physique et Sportives (APS) importées. En dehors de leur enseignement dans les écoles, les APS comme le football et le karaté se pratiquent un peu partout dans la zone et accaparent de plus en plus le public cible de la lutte de *kãgor-yõ*. Bien que leurs heures de pratique semblent se différer, l'attrait, de plus en plus poussé des enfants pour ces sports modernes, se justifie par leur effet de mode. « *La lutte n'est plus à la page, c'est le football qui domine maintenant le monde* » Sow, un enfant de 12 ans de la ville de Toma.

Enfin, cette baisse de pratique de la lutte de *kãgor-yõ* se lit dans les mutations physiques de la zone. Avec l'explosion démographique associée aux opérations de lotissement dans les Chefs-lieux de commune, certaines localités comme Toma, Gossina, Yaba, etc. ont connu une urbanisation accélérée sans tenir compte des lieux de pratique de la lutte de *kãgor-yõ*. A cette urbanisation accélérée, se double d'un changement du mode alimentaire avec une surconsommation des denrées importées (riz, spaghetti, pain, etc.) au détriment du mil local dont le son était utilisé pour amortir les chutes lors des combats de lutte de *kãgor-yõ*. Cette disparition des lieux de prédilection de la pratique a emporté avec elle la lutte de *kãgor-yõ* dans ces localités.

Discussion

Transmise de génération en génération, la lutte de *kãgor-yõ* s'avère être une pratique ancestrale dont le mode d'organisation (rencontres inter-concessions et inter-lignagères) est calqué sur la structure de la société *"san"*. Cette incarnation de l'architecture sociale de la lutte de *kãgor-yõ* confirme les résultats des études sur les jeux traditionnels des chercheurs tels que Lavega (2016, p. 108) et Parlebas (2016, p. 104). Ces auteurs ont concluent dans leur recherche que les jeux traditionnels constituent des microsociétés. De par cette transposition, la lutte de *kãgor-yõ* assure le rôle socialisant du contrat ludomoteur et s'avère être un laboratoire social dans lesquels les protagonistes acquièrent un formidable bagage de compétences sociales. Ce rôle socialisant corrobore les travaux de Piaget (1932) qui situe le contrat social du jeu au cœur du développement des conduites infantiles (le développement de schéma moteur, de la latéralité, la maîtrise de soi et de l'espace). Il confirme également les résultats de travaux de Zongo (2019, p. 181) et de Ouédraogo, Gouda et Palé (2022, p. 77) sur les fonctions des jeux et des luttes traditionnelles en particulier au Burkina Faso. Ces chercheurs conclurent que les jeux traditionnels participe à la promotion la vie saine en développant la solidarité, la coopération, le vivre ensemble, etc. pour le bénéfice de la communauté.

A cette promotion de la vie saine, s'ajoute le reflet identitaire du peuple *"san"* porté par la lutte de *kãgor-yõ*, à travers la posture du lutteur, les sauts de lutte, les pas de danse, etc. qui expose un attribut commun à tous les jeux traditionnels dont plusieurs chercheurs ont déjà développé. Pour Vigne et Dorvillé (2009, p. 1), les jeux traditionnels représentent des éléments fondamentaux de la construction de l'identité culturelle, en ce sens qu'ils incarnent leur localité d'appartenance. Les travaux de Parlebas (2016, p. 36), approuvent aussi cet attribut des jeux traditionnels, car étant en phase avec les normes et les sensibilités de leur territoire, ils marquent les traits distinctifs et reflètent par-là même l'identité de la communauté.

En somme, la promotion de la vie saine par la lutte de *kãgor-yõ* et son incarnation de l'architecture sociale et de l'identité culturelle du peuple *"san"* relance les travaux de Mauss (1934) sur les techniques du corps qui conclut que « toute motricité est une « ethno-motricité » et la logique interne d'une activité est investie par les traditions ethniques et les usages sociaux symboliques, par les représentations sociales et les croyances ». A ce titre, la lutte la lutte de *kãgor-yõ* est donc une ethno-motricité qui reflète l'image de sa communauté, tout en enrichissant le patrimoine culturel de l'humanité.

La situation chancelante de la lutte de *kãgor-yõ* en tant que pratique physique de tradition dont les mobiles sont liés aux mutations physiques et socioculturelles des terroirs corrobore les travaux de plusieurs auteurs. Au titre du système éducatif formel comme facteur exogène du changement, Sanon (1982) note qu'il n'est plus une assertion hypothétique de dire que l'enfant burkinabè est dépossédé de son jeu par l'institution scolaire et par la pression conjuguées des discours officiels qui présentent la pratique sportive comme le modèle d'activité par excellence. Amouzou (2009, p. 27) soutient que l'école s'est plaquée brutalement sur une société qu'elle ignore et combat parfois. Son seul but est d'instruire et non plus d'éduquer, ses finalités, ses programmes, son mode d'évaluation, sa forme de socialisation sont un défi constant aux conventions du passé africain.

Pour Ouédraogo (2018, p. 5), l'illustration parfaite de cette influence de l'école se situe le programme d'enseignement de la matière dite Education Physique et Sportive (EPS) qui exclut toutes formes de pratiques ludomotrices endogènes du Burkina Faso au profit des disciplines sportives importées comme le football, le handball, la gymnastique au sol, l'athlétisme.

Sous l'angle des APS moderne, la baisse tendancielle de la pratique de la lutte de *kãgor-yõ* due à la diffusion du sport moderne dans la zone confirme également les résultats de plusieurs chercheurs dont Parlebas (2016). Cet auteur souligne que la monté en puissance du système sportif institutionnalisé menace de disparition les jeux traditionnels. Processus en vogue dans les sociétés actuelles, l'emprise du sport moderne fait perdre aux jeux traditionnels leur pureté originelle, leurs caractéristiques en lien avec leur terroir.

Conclusion

La lutte de *kãgor-yõ* est une activité ludomotrice ancestrale du peuple *"san"* qui est transmise de génération en génération. Elle est pratiquée par les enfants pendant la journée ou pendant dans les nuits de clair lunaire. Sa mise en œuvre procure des vertus tel la formation physiques intégrale, le fair-play, le patriotisme, l'intégration, le vivre ensemble, etc. L'ensemble de ces valeurs promues par la pratique ancestrale concourt à la promotion d'un mode de vie saine des enfants en milieu *"san"*. Cependant, la lutte de *kãgor-yõ* est menacée de disparition par un ensemble de facteurs endogènes, exogènes ou mixtes tels que l'urbanisation, le nouveau mode de vie, le système éducatif formel et les APS modernes importées. Pour éviter le naufrage la lutte de *kãgor-yõ* afin de bénéficier toujours de sa contribution à la promotion du mode de vie saine, sa redynamisation s'impose, notamment à travers sa codification en une discipline sportive suivie de son intégration dans les programmes scolaires et dans les activités socio-récréatives et sportives. La préservation de ces espaces de déroulement lors des opérations de lotissement constitue également un atout pour sa survie.

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Contribution de l'Education Physique et du Sport (EPS) à la résilience communautaire par l'animation socio-éducative, sanitaire, culturelle et économique (ASCE) face à l'épidémie de la Covid-19 au Sénégal

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Résumé

Arrivé au Sénégal en mars 2020, le coronavirus ou Covid-19 est devenu endémique en Afrique où la population est majoritairement jeune, active, très mobile mais fragile sur le plan économique et avec un taux de scolarisation encore faible. Face à l'ampleur du choc, la réaction s'est d'abord traduite par des décisions et déclarations exprimées entre autres par les termes comme : *« état de guerre », «état d'urgence », « couvre-feu », «confinement », « distanciation sociale » et « geste barrières ».* Aussi, tous les acteurs de l'éducation physique et sportive (EPS) se sont mobilisés pour le rôle et la contribution de l'EPS dans l'éducation à la santé et la résilience, par l'animation socio-éducative, culturelle et économique en jeunesse et au sein des communautés contre cette situation d'épidémie de Covid-19. Le plan de riposte du Sénégal a été cité en exemple au niveau mondial. L'Approche didactique et technologique à visée de description, de lecture, de participation, de maîtrise, de transformation des situations et des pratiques nous a permis de suivre les différentes étapes parcourues et les épreuves subies par l'EPS lors de cette première année d'épidémie de Covid-19. Les données recueillies proviennent des différentes rencontres autorisées en présentiel et à distance sur les plateformes numériques (webinars), les échanges de courriers, les publications, les informations recueillies et partagées par l'Observatoire de l'Animation Socio-Educative en Jeunesse et Loisir en relation avec la radio universitaire et communautaire de l'université Cheikh Anta Diop (UCAD FM). Aussi, nous présentons les étapes, les lieux, les enjeux, les obstacles rencontrés et les actions menées par les différents acteurs pour une Education Physique et un Sport de qualité au service des communautés afin de faire face par la résilience et l'innovation en contexte et en situation de coronavirus Covid-19. Plusieurs actions ont été menées par les différents acteurs et portant sur la gouvernance de l'EPS, la recherche, les enseignements, les formations et les services à la communauté. Ainsi, l'EPS a pu réintégrer non sans difficulté les cours, les épreuves aux examens et concours organisés au Sénégal et être reconnu à nouveau comme discipline scolaire à

part entière du système éducatif sénégalais. Elle a eu à prouver son statut de discipline à part entière en affirmant sa transversalité et sa contribution notable à une nouvelle approche de la santé à travers ses dimensions et ses déterminants majeurs. En conclusion, la situation d'épidémie de Covid-19 a permis à l'éducation physique et au sport (EPS) d'éprouver et de confirmer sa place de discipline scolaire à part entière du système éducatif sénégalais. Elle lui a permis de mobiliser tous les acteurs, de revisiter l'ensemble de sa chaîne de valeurs portant sur la recherche, les enseignements, les formations et les services à la communauté avant de réintégrer les cours, examens et concours concernés aux niveaux scolaire et universitaire. L'EPS engagé pour un système éducatif de qualité a ainsi contribué à la résilience communautaire face à la Covid-19 au Sénégal et continue de participer pour le développement durable dans un environnement sain et paisible.

Mots clés: Education physique, Sport, Epidémie Covid-19, Santé Communautaire, Résilience

Introduction

Le coronavirus ou Covid-19 est arrivé au Sénégal le 02 mars 2020. L'Education et Sportive (EPS) aura vécu à ce jour deux ans avec l'épidémie de la Covid-19 qui par la suite est passée pandémie, et puis est devenue endémique en Afrique et dans le monde. S'en est suivi, un choc et un chaos immenses et une réaction immédiate portant en premier sur la « contrainte par corps » suite aux décisions et déclarations qui se sont exprimées entre autres par les termes suivants : *« état de guerre », «état d'urgence », « couvre-feu », «confinement », « distanciation sociale » et « geste barrières ».*

Au Sénégal et en Afrique, la population est majoritairement jeune, active, très mobile mais fragile sur le plan économique et avec un taux de scolarisation encore faible. Comment cette situation et ces décisions ont-elles été comprises, et acceptées par les différents acteurs de la société? Quelles ont été les actions menées et les résultats obtenus en Education Physique et à tous les niveaux de décision, d'intervention et pour tous les acteurs concernés? Quels ont été le rôle et la contribution de l'EPS dans l'éducation à la santé et la résilience en situation d'épidémie de Covid-19, dans l'animation socio-éducative, culturelle et économique en jeunesse et au sein des communautés? Le plan de riposte du Sénégal est cité en exemple au niveau mondial.

