Physical activity and health aspects of COVID-19 pandemic

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PHYSICAL ACTIVITY AND HEALTH ASPECTS OF COVID-19 PANDEMIC

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CONTENTS

FOREWORD

It is a pleasure to introduce to you this scientific book under the title Physical Activity and Health Aspects of COVID-19 Pandemic. In January 2020, the World Health Organization (WHO) declared a new COVID-19 outbreak to be a public health emergency of international concern. Since then, there have been many confirmed infections and many human deaths. A highly effective method for slowing the spread and infection of the virus is self-isolation or quarantine. However, some countries have adopted measures like travel restrictions and school closures. These extraordinary arrangements have had negative physical and psychological impacts, with increased physical inactivity and sedentary behaviour.

Before the pandemic, in "normal" conditions, analyses showed that more than 3.2 million people in the world die annually directly due to physical inactivity, while some analyses speak of as many as 5 million. When we talk about the leading factors causing mortality and disease development, according to the World Health Organization, physical inactivity is in the high fourth place and is significantly related to other factors and equally represented as a cause of mortality regardless of the level of development of a country.

During the pandemic, other diseases and health risks did not disappear, although the focus of many systems was on the prevention and treatment of patients suffering from COVID-19 virus. A large number of experts in the field of health, kinesiology and other sciences point out the importance of preserving prevention programs in all other segments, regardless of the new pandemic. Physical activity is an indispensable segment of the prevention of many chronic non-communicable diseases, some of which are the leading mortality factors in the world. The consequences of increased physical inactivity, even if due to a pandemic, will be felt by millions of people of all generations. The negative curve of many countries has been present for decades and there is an objective fear that it could worsen significantly during the pandemic period. Mankind will feel the consequences for many years to come in many segments and it is important to point out the importance of physical activity in all the forms available to us.

The topic of this scientific book is related to the COVID-19 disease that is considered the worst pandemic in modern times. It covers some aspects of the pandemic, and the reader can find three very interesting chapters that cover important topics as the influence of COVID-19 pandemic on physical education and psychological health, as well as the influence of COVID-19 pandemic on overall well-being.

The authors of the book chapters come from a large number of countries, and they certainly are well-respected and experienced researchers. We firmly believe that this scientific book will be a valuable assistance to a variety of scientists, practitioners and, of course, students to better understand the events and problems that arose during the pandemic and to help solve them.

Damir Knjaz
Dario Novak
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CHAPTER 1

PHYSICAL EDUCATION, PHYSICAL INACTIVITY AND PSYCHOLOGICAL HEALTH DURING COVID-19 PANDEMIC

Branislav Antala, Dario Novak, Damir Knjaz

The prevalence of psychological disorders among people has been rising worldwide. According to many studies conducted among young and elderly people during the COVID-19 pandemic, physical symptoms may lead to more psychological distress and anxiety. A long stay at home and social isolation have strong psychosocial consequences, especially for the mental health of the general and more vulnerable populations. Studies have reported loneliness, anxiety, boredom, anger, denial, depression, insomnia, and suicides in quarantined people. Reduced physical inactivity is another consequential outcome of social isolation at home or quarantine. It is well known that physical inactivity is a major cause of disease, disability, and serious mental problems worldwide. On the other hand, physical activity has a positive effect not only on physical health but is also an indispensable factor in improving the mental health of an individual. Thus, for example, physical activity and exercise are used in the treatment of people suffering from mental disorders and have been shown to be particularly effective in people suffering from anxiety and depression. Furthermore, physical activity, in addition to having a positive effect on neurotransmitter systems, endorphins and hormones (such as coping with stress and treatment of psychotic disorders and dementia), also significantly affects self-esteem and self-confidence, cognitive functions and socialization. Recommendations for physical activity for people with mental disorders include daily exercise for at least 30 minutes or at least three times a week for one hour. It is important to identify risk factors and protective factors to prevent psychological difficulties during a COVID-19 pandemic. Understanding the link between the COVID-19 pandemic and psychological health, including mental pain, could contribute to improving the effectiveness of existing preventive approaches. Also, early identification of serious mental problems is critical for interventions to be successful. This chapter provides the latest evidence on the physical education, physical inactivity and psychological health during COVID-19 pandemic.

"COVID-19, FORCED INACTIVITY AND INEQUALITY IN SPORT" REMAPPING SCHOOL SPORT IN CATALONIA: A REGIONAL EUROPEAN PERSPECTIVE

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ABSTRACT

Particularly focused in Catalonia region, this article draws from a study carried out in order to show the impact of COVID-19 pandemic measures for sport schools in the region. The article also wants to highlight the enormous challenges that sport schools have faced and is going to face due to the recent COVID-19 pandemic emergency measures. Following government calls for general public isolation, school sporting associations, sport for all and other amateur organisations have gone through the longest period of inactivity since the re-establishment of democracy. Having the potential participants locked down at home, it has forced professionals to explore new ways to connect with them. Public sector has joint in, raising awareness on the risk of inactivity and imposing a range of restrictive measures that have impacted sport, especially the one related to schools and grassroots levels. The situation has obliged one of the major School Sport organisations in Catalonia (UCEC) to reinvent strategies in order to survive and keep providing sport initiatives to more than 200.000 scholars and young adults across the region.