D'abord soulignons, la décision de la fermeture immédiate des écoles et universités. S'en est suivi ensuite la décision de la reprise des cours des classes d'examen de l'élémentaire, du moyen et du secondaire après une grande mobilisation. De toutes les disciplines d'enseignement du système éducatif, l'éducation physique et sportive (EPS) est la seule discipline qui a été exclue lors de la reprise des cours, des examens et concours. Cette décision a créé une grande surprise et suscité plusieurs réactions. Aussi, c'est tout la chaîne de valeurs portant sur les références sociales, culturelles, politiques, économiques, symboliques, éducatives et environnementales qui a été rudement éprouvé.

Cette présentation porte sur les décisions prises, les réactions, les activités menées et les résultats obtenus à tous les niveaux lors de la Covid-19, par les acteurs *investis dans des fonctions « praticiennes » (enseignante ou formatrice), administratrice, innovatrice ou élaboratrice de ressources, d'expertise ou de recherche, qui revendiquent et assument « l'exercice* d'une responsabilité reconnue pour les contenus » de *l'Education Physique et du Sport.* (Martinand 1986). Aussi, nous présentons les étapes, les lieux, les enjeux, les obstacles rencontrés et les actions menées par les différents acteurs pour une Education Physique et un Sport de qualité au service des communautés afin de faire face par la résilience et l'innovation en contexte et en situation de coronavirus Covid-19.

L'ensemble des acteurs impliqués pour la qualité de l'Education Physique et du Sport (EPS) se sont alors mobilisés autour de l'EPS. Aussi la riposte a porté sur les dimensions et les déterminants majeurs de la Santé. C'est ainsi que l'état, les ministères de tutelle de l'EPS, les instituts nationaux de formation des cadres en jeunesse et sports (INJS), les associations sportives, culturelles et économiques (ASCE), se sont mobilisés afin de mener des activités et des actions importantes.
Plusieurs actions ont été menées par les différents acteurs et portant sur la gouvernance de l'EPS, la recherche, les enseignements, les formations et les services à la communauté.

Aussi, l'EPS a pu réintégrer non sans difficulté les cours, les épreuves aux examens et concours organisés au Sénégal et être reconnu à nouveau comme discipline scolaire à part entière du système éducatif sénégalais. Elle a eu à prouver son statut de discipline à part entière en affirmant sa transversalité et sa contribution notable à une nouvelle approche de la santé à travers ses dimensions et ses déterminants majeurs.

L'Approche didactique et technologique à visée de description, de lecture, de participation, de maîtrise, de transformation des situations et des pratiques nous a permis de suivre les différentes étapes parcourues et les épreuves subies par l'EPS lors de cette première année d'épidémie de Covid-19.

Les données recueillies proviennent des différentes rencontres à distance et en présentiel sur les plateformes numériques, (webinars), les échanges de courriers, les publications, les informations recueillies et partagées par l'Observatoire de l'Animation Socio-Educative en Jeunesse et Loisir en relation avec la radio universitaire et communautaire (UCAD FM) de l'université Cheikh Anta Diop de Dakar.

LES DECISIONS PRISES, LES ACTIONS MENEES ET LES RESULTATS OBTENUS

Les décisions prises

L'apparition de la pandémie du Covid-19 qui secoue le monde entier a incité les autorités à prendre des mesures visant à limiter la transmission de la pandémie. Au Sénégal une série de mesures a été mise en œuvre dans ce sens. Parmi les mesures celles qui concernent spécifiquement le secteur de l'éducation, nous retenons la suspension des activités scolaires durant la période allant du 16 mars au 01 juin 2020.

Le Ministère des Sports a pris la décision d'arrêt de toutes les activités sportives et report des Jeux Olympiques de la jeunesse (JOJ) de 2022 à 2026. En effet, au tout début de la pandémie, le ministère des sports a très tôt organisé une rencontre et convoqué une réunion avec tous les acteurs des 58 fédérations et structures sportives sous sa tutelle afin de partager les informations et de manière collégiale s'engager pour une solidarité entière avec les acteurs du sport afin de faire face la Covid-19. En effet, *au Sénégal, la loi n°84-59 portant charte du sport stipule :*

Article premier : la pratique sportive vise l'éducation, la formation, et l'amélioration de la santé physique et morale des pratiquants. Elle participe également à l'amélioration de la qualité de la vie.
Article 2 : l'état et les collectivités publiques et privées créent les conditions préalables et les institutions qui garantissent la pratique sportive amateur, pluridisciplinaire et démocratisée, principalement sous forme :
- d'éducation physique et sportive, facteur d'éducation, d'hygiène corporelle et de santé de la jeunesse ;
- de sport récréatif, facteur de détente, de loisir et d'animation de masse ;
- de sport de compétition, facteur de formation, d'émulation et d'épanouissement physique et moral des individus.

Cette loi sur le sport, citée ci-dessus, a entrainé des exigences, qui ont elles-mêmes influencé la naissance d'instituts universitaires afin d'apporter des réponses aux différentes interrogations soulevées par les acteurs du monde sportif.

Au Sénégal, la prise en compte des STAPS dans les programmes universitaires de recherche et d'enseignement s'est renforcée avec l'ouverture de la section STAPS de l'Unité de Formation et de la Recherche (UFR) en Sciences de l'Éducation, de la Formation et du Sport (SEFS) à l'Université Gaston Berger (UGB) et qui offre plusieurs formations. Trois décisions majeures ont été prises par le Chef de l'Etat et les Ministères de l'Education, Ministère l'Emploi, de la Formation Professionnelle et de l'Artisanat :

- la décision de l'arrêt des cours, examens et concours, puis décision de reprise à l'exclusion de l'EPS et enfin réintégration de l'EPS ;
- la décision du Chef de l'Etat issue du Conseil des Ministres du 29 avril 2020. Concernant la reprise des enseignements apprentissages à partir de 02 juin 2020 dans les structures scolaires pour les classes d'examen ;
- enfin la décision du Chef de l'Etat de renvoyer la reprise des cours prévue pour le 01 juin 2020 à une date ultérieure.

Dans cette perspective de reprise et de poursuite de toutes les activités scolaires sauf les cours d'Education Physique et Sportive ont été suspendus jusqu'à nouvel ordre. Dans un communiqué conjoint, avec le Ministre de l'Emploi, de la Formation Professionnelle et de l'Artisanat, ils se sont engagés à poursuivre les efforts en vue d'une prochaine reprise des cours. Ainsi, sauf l'EPS, les activités scolaires pour les classes d'examen se sont déroulées jusqu'à l'organisation des examens scolaires officiels : CFEE, BFEM et Baccalauréat. Dès lors, il apparait nécessaire de s'interroger sur les modalités pratiques de reprise des enseignements-apprentissage et d'organisation des différentes disciplines aux examens certificatifs.

LES ACTIONS MENEES ET LES RESULTATS OBTENUS

A/Les réactions et la mobilisation des « acteurs *investis dans des fonctions, qui revendiquent et assument l'exercice d'une responsabilité reconnue pour les contenus* » de *l'Education Physique et du Sport*.

Ce sont entre autres, les inspecteurs et enseignants d'EPS, les syndicats et associations de parents d'élèves se sont mobilisés dans un cadre unitaire afin de faire face aux décisions et mener des actions conjointes.Les acteurs ont commencé par le rappel des références juridiques qui fondent la légalité et la légitimité de considérer l'EPS comme une discipline à part entière du système éducatif sénégalais.

« L'éducation physique et sportive est une discipline obligatoire aux examens du CFEE, du BFEM et du Baccalauréat. Seuls les candidats déclarés inaptes par un certificat médical délivré par l'Inspection Médicale des Ecoles (IME) de la région à l'inscription ou en cours d'année scolaire en sont dispensés ». (Décret n° 95.947 du 18

octobre 1995; Décret n° 2014-570 du 06 mai 2014, Décret n° 2013-738 et Arrêté n° 0017/MEN/SG/DEXCO/os du 29 avril 2013).

Par une réflexion anticipative des acteurs de l'EPS en date en date du 02 juin 2020, il a été proposé au Ministre de l'Education Nationale un protocole pour la reprise des enseignements apprentissages en EPS prenant en compte les dispositions édictées par le Ministère de la santé et de l'action sociale pour éviter la contamination.

Pour la reprise des cours et l'exclusion de l'EPS aux examens et concours, il a été proposé d'abord par l'Autorité la prise en compte des seules notes de contrôles continus d'EPS aux examens. Cependant, pour la reprise de l'EPS, il a été proposé par les autres acteurs, un argumentaire pour la reprise des activités scolaires EPS et l'organisation des épreuves physiques. Les propositions et contributions ont porté sur des dispositions techniques favorables à la reprise effective des enseignements apprentissages en EPS et l'organisation des épreuves physiques du CFEE, du BFEM et du Baccalauréat session 2020.

En ce qui concerne l'EPS, les évaluations sont essentiellement pratiques. Dans une perspective de reprise des activités physiques et sportives, les questions centrales suivantes se posent:
1. Comment reprendre les enseignements – apprentissages en EPS le 02 juin 2020 ?
2. Comment planifier les épreuves physiques aux différents examens certificatifs ?
3. Quel dispositif mettre en œuvre pour évaluer les élèves aux épreuves physiques dans le respect des mesures barrières individuelles et collectives?

A suivi la proposition par les acteurs de l'EPS que sont entre autre : les Inspecteurs de l'Enseignement Moyen Secondaires (spécialités EPS), les formateurs, les coordonnateurs des cellules d'établissements et cellules mixtes, d'un protocole de reprise portant sur les modalités d'organisation de la session 2020 dans un contexte particulier au regard des mesures fixées par la feuille de route et défavorables à l'EPS.

1. Reprise des enseignements – apprentissages en EPS
L'état des lieux a montré que la suspension des enseignements – apprentissages associée «au confinement », a créé une rupture dans la pratique de activités physiques chez les apprenants. Cette rupture a engendré une sédentarité et créé une déperdition des acquis au plan physique, moteur et psychologique. En conséquence, la reprise des enseignements – apprentissages a mis l'accent sur :

a. la conduite de séquences pédagogiques pour quatre (04) heures de cours pour une « remise en condition physique générale» du 02 au 15 juin 2020;
b. la conduite de séquences pédagogiques de six (06) heures de cours orientées sur les épreuves choisies par les candidats aux différents examens du 16 juin au10 juillet 2020 ;

2. Planification des épreuves physiques

- CFEE : 26 juin 2020 sur initiative des IEF ;
- BEP ; BT, CAP : du 01 au 10 juillet 2020 ;
- Baccalauréat général et technique : 13 au 23 juillet 2020 ;

- BFEM : 24 au 31 juillet 2020.

3. Dispositif technique et sanitaire pour l'organisation des épreuves physiques
Définition de l'épreuve. L'évaluation en éducation physique et sportive au BFEM et au baccalauréat comprend deux (02) disciplines:

- une épreuve d'athlétisme notée sur vingt (20) et composée de concours et de courses ;
- une épreuve obligatoire de gymnastique notée sur vingt (20) ;
- la note du candidat est obtenue en faisant la demi-somme des notes obtenues dans ces deux épreuves.

Au CFEE, les épreuves sont constituées de course, de lancer d'adresse et de saut. Les candidats obtiennent des notes issues de l'organisation des épreuves physique à l'échelle nationale conformément aux textes précités. La prise en compte des notes de contrôles continus constitue une violation des textes en vigueur et porterait atteinte à la crédibilité des différents examens nationaux.

Important : les différents examens certificatifs utilisent des activités physiques dites individuelles qui sont : gymnastique, courses, sauts. De ce point de vue, toutes les mesures préconisées par les autorités sanitaires sont plus que jamais respectables :

- distanciation physique : les épreuves physiques se déroulent dans un espace libre et aéré. La distanciation physique est naturelle ;
- chaque candidat effectue son exercice seul et sans contact.

Propositions :
1. planification : le déroulement des épreuves physique prévoit le passage des élèves par petits groupes de vingt-cinq (25) candidats, encadrés et gérés chacun par un évaluateur.

A ce propos, les épreuves pourront se dérouler le matin de 9 heures à 12 heures, l'après-midi de 16 heures à 18 heures.
2. les épreuves

- Les candidats vont choisir une épreuve de course et une épreuve de concours. La gymnastique et obligatoire ;
- Toutefois il existe des épreuves à éliminer pour cette session : il s'agit du lancer de poids, du grimper, des courses de demi-fond (600 m et 1000 m) ;

Motif : d'une part, les candidats utilisent et partagent les mêmes engins ; ce qui ne favorise pas le respect des mesures barrières ; d'autre part, les courses de demi-fond (600 m et1000 m) sont sources de fatigue. Dès la reprise, des cours, les candidats et les enseignants en seront informés ;
- Pour la gymnastique : un dispositif d'utilisation du gel hydro-alcoolique et le lavage systématique des mains, avant et après le passage sera mis en place. Les candidats exécutent leur enchaînement un à un, dans le respect de la distanciation ;

Comme à l'accoutumée, les passages et les rotations des candidats à l'atelier de gymnastique se déroulent sous la supervision de l'examinateur chargé de gérer et d'accompagner les candidats dans le respect des mesures barrières. Chaque candidat à son espace dédié et matérialisé.
3. les centres : Les épreuves physiques se tiennent dans les établissements scolaires et stades qui remplissent les conditions relatives aux infrastructures sportives fonctionnelles, au matériel didactique suffisant, aux conditions d'hygiène et de sécurité confirmées
.

B/ Les réactions et la mobilisation des « acteurs *investis dans des fonctions innovatrice ou élaboratrice de ressources, d'expertise ou de recherche* » *(Martinand 1986).*

Ce sont les structures d'enseignement et de formateurs de formateurs membres du réseau (RINJS, (INSEPS, CNEPS, UGB). Dans les INJS, nos deux orientations majeurs de recherche portent sur :1) l'orientation vers la production de connaissances fiables sur les processus d'enseignement-apprentissage, (ayant une fonction objectivante et critique) et sur 2) l'orientation vers l'élucidation des conditions et conséquences de décisions d'intervention (ayant une fonction prospective et proactive).

Ces orientations ayant deux fonctions, objectivante et critique, prospective et proactive, nous amènent à la confrontation avec les sciences humaines et sociales (ED ETHOS), les sciences biologiques (SEV), mais aussi aux sciences de l'ingénierie, le génie pédagogique (sciences et techniques de gestion, technologie de l'information pour l'éducation etc..) ou les sciences anthropo-sociales de l'éducation.

Au Sénégal, la prise en compte des STAPS dans les programmes universitaires de recherche et d'enseignement a connu un bond en qualité porté par le CNEPS, l'INSEPS et renforcée par l'ouverture de la section STAPS de l'Unité de Formation et de la Recherche (UFR) en Sciences de l'Éducation, de la Formation et du Sport (SEFS) à l'Université Gaston Berger (UGB. Nous avons organisé un panel à distance (*webinar)* le vendredi 18 décembre 2020 sur la plateforme de l'Université Virtuelle du Sénégal (UVS) et portant sur le thème : « Education physique, sport et jeunesse en situation d'épidémie de covid-19 : le jeu et les enjeux ».

En route vers les jeux olympiques de la jeunesse en 2022 au Sénégal nous avons été stoppés nette par l'avènement de la COVID19. En Sport et Jeunesse, les conséquences sont alors énormes sur tous les plans symbolique, économique, politique, culturel, éducatif, sanitaire et environnemental. Le Sénégal a très tôt pris les bonnes dispositions édictées par le Président de la République en fermant ses frontières, suivi par la Ministre des Sports qui a convoqué tous les acteurs du secteur chargés de l'Animation Socio-Educative des Collectivités pour une large et franche concertation et consultation en vue de valider la conduite à tenir face à la Covid-19 et s'y engager. Le champ des Sciences et Techniques de l'Activité Physique en Jeunesse et Sport (STAPS-JL) est vaste, et, est sous la tutelle de différents ministères mais s'unifie à travers les associations sportives culturelles et économiques (ASCE) qui impliquent tout le peuple sénégalais et toutes les communautés dans sa proximité et son intimité.

Dès le début de la COVID19, nous avons mis en place un observatoire au Laboratoire en STAPS-JL de l'INSEPS, animé une chronique qui diffusée par la radio UCAD-FM de notre Université, Cheikh Anta Diop (UCAD) de Dakar afin de remplir nos missions universitaires à tous les niveaux de la chaîne de valeurs que sont : la crédibilité scientifique par la recherche, la transmission par les enseignements-formation et les services à la communauté. Il s'agit d'observer et d'analyser l'impact sur la gouvernance, la santé l'environnement, l'économie, l'éducation et la paix ; ceci, pour tous les acteurs et les segments de la population (des personnes à besoins spécifiques (handicapés et personnes âgées aux athlètes) et pour toutes les formes de pratiques, du loisir au sport de haut niveau. Un modèle global prenant en compte les trois grandes phases du stress a été utilisé pour suivre la crise de la Covid-19, qui est passé d'épidémie à pandémie et qui actuellement est devenue endémique. Il s'agit de : 1°) la phase d'alarme qui a lieu dès la perception par l'organisme d'une contrainte à laquelle il n'est pas préparé pour y répondre et qui initie le processus de réaction non spécifique au stimulus stressant ; 2°) la phase de résistance ou d'adaptation à l'agression qui intervient dans le cas où l'organisme est soumis de manière prolongée au stimulus stressant. L'organisme alors met en place ses propres mécanismes d'adaptation afin de faire face à l'agent stresseur et 3°) la phase d'épuisement qui est amorcée lorsque l'organisme cesse de pouvoir s'adapter aux stresseurs auxquels il est soumis. L'organisme répète la réaction d'alarme mais les mécanismes d'adaptation s'effondrent.

La santé a été redéfinie en relation avec ses dimensions et ses déterminants majeurs. Un modèle réactualisé distingue et prend en compte les différentes dimensions de la santé. En effet, la santé est un processus faisant agir l'ensemble des ressources physiques, psychiques, sociales et d'intégration à l'environnement matériel ou construit. Intégrant des aspects objectifs et la perception subjective, la santé peut se concevoir au niveau de l'individu ou de la population. Ses quatre (4) dimensions sont :a) la dimension physique ; b) dimension sociale et d'intégration à l'environnement ; c) la santé de l'individu et d) la santé d'une population. Pour son évaluation, notons la santé objective et la santé subjective. Retenons les cinq (5) déterminants majeurs de la santé: 1°) Environnement physique ; 2°) Patrimoine biologique et développement sain pendant l'enfance ; 3°) Mode de vie (activité physique), déterminé et prenant en compte (Revenus, réseaux de relation, éducation, emploi, environnement social, culture, genre ; 4°) Services de santé; 5°) Socioculturels, ensemble d'éléments qui exercent leur influence principalement sur le mode de vie.

Un panel en ligne et à distance dont le thème est intitulé : *«Sport et Jeunesse en Contexte et Situation de Covid-19 : le jeu et les enjeux*» est donc un cadre d'échange et une occasion de discussion sur l'état des lieux de ce que nous avons fait, de ce que nous avons appris avec la Covid19 et enfin de ce qui est à promouvoir.

Les communications ont mis l'accent sur les jeux et les enjeux de la COVID19 à travers des approches et des postures multidisciplinaires, interdisciplinaire et transdisciplinaires comme l'est d'ailleurs le champ des STAPS-JL. Ces communications sont issues des différentes équipes du Laboratoire en STAPS-JL de l'INSEPS affilié aux les Ecoles Doctorales « Santé, Environnement et Vie » (SEV) et « Etudes de l'homme en société » (ETHOS) de l'UCAD ont porté sur : a) *Sport,*

APS, EPS et gestion de la COVID 19 au Sénégal ; b) Sport et Conflit au Sénégal, entre Collision et Collusion et c) Sport et Gestion de l'Émigration clandestine au Sénégal : une niche de création d'emplois.

Toutes ces activités ont été portées par nos autorités institutionnelles, de tutelle et nos partenaires que sont : le Ministère de l »Enseignement Supérieur de la recherche et de l'Innovation (MESRI), la Direction Générale de la Recherche et de l'Innovation (DGRI) ; l'Observatoire National des Sciences, des Technologies et de l'Innovation pour la riposte contre la COVID19; les Ecoles Doctorales « Santé, Environnement et Vie » (SEV) et « Etudes de l'homme en société » (ETHOS) ; l'Université Virtuelle du Sénégal (UVS) ; la Conférence des Ministres de la Jeunesse et des Sports (CONFEJES) de la Francophonie et la Fédération Internationale de l'Education Physique et Sportive (FIEPS), pour leur appui constant et qui nous accompagnent dans la démarche qualité, l'animation de nos établissements par la recherche, les enseignements, les formations pour l'emploi et l'employabilité des jeunes et à travers notre réseau des instituts nationaux de jeunesse et de sport (RINJS) et la RADIO UCAD FM, une radio communautaire où nous continuons d'animer depuis le début en mars 2019, une chronique sur l'impact de l'épidémie de la Covid-19, à partir de « l'Observatoire de l'Animation Socio-Educative des Collectivités » et portant sur la gouvernance, l'environnement, l'économie, la santé, l'éducation et la paix.

En conclusion, la situation d'épidémie de Coronavirus a permis à l'éducation physique et au sport (EPS) d'éprouver et de confirmer sa place de discipline scolaire à part entière du système éducatif sénégalais. Elle lui a permis de mobiliser tous les acteurs, de revisiter l'ensemble de sa chaîne de valeurs portant sur la recherche, les enseignements, les formations et les services la communauté avant de réintégrer les cours, examens et concours concernés aux niveaux scolaire et universitaire. L'EPS engagé pour un système éducatif de qualité a ainsi contribué à la résilience communautaire face à la Covid-19 au Sénégal et continue de participer pour le développement durable dans un environnement sain et paisible.

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Gestion de l'enseignement l'Education Physique et du Sport Scolaire dans le contexte de la Covid-19 au Maroc

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Résumé

La covid-19 est une maladie dangereuse pandémique qui a fait des morts et un nombre important de contaminés dans le monde. Sur le site de l'OMS, au 28 Avril 2021, le nombre de cas contaminé est de l'ordre de 148 329 348 dont 3 128 962 décès. Les mesures prises pour contre la propagation de ce virus ont été gérées différemment d'un pays à un autre. L'enseignement en général et de l'Education Physique et Sportive (EPS) en particulier, a été impacté par ces mesures. Le fait que l'élève change ses habitudes quotidiennes (être confiné plusieurs mois chez lui, respecter les dispositions de distanciation avec ses amis etc.…), il se trouve dans une situation de gestions de ses conduites contraignantes. Il doit être actif pour protéger sa santé et son bien-être d'une part, d'autre part il doit effectuer des activités physiques et sportives dans ces conditions draconiennes. Une problématique à laquelle ont été confrontée les acteurs de l'EPS. Cette situation a été gérée aussi différemment d'un pays à un autre. Cet article a pour objet de montrer comment a été organisé l'enseignement de l'EPS et du sport scolaire au Maroc d'une part, d'autre part d'identifier les scénarios possibles de l'apprentissage par le sport en intégrant les mesures sanitaires contre la COVID-19.

Mots clés: Covid-19- la pandémie, L'enseignement, L'éducation physique et le sport (EPS), Le sport scolair.

Personne ne croyait avant qu'un jour un virus peut geler toutes les activités humaines notamment la mobilité. Si on n'a pas vécu cette situation, on pourrait dire qu'il s'agit de la science-fiction. Et pourtant, pendant une année, l'humanité a vécu des moments d'horreur, de stress et d'inquiétude. Dans le monde, au « 13 avril 2021, plus de 1,7 million de personnes ont été infectées et près de 85 000 sont décédées » (OMS, 2021). Chaque pays a mis en place des dispositifs pour faire face à l'ennemi la Covid 19 invisible en essayant d'équilibrer l'équation entre les mesures sanitaires et l'activité économique. Le Maroc a annoncé l'état d'urgence sanitaire et le confinement le vendredi 20 mars 2020 à 18h, sachant que le premier cas a été enregistré positif le 2 Mars 2020. Les écoles sont fermées et les élèves sont confinées chez eux avec leurs familles. Le gouvernement, sous la coordination de sa majesté le Roi Mohamed VI, Roi du Maroc, a fait de la lutte contre la pandémie de la Covid-19 une priorité stratégique de l'Etat en mobilisant tous les moyens pour faire face à cette crise. Le ministère de l'Education Nationale a mis en place un dispositif d'enseignement en ligne dès le 16 Mars 2020 à travers la plateforme électronique «TelmidTICE», via les chaines de télévision publiques qui ont contribué à la diffusion des cours, ou à travers les classes virtuelles créées par les enseignants pour communiquer avec leurs élèves. D'autres conduites humaines commencent à s'installer pour faire face à la pandémie notamment comment concilier entre la dynamique économique et la préservation de la santé. Un tiraillement est perçu entre ceux qui croient à la vie comme auparavant et ceux qui sont effrayés par l'atteinte du virus. Les élèves ne sont pas à l'abri non plus. Face à la pandémie faut-il rester inactif ou réagir pour créer un environnement de l'EPS ? Tout porte à croire que le confinement est une mesure pour protéger la santé de l'élève, mais au même temps il constitue un danger pour sa santé en restant inactif. D'où la question principale : que faut-il proposer comme menu d'activités à l'élève en tenant compte des mesures sanitaires recommandées par le gouvernement ? Les cours d'Education physique et le sport, ainsi que les activités du sport scolaire ont été aussi programmées pour permettre aux élèves d'entretenir leur bien-être physique et mental. Ces cours sont médiatisés en ligne via des plate-formes ou diffusés par les chaines de télévision publiques nationales. Cet article a pour objet de montrer comment a été organisé l'enseignement de l'EPS et du sport scolaire au Maroc d'une part, d'autre part d'identifier les scénarios possibles de l'apprentissage par le sport en intégrant les mesures sanitaires contre la COVID-19.

Les mesures entreprises par le Maroc face à la pandémie

La COVID-19 est « la maladie causée par un nouveau coronavirus, le SARS-CoV-2. L'OMS a appris l'existence de ce nouveau virus le 31 décembre 2019 lorsqu'un foyer épidémique de cas de « pneumonie virale » a été notifié à Wuhan, en République populaire de Chine » (OMS, COVID-19 : ce qu'il faut savoir, 2020). Il fallait plusieurs mois pour son identification, et en cours toujours des doutes de sa physiopathologie, de son évolution, de sa propagation et de traitement de la maladie. Tout ce qu'on sait que cette une maladie infectieuse due à un virus mortel capable de se propager très vite entre les humains par un simple contact ou par le toucher d'une surface contaminée ou par respiration des gouttelettes de la toux d'une personne infectée. Le nombre de personne déclaré positif dans le monde est de l'ordre de 148 329 348 dont 3 128 962 morts au 28 Avril 2021 selon l'OMS. Les USA est le pays plus touché par cette pandémie avec 31 835 314 confirmés et 567 971 décès. Le Maroc est le 42ème pays concerné par cette pandémie avec

9015 morts et 510 465 confinés. Selon une publication du gouvernement marocain (Conseil de Gouvernement, 2021), la gestion de crise pandémique est gérée par une intelligence collective en tenant compte de l'évolution du virus. Ce qui a induit la mise en place un certain nombre de mesures.

Le confinement

Les mesures sont prises par le Maroc lorsque le premier cas est apparu le 02 Mars 2020 et les 19 cas détectés le 13 Mars 2021. C'est ainsi que le Maroc a procédé à la fermeture des frontières le 15 Mars 2021 et à l'arrêt des études dans tous les cycles d'enseignement. Le confinement total et les mesures sanitaires imposés le vendredi 20 mars 2020 à 18h est une sorte d'état d'alerte sur tout le territoire marocain. Il s'agit de limiter les déplacements et de rester chez soi comme mesure nécessaire pour faire face à la propagation du Conavirus. Les déplacements ne sont autorisés que pour faire des courses, soigner ou rejoindre le travail par un ordre de mission. Des barrages de contrôles sont mis en place entre les villes et entre les quartiers. Ces mesures ont permis d'éviter l'épidémie et l'apparition des cas en danger ou des décès comme c'est le cas dans plusieurs pays. Le port du masque imposé le 14 Avril 2020 et les mesures de distanciation sont obligatoires et doivent être respectées. De plus, d'autres actions ont été menées sous les directives de sa majesté le Roi Mohammed VI, notamment la création du fonds spécial pour la gestion de la pandémie de la covid-19 ayant pour but le renforcement du dispositif médical et la compensation des pertes socio-économiques causées par cette pandémie. Ce fond a enregistré des recettes de l'ordre de 33.7 Milliards de dirhams (34 millions de dollars).

Déconfinement par un Assouplissement des mesures

Par obligation et ou par volonté politique, le gouvernement a pris la décision d'assouplir les conditions de confinement. Les mesures d'allégement sont entrées en vigueur allant de 25 Mai au 20 juillet 2021. Elles concernent le port obligatoire des masques, la reprise des activités scolaires, commerciales et touristiques sauf pour les régions ayant enregistré un taux élevé des cas atteints par la pandémie. C'est faire face à la pandémie par un comportement conscientisé et citoyen. En cas de non respect de ces mesures, des amandes sont infligées sur place, par les autorités locales.

Le couvre-feu par un protocole "renforcé"

Un ensemble de restrictions ont été mises pour limiter la mobilité et l'encombrement des personnes. Les mesures deviennent draconiennes quand une ville ou région est déclarée en situation épidémiologique (augmentation du nombre de la population infectée). Ces mesures concernent la fermeture des restaurants, des cafés, des commerces et des grandes surfaces tous les jours à 20h. Ces mesures ont été statuées dans le code pénal en cas de délit. Tout déplacement entre les villes doit être justifié d'une autorisation délivrée par les autorités locales. Pour les déplacements à l'étranger ou à l'embarquement, le voyageur est obligé de présenter aux autorités des frontières le résultat du test RT-PCR effectué 72 heures avant de quitter le territoire.

Les mesures prises au niveau de l'enseignement et l'éducation physique et sportive

Pour faire face à la pandémie, le ministère de l'Éducation nationale, de la formation professionnelle, de l'enseignement supérieur et de la recherche scientifique (MEN) a annoncé, le 13 Mars 2020, la fermeture de tous les établissements scolaires et universitaires, à partir du 16 Mars 2021. Ainsi, pour assurer la continuité pédagogique, il a mis en place un dispositif d'un enseignement à distance. Pour ce faire, la plateforme électronique «TelmidTICE» a été créée pour renforcer le dispositif de l'enseignement à distance instauré auparavant. Cet enseignement est planifié pour couvrir tous les établissements et tous les niveaux scolaires. Selon le Rapport du gouvernement (Conseil de Gouvernement, 2021) « La plateforme offre ainsi 4500 contenus numériques pour une moyenne d'utilisateurs de 600.000 par jour. Les chaines de télévision du pôle public ont pour leur part été mises à contribution pour diffuser des cours filmés, ce qui a permis de couvrir tous les niveaux depuis la première année du primaire, jusqu'à la deuxième année du baccalauréat, afin que les cours puissent profiter à tous les élèves, particulièrement en milieu rural où 91 % de la population est équipée de téléviseurs, et ne disposant pas toujours d'un accès à internet ». Afin de permettre à tous les élèves de poursuivre les cours chaque jour, les séances sont soit diffusées sur quatre chaines de la télévision nationale, soit assurées par les enseignants qui communiquent avec leurs élèves en utilisant le système d'information intégré « Massar» [1] et la plateforme *teams*. Plus de 723.966 classes virtuelles sont créées pour l'enseignement public et plus de 105.316 pour le privé. Pour permettre l'accès à l'enseignement à distance, trois opérateurs téléphoniques ont offert leur service de connexion internet gratuitement à tous les élèves sur tout le territoire national.

L'EPS a joué un rôle important malgré la pandémie et l'incompatibilité de l'enseignement à son contexte comme peuvent prétendre certains enseignants. Sauf que les objectifs des séances vont changer et ciblent directement ~~à~~ l'entretien du corps en tant que mode adapté au contexte pandémique. Si l'élève est inactif sur le plan physique pendant le confinement, il pourra avoir une prise de poids. Ce qui impactera sa santé et son bien-être. Pourtant, les élèves n'ont pas les mêmes conditions de pratique chez eux. Donc, il a fallu orienter la réflexion aux objectifs recherchés par l'EPS pour faire face à cette crise et proposer des activités d'apprentissage, d'entrainement et de compétition adaptées au contexte de vie à la maison de tous les élèves. Tout se fera en ligne. Le recours à la télévision nationale pour la programmation des cours d'aérobic, de yoga… et l'utilisation de la plateforme du ministère (Massar) disposant d'un Data center, ont facilité la mise en marche des cours d'EPS. Ce sont deux moyens officiels qui ont permis à tous les élèves d'accéder à l'information et aux apprentissages. Sachant, que les enseignants ont eu recours à d'autres moyens tels les applications mobiles.

[1] Le projet "Massar" est un système de gestion d'information intégré crée par le ministère de l'Éducation nationale, de la formation professionnelle, de l'enseignement supérieur et de la recherche scientifique (MEN) permettant la gestion de scolarité des élèves individuelles sur le plan pédagogique et administratif. Il permet de fournir une base de données de toutes les composantes du système éducatif.

Pendant le confinement total : du 16 Mars 2020 jusqu'à la fin de l'année scolaire

a. Programmation des séances d'EPS en ligne pour l'entretien physique

Ces séances sont préparées en studio. Les enseignants d'EPS spécialistes en aérobic et des sports de salle sont invités pour présenter des prestations physiques. Ces dernières sont filmées et montées par des spécialistes en audio-visuel et diffusées sur les chaines nationales chaque jour à 11h 30mn. Les étapes entreprises avant la diffusion sont comme suites :

- Désignation des enseignantes et des enseignants spécialistes en aérobic et en sport de salle.
- Préparation de la séance en groupe : sélectionner les exercices physiques adéquats et le support musical d'accompagnement, prévoir le type d'enchainement.
- Coordination avec les équipes de tournage pour l'enregistrement des séquences vidéos.

Les cours sont enregistrés dans un espace ressemblant à celui où joue l'élève chez lui et ne dépassant pas 9 m². Les séances sont diffusées, chaque jour de 11 h 30 à midi, sur une chaine de télévision nationale.

b. Organisation exceptionnelles des compétitions sportives en ligne

Pour permettre aux élèves de vivre des moments de compétition, il a été question de proposer des activités respectant le protocole de confinement. Ces activités proposées doivent répondent aux critères suivants :

- La prestation de l'élève devra être réalisée dans un espace de la maison ou sur la terrasse.
- L'élève doit respecter les consignes de présentation (aspect technique, temps de la réalisation, tenue sportive).
- La prestation, en format vidéo d'une minute au maximum, est postée sur la plate-forme du ministère de l'éducation nationale.

Une correspondance ministérielle a été envoyée à tous les établissements scolaires et diffusée sur le site du ministère. Le choix est porté sur quatre activités : le taekwondo (présentation d'un enchaînement d'un poomsé), le karaté (présentation d'un enchaînement d'un kata), le jeu d'échecs en ligne, les mouvements créatifs. Tous les élèves sont autorisés à y participer, quel que soit leur âge, leur sexe y compris les enfants en situation d'handicap. Après inscription sur la plate-forme Massar du ministère dédié à la compétition, l'élève choisit une activité dans le menu présenté et participe à la compétition conformément aux règlements stipulés par les organisations. La session de cette année a vu la participation de 1200 élèves dont 936 filles. Les 3 premiers de chaque catégorie ont reçu des tablettes.

Les jeunes en taekwondo, des différentes catégories, ont participé au championnat du monde organisé par l'ISF[2] au Népal en août 2020. Le Maroc a eu la deuxième place après la chine.

[2] International School Sport Federation

Pendant le déconfinement avec couvre-feu : De l'entrée scolaire jusqu'à aujourd'hui

La rentrée scolaire a été maintenue. Elle a eu lieu le 7 septembre 2021. Les parents sont sollicités à prendre une décision si leur enfant doit suivre les cours à distance ou en présentiel, suivant la note ministérielle N°039/20. Chose qui a suscité des réactions à plusieurs niveaux y compris au parlement. Mais la situation pandémique commence et le nombre des contaminés a augmenté d'une manière exponentielle, et pour répondre aux attentes des parents qui ont opté pour le présentiel, le scénario qui a été adopté par le gouvernement est le dispositif d'alternance en divisant la semaine en deux périodes : une période sera réservée à l'enseignement en présentiel à l'école et une autre sera réservée à l'enseignement en distanciel à la maison.

Le dispositif mis en place en présentiel catégorise la classe en deux groupes afin de permettre aux élèves de retourner à leur classe d'une part, et d'autre part de respecter les dispositions de distanciation imposées pour faire face à la pandémie. Chaque groupe bénéficie de façon alternée (1 fois par semaine) des deux types d'enseignement au cours de la semaine. Les emplois du temps des élèves sont organisés pour permettre cette alternance. D'autres procédés pédagogiques sont mis en présentiel et en ligne pour la construction et renforcement des apprentissages, ainsi que l'auto-formation et le suivi des réalisations des élèves. L'enseignement en ligne est assuré par les enseignants via une plate-forme dédiée pour cela et reliée au système d'information scolaire Massar Ces mesures sont prises pour garantir l'équité des apprentissages et renforcer l'auto-formation des élèves. Mais en cas d'apparition des cas contaminés, l'école est automatiquement fermée.

Le dispositif de l'enseignement de l'EPS en présentiel

En EPS, démarrer l'enseignement par l'incertitude et l'aléas est une chose qui a été prise en considération au début de septembre 2020, des réunions sont programmées en ligne avec les inspecteurs régionaux ont permis d'aboutir à des propositions et des recommandations. Ces dernières s'inscrivent dans la même logique de l'enseignement général, la note ministérielle N° 058/20 vise, en effet, les objectifs de l'EPS en tant que matière d'enseignement obligatoire. Les activités qui devraient être programmées dans le cadre du projet d'EPS se conforment au tableau1.

Les cours d'EPS en présentiel sont assuré en groupe restreint (la moitié de la classe), la note définit les dispositions à prendre en considération pour éviter toute contamination au Covid-19 notamment aménagement des couloirs de passage, limitation des espaces, stérilisation du matériel d'EPS, fermeture des vestiaires, lavage des mains, pas d'échange d'objets (bouteilles…). Le masque n'est pas utilisé pendant l'exercice à condition de respecter la distanciation.

Le dispositif de l'enseignement de l'EPS et du sport scolaire à distance

L'enseignement à distance est programmé en tenant compte de la situation sociale des élèves et l'environnement où ils apprennent. Ce qui a obligé le département d'éducation nationale de diversifier les moyens de diffusion et de connexion pour chaque élève aura la possibilité de poursuivre les cours en télé-enseignement ou sur la plate-forme du ministère.

Tableau 1

Activités physiques et sportives	Autoriser à pratiquer ou non	Exemples de types d'activités possibles à proposer
Activités physiques et sportives et d'expression sans engin	Oui	- La course de vitesse ; - La course de durée - Sauts ; - Exercices et mouvements d'entretien du corps : Aérobic-Danses… ; - Les activités de créativité motrice et d'expression individuelle ; -…
Activités physiques et sportives et d'expression avec engin	A condition de désinfecter le matériel utilisé	- La gymnastique au sol ; - Les lancers ; - La manipulation du ballon ; - La course de haies -….
Activités physiques et sportives et d'expression collective sans engin	Non	
Activités physiques et sportives et d'expression collective avec engin	Non	

L'enregistrement des séquences vidéo et leur diffusion est orienté vers les régions où chaque Académies Régionale de l'Education et de la Formation produit ses propres ressources numériques et vidéothèques. Des difficultés sont enregistrées quant à l'utilisation de la technologie par les élèves mais aussi par les enseignants. Ces derniers, habitués à l'enseignement en présentiel, se sont trouvés désarmer des compétences pédagogiques de l'enseignement en ligne au niveau de la gestion de la classe virtuelle, le suivi des productions des élèves, l'équité des apprentissages, …etc.

Le fait que la Covid-19 a continué de faire des dégâts en nombre de morts, et que les mesures de protection sanitaire se sont renforcés, l'organisation des compétitions sportives a été maintenue pour couvrir les sports préférés par les jeunes et qui se pratiquent individuellement. Le choix est porté sur le taekwondo, le karaté, le break dance, le hip hop, le Skate-board et roller, le wushu, le football freestyle et les échecs via la plateforme en ligne (www.adss.men.gov.ma.). La compétition est étalée sur trois mois (du 1er février au 25 mai2021) allant de la période d'inscription jusqu'à la qualification au niveau national. Tous les élèves des 3 cycle de l'enseignement sont concernés. Le nombre d'élèves inscrits est de l'ordre de 17289 dont 6020 filles.

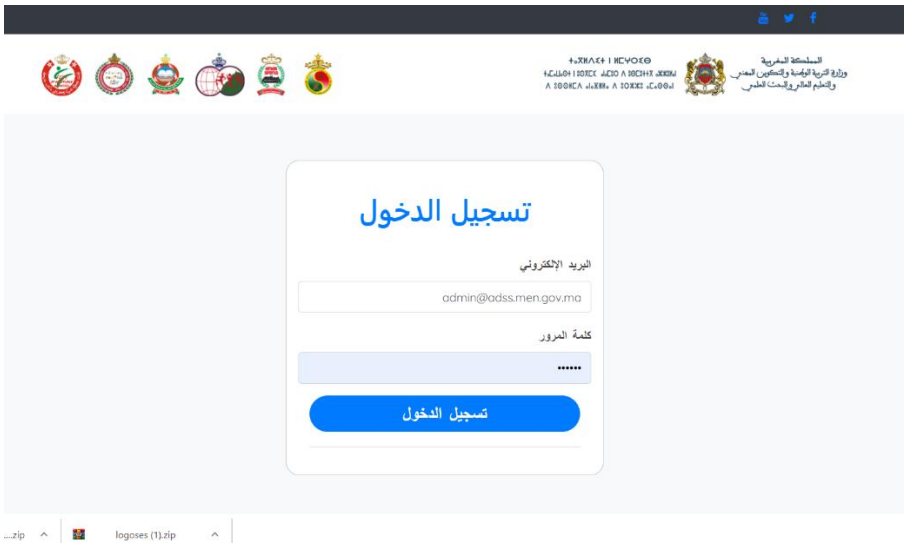

Image 1 Plate-forme d'accès des élèves et des juges : www.adss.men.gov.ma

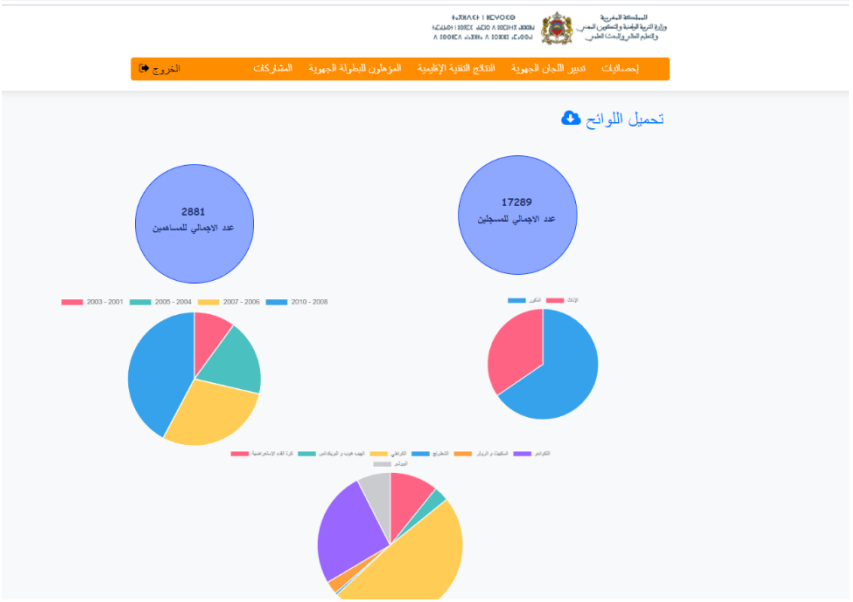

Image 2 Statistiques des inscriptions et de participation des élèves (en ligne) au 26 Avril 2021

Les pratiques de l'EPS dans un contexte pandémique

Dans le sport, il y a souvent la notion de l'interaction avec autrui, avec les objets et avec l'environnement. En fonction des caractéristiques de chaque sport, le contact et le rapprochement entre les sportifs en jeu ne sont pas tolérés dans ces conditions pandémiques. Le contact avec le corps ou toute expiration peut entrainer la contamination surtout en sports collectifs tels qu'ils sont organisés aujourd'hui. Faire jouer les élèves au Basket-ball présentera des risques d'infection les uns des autres en cas d'atteinte d'un joueur du Covid. Pourtant, les sportifs ne prennent pas en considération ce danger. On les voit dans les terrains des quartiers jouer des matchs comme si la

situation était normale. Car, dans le sport, il y a une magie que seul le sportif peut la comprendre. Les enseignants eux-mêmes sont habitués à créer de l'énergie, de l'activité, de la joie chez les jeunes. Aujourd'hui, ils sont obligés de prendre en considération d'autres contraintes et des règles qui ne font pas partie du jeu lui-même.

La question aujourd'hui, si la pandémie continue pour les années à venir : faut-il ignorer la maladie, faire semblant que les choses sont normales. Autrement dit, c'est programmer des activités physiques et sportives en présentiel pour les élèves en mettent à l'esprit que ces activités protègent le corps des maladies et permettent la guérison. Cette attitude est ancrée dans l'esprit de certains enseignants d'EPS et coachs. De plus, la compétition crée le spectacle et la valeur. Chacun trouve en elle une satisfaction qu'elle soit morale, physique ou financière. A la question posée, on peut répondre : la santé des pratiquants est primordiale ; est-il possible de proposer des jeux adaptés ou transformés au contexte pandémique ? l'entreprise s'avère très difficile et il faut attendre des années pour pouvoir la réaliser. Aujourd'hui, beaucoup d'initiatives apparaissent ici et là dans le but de créer l'activité, mais on est loin des formes d'attraction atteintes par le sport. Tout est centré sur la distanciation entre les joueurs, l'évitement de tout contact et le port du masque qui sont des contraintes à prendre en considération pour la programmation d'une leçon d'EPS, d'un entrainement sportif ou de l'organisation d'une compétition sportive. Par conséquent, les jeux permettant le contact et le non-respect de distanciation sont à éviter. Ainsi, presque tous les jeux sportifs seront délaissés et par conséquent :

- Les enseignants d'EPS semblent désœuvrés par rapport à d'autres enseignants branchés en ligne. Certains directeurs prévoient de les charger de missions administratives ;
- Le confinement à l'école et le déconfinement hors de l'école : Un paradoxe où la pratique de sport collectif dans les terrains de proximités des quartiers est permise par exemple, alors qu'elle n'est autorisée à l'école ;
- En cas de d'atteinte d'un cas par la covd-19, c'est toute l'école qui doit fermer ;
- Certains enseignants ont refusé d'être vaccinés, chose qui a suscité la réaction des parents. Ces derniers craignent que leurs enfants soient contaminés.
- « Le retour à l'école dans le contexte de la pandémie du COVID-19 introduit un nouvel ensemble de protocoles et de responsabilités. Assurer la protection des enfants et des éducateurs est une priorité absolue. Les parents, les enfants et les enseignants doivent s'assurer que les écoles sont des lieux sûrs et que les précautions nécessaires ont été prises pour prévenir la propagation potentielle du COVID-19 en milieu scolaire » (UNICEF, 2020).

Le recours à l'enseignement ou à l'animation en ligne est une alternative utilisée, aujourd'hui, en attendant la disparition complète de la maladie ou son atténuation dans les mois prochains. Covid 19, nous a appris à revoir nos conduites et à transformer la majorité de nos pratiques en des interactions en ligne. Ce qui nous incite à instaurer d'autres dispositif d'enseignement et de formation. Ça sera d'autres compétences professionnelles qui devront être maitrisées par les enseignants.

Conclusion

Les enseignants nourrissent l'espoir que bientôt la maladie disparaitra et les élèves regagneront les terrains de sport comme auparavant. Aujourd'hui, ils sont inquiets et stressés à cause de l'inactivité et de l'absence de l'animation et de la dynamique créées dans les séances d'EPS. Un enseignant questionné à propos de la situation de l'enseignement à l'école, il a répondu : « je me sens dans le désert ! ». Ils sont situés entre deux paradoxes : des élèves qui réclament la pratique des activités physiques et sportives d'une part, d'autre part la préservation de la santé de leurs élèves en se confiant aux dispositions sanitaires institutionnelles. Ils sont ainsi obligés de s'abstenir à l'envie de leurs élèves. De plus, organiser des activités selon des règles strictes ne les confortent pas soit en présentiel ou en ligne. Réduction d'un nombre important de sports notamment les sports collectifs, dénaturation de la pratique de certaines activités physiques et sportives par l'introduction dans les règles de jeu d'autres consignes. Bien que cette situation est pitoyable, les enseignants ont pris des initiatives de création des jeux sportifs adaptés au contexte pandémique. Quant aux compétitions sportives, elles sont organisées en ligne en se focalisant des prestations individuelles avec engin ou sans engin. Ces prestations filmées sont postées sur la plate-forme du ministère dédiée à ces compétitions. Ce qui limite les facteurs de risque pandémique chez les élèves et les motivent pour se confronter à leurs pairs dans d'autres coin du pays. Covid-19 nous appris de se comporter autrement, d'utiliser d'autres moyens technologiques et de créer l'environnement d'autres activités. Si la pandémie persiste, de nouvelles activités physiques et sportives naîtront.

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Attitudes des élèves vis-à-vis du cours d'éducation physique et sportive, perception des compétences durant la période de propagation de la Covid-19 au Gabon

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Résumé

A partir d'une enquête par questionnaire menée auprès des élèves de 5ème et 3ème, faisant des cours à d'éducation physique et sportive à l'école, nous avons voulu connaître dans un premier temps, les attitudes des élèves face aux cours d'éducation physique et sportive (EPS) et dans une deuxième phase, voire la perception qu'ils ont de leur compétence vis-à-vis de l'EPS. Afin de pouvoir mesurer les attitudes des élèves à l'égard des cours d'éducation physique et sportive et la perception de compétences, nous avons utilisé le questionnaire de Piéron, Ledent, Luts Pirottin et Delafosse (1998) avec lequel il a été possible d'évaluer les opinions que les sujets ont des cours d'éducation physique et sportive dans le contexte scolaire. Cet article propose de mieux comprendre les attitudes à l'égard des cours d'EPS et la perception des compétences de quelques élèves gabonais durant la période de la propagation de la Covid-19.

Mots clés: Attitudes, Éducation physique et sportive, Perception, Compétences, Covid-19.

Introduction

Aujourd'hui beaucoup de pays du monde et même le Gabon, se retrouvent confrontés à une crise sanitaire liée au coronavirus encore appelé Covid-19. Pour éviter la propagation du virus, des mesures ont été prises par le gouvernement gabonais. En situation d'urgence, la solution optée par les établissements secondaire, a été de cessé momentanément les cours pratiques et procéder à l'évaluation des élèves à l'unité d'enseignement d'éducation physique et sportive de façon théorique. Après allègement des mesures aboutissant à une reprise des activités pratiques plusieurs questions peuvent nous intriguer, telle que l'attitude des élèves vis-à-vis du cours d'éducation physique et sportive. Le comportement de l'élève s'inscrivant dans une perspective dynamique et évolutive, il se pourrait que la cessation du cours d'EPS du fait de la Covid-19, aurait contribuer à une attitude négative des élèves à l'égard de ce cours et de même affecter leurs sentiment de compétences en éducation physique et sportive. L'objectif de cette étude est d'une part, d'apporter un éclairage sur les attitudes des élèves gabonais vis-à-vis du cours d'éducation physique et sportive en ce temps de pandémie Covid-19. Et d'autre part, voir quelle perception ils ont de leurs compétences en éducation physique et sportive en ce temps de pandémie Covid-19. Dans la première partie, il s'agit de la présentation du problème de l'étude, tandis que la deuxième partie se concentre sur la démarche méthodologique.

Problématique

Se référant à Faye (2003, p.16) pour les psychologues, le concept *d'attitudes* désigne la manière d'être dans une situation. Il est fondamental en psychologie et tout spécialement en psychologie sociale. C'est semble-t-il un concept flou, car il recouvre diverses significations. Il désigne l'orientation de la pensée, les dispositions profondes de notre être (souvent inconscientes) qui guident notre conduite. Le concept d'attitude désigne « une prise de position génératrice d'opinions et d'actions sur un problème ou dans des circonstances », nous apprend Mucchielli (1979). Une attitude est toujours orientée vers un objet. Moscovici (1976), souligne que « l'attitude exprime un positionnement, une orientation par rapport à l'objet. L'attitude est donc porteuse de sens et d'orientation et, est un état quasi permanent de la préparation à l'action, ne constituant pas un vécu, mais un mode une disponibilité à sentir, à percevoir et à réagir d'une façon réfléchie et particulière (Faye, *op.cit*). En ce sens, tenant compte de ces approches définitionnelles, nous pensons qu'il est nécessaire d'apporter un éclairage aux attitudes des élèves vis-à-vis du cours d'éducation physique et sportive durant la période de la propagation de la Covid-19. *L'éducation physique et sportive (E.P.S),* se présente selon Vassadia (2005), comme une discipline d'enseignement qui propose, en favorisant le développement et l'entretien organique et foncier, l'acquisition de connaissances et la construction de savoirs permettant l'organisation et la gestion de la vie physique à tous les âges, ainsi que l'accès au domaine de la culture que constituent les pratiques sportives. L'E.P.S, en tant que discipline scolaire, fonde son enseignement sur des pratiques qui doivent être évaluées dans le contexte de l'apprentissage. Dans ce cadre, la performance devient l'objet de l'évaluation. Par ailleurs, Bandura (1977, 1986, 1994, cité par Bouchard, 1997, p.29) fut le premier auteur à développer le concept de *perception de la compétence* sous l'appellation «self-efficacy appraisal ».

Bouchard (1997), a mené une étude sur la perception de la compétence des élèves dans le contexte de certaines activités d'enseignement et d'apprentissage bien précises des cours de sciences physiques. Pour l'auteur, la perception de la cornp6tence est l'un des déterminants de la motivation. la piètre perception de leurs compétences scientifiques suscite chez plusieurs jeunes[1] des craintes et du découragement même au secondaire. De plus il s'inscrit d'ailleurs dans l'esprit des travaux de Maehr (1983), une carence de la perception de la compétence entraîne même de mauvaises performances voire des échecs. La perception de la compétence exerce une influence significative sur différentes facettes de l'autorégulation, telles le monitoring durant la période de travail et la persévérance, autant que sur la performance (Bouffard-Bouchard, Parent et Larivée, 1991, cité par Bouchard, *op.cit*, 1997, p.37). **Ces auteurs constatent notamment que les élèves dont la perception de la compétence est élevée exerce un contrôle plus actif sur leur période de travail et persistent davantage sur la tâche que les élèves dont la perception de compétence est faible**. Les élèves qui sous-estiment leurs compétences sont moins attirés par les défis, ce qui les expose à une autre diminution de leurs perceptions. À long terme, chez les enfants réellement compétents, la sous-estimation de la compétence est plus néfaste que la surestimation (Bouchard, *op.cit*, 1997, p.36). Se référant à ces résultats, il nous semble intéressant d'une part de connaitre les attitudes des élèves vis-à-vis des cours d'éducation physique et sportive, pendant la période de propagation de la covid-19, et d'autre part, de voir la perception que les élèves ont à l'égard du cours d'éducation physique et sportive. Cette étude s'inscrit dans un domaine en ébullition : celui de la perception de soi.

Nous nous intéressons à l'un des principaux déterminants de la motivation: la perception de la compétence. Pour l'heure, au Gabon, aucune étude n'a porté sur les attitudes des élèves vis-à-vis de l'EPS et la perception des compétences qu'ils peuvent avoir. La décision prise par le gouvernement afin de limiter la propagation de la Covid-19, notamment celle de cesser les cours pratique d'EPS au cours de l'année 2020, aurait certainement engendré des attitudes négatives des élèves vis-à-vis des cours pratiques d'EPS et même avec avoir un effet négatif sur la perception qu'ils ont de leurs compétences. L'originalité de ce travail réside dans le fait de s'intéresser d'une part, aux attitudes des élèves à l'égard du cours d'éducation physique et sportive durant la période de propagation de la Covid-19 au Gabon. Mais également du fait qu'elle cherche à voir la perception que les élèves ont de leurs compétences vis à vis du cours d'EPS durant le période de propagation de la covid-19. L'intérêt de cette recherche est qu'elle pourrait contribuer à motiver les élèves à avoir une bonne attitude à l'égard du cours d'éducation physique et sportive (EPS). Mais de plus, nous croyons qu'une meilleure compréhension des attitudes des élèves à l'égard du cours

[1] En nous référant à l'Unicef (2020), la Covid-19 est :

« Une maladie provoquée par une nouvelle souche de coronavirus. D'abord appelée nouveau coronavirus 2019 ou nCoV-2019, la maladie a été rebaptisée maladie à coronavirus 2019 (COVID-19) – *CO* pour corona, *VI* pour virus et *D* pour maladie en anglais. Le virus de la COVID-19 est un nouveau virus de la même famille que d'autres virus tels que le syndrome respiratoire aigu sévère (SRAS) et certains types de rhumes courants ». En effet, selon l'Unicef, le virus se transmet par contact direct avec les gouttelettes respiratoires produites par une personne infectée (lorsqu'elle tousse ou éternue) et en touchant des surfaces contaminées par le virus ou en se touchant le visage (par exemple, les yeux, le nez ou la bouche).

d'éducation physique et sportive, et de plus, pourrait nous aider à outiller davantage les enseignants dans leur pratique.
Nous nous sommes posé la question de savoir, quelles sont les attitudes des élèves vis-à-vis du cours d'éducation physique et sportive durant la pandémie de la Covid-19[1] ? De plus, quel est la perception de compétence des élèves vis-à-vis du cours d'EPS?

Méthodologie

Cadre de l'étude et la description de la population d'étude

La présente étude s'est déroulée à Libreville auprès des élèves de 5ème et de 3ème du Collège Monseigneur Béssieux faisant des cours d'Education Physique et Sportive, durant la période de propagation de la Covid-19. Notre population cible était constituée exclusivement des élèves en pleine pratique des cours d'EPS. Notre échantillon était composé de 96 sujets, dont 22 hommes (38,60%) et 35 femmes (61,40%). Du fait du confinement, pour recueillir les données de cette étude, nous nous sommes rendu auprès du directeur du collège, pour l'obtention d'une autorisation nous permettant d'administrer un questionnaire aux élèves. Nous avons travaillé avec un échantillon tout venant, en fonction de la disponibilité des sujets.

Questionnaire

Pour notre recherche nous n'avons pas eu besoin de construire d'instruments, nous avons tout simplement adapté les outils existant dans la littérature relative à notre étude. L'instrument de mesure privilégié dans le cadre de cette étude est le questionnaire d'enquête, composé de deux échelles. Une mesurant *les attitudes des élèves vis-à-vis du cours d'EPS et* l'autre, *la perception des compétences*, nous avons adapté à notre contexte le questionnaire de Piéron, Ledent, Luts Pirottin et Delafosse (1998).

Traitement des données

Le dépouillement s'est fait en regroupant les réponses identiques par la méthode du pendu. Ainsi, en se référant à l'étude de Faye (2003), les réponses sont d'abord groupées en fonction de l'âge et du sexe, ensuite calculées en pourcentages par rapport aux totaux enregistrés au niveau de chaque âge et par sexe.

Présentation des résultats et commentaires

Nous avons posé la question aux élèves du collège Monseigneur Béssieux afin de connaitre leur sentiment à l'égard du cours d'éducation physique durant la période où sévie la pandémie de la Covid-19 au Gabon. Il ressort du tableau 1, que la grande partie des élèves aiment (beaucoup ou bien) leurs cours d'éducation physique et sportive. En effet, de 10 ans à 19 ans le constat est le

même, les élèves ont une attitude positive des cours d'éducation physique et sportive. La seule élève de 10 ans de notre échantillon aime l'éducation physique et sportive, soit un pourcentage de 100%.

Tableau 1 Attitudes à l'égard des cours d'Education Physique : sentiment des élèves au cours d'Education Physique (en pourcentage)

Age moyen	Effectif		J'aime (beaucoup ou bien)		Je n'aime pas (beaucoup ou du tout)	
	G	F	G	F	G	F
10ans	0	1	0	100%	0	0
11ans	2	7	50%	42,85 %	0	7,14%
12 ans	5	9	50%	38,75 %	0	11, 25%
13 ans	6	6	50%	50%	0	0
14ans	8	19	50%	44,73 %	0	5,26%
15 ans	2	10	50%	45%	0	5%
16 ans	6	10	50%	35%	0	15%
17 ans	3	1	50%	50%	0	0
19 ans	1	0	100%	0	0	0

La majeure partie des sujets de 11 ans disent *aimer* leur cours d'éducation physique et sportive, soit 92,85% pour 50% de garçons et 42,85% de filles, tandis que seulement 7,14% des sujets de cet âge disent *ne pas aimer* leur cours d'éducation physique et sportive. De même les élèves de 12 ans également disent *aimer* les cours d'éducation physique et sportive, soit 98,75% pour 50% de garçons et 38,75% de filles, tandis que 11,25% n'aiment pas leur cours. Le constat est le même pour les élèves de 13 ans, ils *aiment* le cours d'EPS, soit 50% de garçons et 50% de filles. Les élèves de 14 ans *aiment* le cours d'EPS, soit 50% de garçons et 44,73% de filles, alors que seulement 5,26% des sujets de cet âge disent *ne pas aimer* le cours d'EPS. Les élèves de 15 ans *aiment* leur cours d'EPS, soit 50% de garçons et 45% de filles, contre seulement 5% qui disent *ne pas aimer*. Les élèves de 16 ans *aiment* leur cours d'EPS, soit 50% de garçons et 35% de filles, contre 15% qui disent *ne pas aimer*. Les élèves de 17 ans *aiment* leur cours d'EPS, soit 50% de garçons et 50% de filles). Le seul élève de 18 ans de notre échantillon *aime* le cours d'EPS, soit un pourcentage de 100%.

Par la suite, il a été question de connaitre le niveau d'importance du cours d'éducation physique et sportive pour les élèves du collège Monseigneur Béssieux durant la période où sévie la pandémie de la Covid-19 au Gabon. A travers le tableau 2, nous constatons que la grande partie des élèves considèrent que le cours d'éducation physique et sportive est très important ou simplement important. En effet, de 10 ans à 19 ans, l'observation est la même, les élèves considèrent leurs

cours d'éducation physique et sportive comme étant important ou très important. La seule élève de 10 ans de notre échantillon accorde de l'importance en éducation physique et sportive, soit un pourcentage de 100%.

Tableau 2 Attitudes à l'égard des cours d'éducation physique : importance accordée à l'éducation physique (en pourcentage)

Age moyen	Effectif		Très important ou important		Peu important ou pas important du tout	
	G	F	G	F	G	F
10 ans	0	1	0	50%	0	0
11ans	2	7	50%	35,71 %	0	14,29 %
12 ans	5	9	50%	44,44 %	0	5,56%
13 ans	6	6	41,66 %	41,66 %	8,33%	8,33%
14ans	8	19	50%	42,10 %	0	7,89%
15 ans	2	10	50%	40%	0	10%
16 ans	6	10	50%	40%	0	10%
17 ans	3	1	50%	50%	0	0
19 ans	1	0	0	0	0	0

La majeure partie des sujets de 11 ans disent accorder *de l'importance* à leur cours d'éducation physique et sportive, soit 85,71% pour 50% de garçons et 35,71% de filles, tandis que seulement 14,29% des sujets de cet âge disent *ne pas aimer* leur cours d'éducation physique et sportive. Les élèves qui disent accorder beaucoup plus de *l'importance à* leurs cours d'éducation physique et sportive sont ceux de 12 ans, soit 94,44% pour 50% de garçons et 44,44% de filles, tandis que 5,56% n'accordent aucune importance à ce cours. De même, Les élèves de 13 ans, accordent de l'importance à leur cours d'EPS, soit 83,32% pour 41,66% de garçons et 41,66% de filles. Les élèves de 14 ans accordent de l'importance *à* leurs cours d'EPS, soit 92,10% pour 50% de garçons et 42,10% de filles, alors que seulement 7,89% des sujets de cet âge disent ne pas accorder *d'importance* au cours d'EPS. Les élèves de 15 ans *accordent de l'importance à* leur cours d'EPS, soit 90% pour 50% de garçons et 40% de filles, contre seulement 10% qui disent ne pas accorder *d'importance*. Les élèves de 16 ans accordent de *l'importance à* leur cours d'EPS, soit 90% pour 50% de garçons et 40% de filles, contre 10% qui disent ne pas accorder *d'importance*. Les élèves de 17 ans également disent accorder une certaine importance *à* leur cours d'EPS, soit 100% des sujets, pour 50% de garçons

et 50% de filles. Le seul élève de 18 ans de notre échantillon accorde de l'importance au cours d'EPS, soit un pourcentage de 100%.

De plus, il a été question de connaitre l'utilité que les élèves du collège Monseigneur Béssieux accordent à leur cours d'éducation physique en fonction de l'âge et le sexe durant la période où sévie la Covid-19 au Gabon.

Tableau 3 Attitudes à l'égard des cours d'éducation physique : utilité de l'éducation physique en fonction de l'âge et le sexe (en pourcentage)

Age moyen	Effectif		A se développer physiquement, à être en bonne santé		A s'amuser, à se détendre		A apprendre des techniques sportives		A apprendre à jouer ensemble, à se faire des copains	
	G	F	G	F	G	F	G	F	G	F
10 ans	0	1	0	100 %	0	0	0	0	0	0
11ans	2	7	25%	50%	0	%	25%	0	0	0
12 ans	5	9	50%	50%	0	0	0	0		
13 ans	6	6	25%	50%	16, 66 %	0	8,33 %	0	0	0
14ans	8	19	50%	39,4 7%	0	5,26 %	0	2,63 %	0	2,63 %
15 ans	2	10	25%	50%	0	%	25%	0	0	0
16 ans	6	10	50%	50%	0	%	0	%	0	0
17 ans	3	1	50%	50%	0	0	0	0	0	0
19 ans	1	0	100%	0	0	0	0	0	0	0

A travers le tableau 3, nous constatons que la grande partie des élèves considèrent que le cours d'éducation physique et sportive sert beaucoup plus à se développer physiquement, à se muscler, à être en bonne santé et à améliorer la condition physique. En effet, au vu des réponses, on pourrait dire que les élèves aiment le cours d'éducation physique et sportive et y accordent de l'importance parce qu'ils considèrent que leurs cours d'éducation physique et sportive contribue à se développer physiquement, à se muscler, contribue à la bonne santé et contribue à améliorer la condition physique. La seule élève de 10 ans dit aimer et accorder de l'importance au cours d'éducation physique et sportive, parce qu'il contribue à se développer physiquement, à se muscler, à être en bonne santé et à améliorer la condition physique, soit un pourcentage de 100%. De plus, 75% des sujets de 11 ans disent accorder *aimer et accorder de l'importance* à leur cours d'éducation physique et sportive, parce qu'il contribue à se développer physiquement, à se muscler, à être en bonne santé et à améliorer la condition physique, tandis que seulement 25% des sujets de cet âge disent aimer

et accorder de l'importance à l'EPS parce qu'ils apprennent des techniques sportives et apprennent à faire certains exercice convenablement. En ce qui concerne les élèves de 12 ans, 100% des élèves disent *aimer et accorder de l'importance* à leur cours d'éducation physique et sportive, parce qu'il contribue à se développer physiquement, à se muscler, à être en bonne santé et à améliorer la condition physique, soit 50% de garçons et 50% de filles. Les élèves de 13 ans, disent accorder *aimer et accorder de l'importance* à leur cours d'éducation physique et sportive, parce qu'il contribue à se développer physiquement, à se muscler, à être en bonne santé et à améliorer la condition physique, soit 75% pour 25% de garçons et 50% de filles, alors que seulement 8,33% de cet âge disent aimer et accorder de l'importance à l'EPS parce qu'ils apprennent des techniques sportives et apprennent à faire certains exercice convenablement. . Les élèves de 14 ans disent accorder *aimer et accorder de l'importance* à leur cours d'éducation physique et sportive, parce qu'il contribue à se développer physiquement, à se muscler, à être en bonne santé et à améliorer la condition physique, soit 89,47%, pour 50% de garçons et 39,47% de filles, alors que 5,26% des sujets de cet âge disent *aimer* et accorder *d'importance* au cours d'EPS parce qu'il sert pour s'amuser, à se détendre, d'autres élèves de 14 ans, soit 2,63% de filles, aiment et accordent de l'importance parce qu'ils apprennent des techniques sportives, apprennent à faire certains exercice convenablement et pour finir certains élèves de 14 ans soit 2,63% de filles, aiment et accordent de l'importance à l'EPS, parce qu'ils apprennent à jouer ensemble, à se faire des copains.

La grande partie des élèves de 15 ans disent *aimer* et accorder *d'importance* au cours d'EPS parce qu'il sert à se développer physiquement, à se muscler, à être en bonne santé et à améliorer la condition physique, soit 75% pour 25% de garçons et 50% de filles, contre seulement 25% qui disent aimer et accorder de l'importance au cours d'EPS parce qu'ils apprennent des techniques sportives et apprennent à faire certains exercice convenablement. Les élèves de 16 ans disent *aimer* et accorder *d'importance* au cours d'EPS parce qu'il sert à se développer physiquement, à se muscler, à être en bonne santé et à améliorer la condition physique, soit 100% pour 50% de garçons et 50% de filles. Les élèves de 17 ans également disent *aimer* et accorder *d'importance* au cours d'EPS parce qu'il sert à se développer physiquement, à se muscler, à être en bonne santé et à améliorer la condition physique, soit 100% pour 50% de garçons et 50% de filles. Le seul élève de 18 ans de notre échantillon dit aimer et accorder de l'importance au cours d'EPS, parce qu'il contribue à se développer physiquement, à se muscler, contribue à la bonne santé et à améliorer la condition physique soit un pourcentage de 100%.

Nous avons interrogé les élèves sur la perception qu'ils ont de leur compétence de manière générale à l'égard de l'EPS, il ressort du tableau 4, que la grande partie des élèves se disent moyen ou faible en éducation physique et sportive. La seule élève de 10 ans de notre échantillon se dit moyenne ou faible en éducation physique et sportive, soit un pourcentage de 100%. Les élèves de 11 ans disent être également moyen ou faible en éducation physique et sportive, soit 53,57% pour 25% de garçons et 28,57% de filles, tandis que seulement 46,43% des sujets de cet âge disent être moyen ou faible en éducation physique et sportive. Par contre, les élèves de 12 ans pour la majorité disent être fort ou très fort en éducation physique et sportive, soit 74,44% pour 30% de garçons et 44,44% de filles, tandis que 25,55%, disent être moyen ou faible, pour 20% de garçons et 5,55% de filles.

Les élèves de 13 ans, quant à eux disent être moyen ou faible en éducation physique et sportive, soit 66,67% des sujets, pour 25% de garçons et 41,67% de filles, alors que 33,33% se disent fort ou très fort en éducation physique et sportive, avec 25% de garçons et 8,33% de filles. Les élèves de 14 ans disent être moyen ou faible en éducation physique et sportive, soit 67,11% des sujets, pour 25% de garçons et 42,11% de filles, alors que seulement 32,89% des sujets de cet âge disent être fort ou très fort en EPS, soit 25% de garçons et 7,89% de filles.

Tableau 4 Perception de compétences d'une manière générale en éducation physique et sportive (en pourcentage)

Age moyen	Effectif		Je suis très fort (e) Ou très fort (e)		Je suis moyen (ne) ou faible	
	G	F	G	F	G	F
10 ans	0	1	0	0	0	100 %
11ans	2	7	25%	28,57	25%	21,43%
12 ans	5	9	30%	44,44 %	20%	5,55 %
13 ans	6	6	25%	8,33%	25%	41,67%
14ans	8	19	25%	7,89%	25%	42,11%
15 ans	2	10	50%	20%	0	30%
16 ans	6	10	25%	20%	25%	30%
17 ans	3	1	50%	0	0	50%
19 ans	1	0	100%	0	0	0

Les élèves de 15 ans disent sont eux plutôt fort en éducation physique et sportive, soit 70% des sujets, pour 50% de garçons et 20% de filles, contre seulement 30% de filles qui disent *être moyennes ou faibles*. Les élèves de 16 ans pour la majorité se disent moyen ou faible en EPS, soit 55% des sujets, pour 25% de garçons et 30% de filles, alors que 45% se disent être fort, avec 25% de garçons et 20% de filles. Les élèves de 17 ans sont pour la moitié fort ou très fort en EPS, soit 50% des sujets uniquement constitué de garçons, et 50% des sujets uniquement constitué de filles, sont moyens ou faibles en d'EPS. Le seul élève de 18 ans de notre échantillon se dit fort en EPS, soit un pourcentage de 100%.

Dans le même ordre d'idée au niveau de la perception des compétences, nous avons interrogé les élèves sur l'activité proposée par le professeur le jour de la distribution de notre questionnaire. Il

ressort du tableau 5, que la seule élève de 10 ans de notre échantillon se dit moyenne ou faible en éducation physique et sportive, soit un pourcentage de 100%. Les élèves de 11 ans, se disent pour la majorité être également moyen ou faible en éducation physique et sportive, soit 53,57% pour 25% de garçons et 28,57% de filles, tandis que seulement 46,42% des sujets de cet âge se disent fort ou très fort en EPS. Cependant, les élèves de 12 ans pour la majorité disent être fort ou très fort en éducation physique et sportive, soit 57,77% pour 30% de garçons et 27,77% de filles, tandis que 42,23%, disent être moyen ou faible, pour 20% de garçons et 22,23% de filles.

Tableau 5 Perception de compétences dans l'activité proposée par le professeur (en pourcentage)

Age moyen	Effectif		Je suis fort ou très fort (e)		Je suis moyen (e) ou faible	
	G	F	G	F	G	F
10 ans	0	1	0	0	0	100%
11ans	2	7	25%	21,42 %	25%	28,57 %
12 ans	5	9	30%	27,77 %	20%	22,23 %
13 ans	6	6	25%	25%	25%	25%
14ans	8	19	37,5%	13,15 %	12,5 %	36,85 %
15 ans	2	10	50%	15%	0	35%
16 ans	6	10	33,33 %	20%	16,6 6%	30,11 %
17 ans	3	1	50%	0	0	50%
19 ans	1	0	100%	0	0	0

Les élèves de 13 ans, quant à eux disent pour la moitié être fort ou très fort en EPS, soit 50% des sujets, pour 25% de garçons et 25% de filles, alors que 50% se disent moyen ou faible en EPS, avec 25% de garçons et 25% de filles. Les élèves de 14 ans disent être fort ou très fort en éducation physique et sportive, soit 50,65% des sujets, pour 37,5% de garçons et 13,15% de filles, alors que 49,35% des sujets de cet âge disent être moyen ou faible en EPS, soit 12,5% de garçons et 36,85% de filles. Les élèves de 15 ans disent sont eux plutôt fort ou très fort en EPS, soit 65% des sujets, pour 50% de garçons et 15% de filles, contre seulement 35% de filles qui disent être moyennes ou faibles. Les élèves de 16 ans pour la majorité se disent fort ou très fort en EPS, soit 53,33% des sujets, pour 33,33% de garçons et 20% de filles, alors que 46,77% se disent être moyen ou faible, avec 16,66% de garçons et 30,11% de filles. Les élèves de 17 ans sont pour la moitié fort ou très fort en EPS, soit 50% des sujets uniquement constitué de garçons, et 50% des sujets uniquement

constitué de filles, sont moyens ou faibles en d'EPS. Le seul élève de 18 ans de notre échantillon se dit fort en EPS, soit un pourcentage de 100%.

Nous avons demandé aux sujets de se comparé aux autres filles et aux autres garçons de leur âge. Il ressort du tableau 6, que la majeure partie des élèves soumis à notre étude présente de bonnes qualités physiques, soit 96,96% de garçons et 79,36% de filles. De plus, la majorité dit être gracieux et élégant lors au cours d'EPS, soit 63,63% de garçons et 68,25% de filles. En outre, la grande partie des sujets se dit être en forme soit 90,90% des garçons et 60,31% de filles. Au par delà de cela, le plus grand nombre se dit fort(e), soit 93,93% de garçons et 60,31% de filles.

Tableau 6 Perception des compétences selon le sexe (en pourcentage)

Propositions	***Effectifs***		***Garçons***		***Filles***	
	G	***F***	***Oui***	***Non***	***Oui***	***Non***
J'ai de bonnes qualités physiques	33	63	96,96%	3,03%	79,36%	20,63%
Je suis gracieux (se) élégant (e)	33	63	63,63%	36,36%	68,25%	*31,74%*
Je suis souple	33	63	51,51%	48,48%	47,61%	52,38%
Je suis en forme	33	63	90,90%	9,09%	60,31%	39,68%
Je suis rapide	33	63	81,81%	18,18%	36,50%	63,43%
Je suis fort(e)	33	63	93,93%	6,06%	60,31%	29,68%
Je suis courageux (se)	33	63	90,90%	9,09%	79,36%	20,63%

En plus de cela, la plupart se dit courageux (se), soit 90,90% de garçons et 79,36% de filles. Cependant, quand la grande partie des garçons se dit souple, soit 51,51%, la majorité des filles dit ne pas l'être, soit 52,38%. Dans le même ordre d'idées quand la grande partie des garçons se dit rapide, soit 81,81%, la majorité des filles dit ne pas l'être, soit 63,43%. D'une façon brève, la majorité des pourcentages de réponses **oui** des garçons sont supérieurs à ceux des filles.

Conclusion

A l'issus de notre étude portant sur les attitudes des élèves vis-à-vis du cours d'éducation physique et sportive et la perception de compétences durant la période de propagation de la covid-19, nous sommes parvenue, d'abord au constat selon lequel les élèves de 5ème et de 3ème du collège Monseigneur Béssieux ont une attitude favorable à l'égard du cours d'EPS. De plus, les élèves se surestiment au niveau de leur compétences, mais beaucoup plus les garçons qui se disent être plus compétents et avoir plus de bonnes qualités physiques contrairement aux filles. Les résultats ont permis d'observer que la grande partie de ces élèves se disent plutôt fort en EPS. Cependant nous sommes conscient des limites de cette recherche, d'abord, celle liée au nombre de sujets, nous

aurons pu avoir un échantillon plus représentatif, ensuite, la limite liée au fait que nous n'avons pas croisé les variables relatives à notre étude, en s'inscrivant dans une démarche descriptive.

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