Keywords: COVID-19, Sport School, sporting opportunities, sport equity, Physical Activity, Sport for All, Personal & Social Values

INTRODUCTION

Catalonia, a sports country

In Catalonia, sport has always been related to modernity and a civil society self-organisation. In the late 19th century, new vision of sport had a considerable impact in Catalan society, alongside more traditional games such as skittles, tip-cat, tug-of-war, and certain ball games, along with footraces, nautical races with small boats and animal races, thanks to the role played by clubs in consolidating sports as both exercise and entertainment (Santacana, 2014). A number of sporting clubs and associations were created during that period of time, following the need of institutionalisation. Some of them responded to Catalan historical relation to their own natural landscape (hiking, cycling, running, horseback riding) and other were imported thanks to British connection due to a growing commercial and trade agreements (football, tennis, boxing, gymnastics). The will to promote organised physical activity linked with Catalanism political movement, propelled Barcelona's candidacy to host the 1924 Olympic games (Santacana, 2014). However, from the early 40's, Franco's dictatorship progressively eliminated democratic meaning of sporting organisation and their links to Catalanism. Therefore, many clubs changed their icons and symbology, and sport personalities were prosecuted and sentenced to prison. With the return of democracy in the early 80´s, all sport manifestations relinked with their original pursuit and were reborn under the basis of "sports for everyone" and the international recognition of the 1992 Barcelona Olympics (Santacana, 2014).

Nowadays, Catalonia is a world renamed sport cluster due to the internationalisation of some of its clubs in many sport manifestations (FC Barcelona, FIATC Joventut de Badalona, Club Natació Sabadell) as well as the irruption of sportsmen and women, such as Lionel Messi, Kilian Jornet, Pau Gasol or Mireia Belmonte. Besides, there is a growing interest for organising top sporting events (Barcelona World Race, Barcelona Zurich Marathon, F1 and Moto Gp Grand Prix). None of these events were possible without excellent sport infrastructure (Camp Nou, Montmeló, Palau Sant Jordi). With 35,424 sports areas, Catalonia has more sports facilities than any other region in Spain, which allows the Catalan population to enjoy more than 300 different sports activities, offered by both public and private sectors (Indescat, 2014).

Catalonia has world-class facilities for hosting, playing, doing, or training in any kind of sport, ranging from motorsports to sailing, skiing, cycling or golf. Having worldwide sport recognition, international events have attracted a number of major foreign sport companies that have established their headquarters in recent years. Catalonia is the territory with the greatest concentration of sports businesses in Europe. It has more than 500 companies linked to sport which can be grouped into 3 different sports segments (facilities, events, and consumer goods), and represents more than 70% of Spanish production, with a turnover exceeding 4 billion euros and more than 22,000 employees. This growing sector includes a wide variety of industries and accounts for 2.1% of the Catalan GDP (Indescat, 2014).

Catalonia has also developed a solid sport tourism sector thanks to being in an exceptional location and having a miscellaneous outdoors environment which allows the realisation of wide range of sporting disciplines. Together with winter sports, this mountainous country, full of valleys carved out by rivers, glaciers, natural parks, and protected areas, is especially suitable for activities such as hiking, with a network of footpaths over 5,000 km long. Climbing, cycling, horse-trekking and a wide range of activities are also possible in this diverse and charming landscape. Finally, there is a set of international sport events that attracts tourists, ranging from spectators to those willing to take an active part (Indescat, 2014).

Regional sport system

Catalonia sport system is organised under a number of sport institutions which act as governing bodies responsible for managing and revising sport strategies. The main public institution is "Secretaria General de l'Esport i de l'Activitat Física" (SGEAF) and is entitled to develop Catalan regional government sport competencies based on the increasing level of citizens' sport practice collaborating with other private and public organisations through another public institution called "Consell Català de l'Esport" (CCE). Among its duties we can find supporting schooling, medic, technical and legal areas of sport; increasing and supervising regional sport facilities; helping Catalan sport federations competing at international level and promoting sport as a cultural identity sign of Catalan society.

On the private side of sport, there are three main sport organisations: "Unió de Federacions Esportives de Catalunya" (UFEC) which is the cluster of all Catalan sport federations; "Esport Català Universitari" (ECU) integrated by all the Catalan universities which is responsible for organising Catalan university sport championships and "Unió de Consell Esportius de Catalunya" (UCEC), the organisation in charge of managing sport schools across the region.

UCEC, sport school management in Catalonia

The UCEC (Unió de Consells Esportius de Catalunya) is a private sport organisation granted with public support in order to promote school sport and sport for all services across the region. The organisation was founded in 1994 in order to promote Physical Activity and Sport for All principles in Catalonia, focusing on supporting children, adolescents and youth participants and basing its policies on equality, equity and reinforcing personal values, social responsibility, and health habits. The organisation is currently formed by up to 45 county divisions that cover the whole region and allow over 200.000 school students to interact with a wide range of sport disciplines.

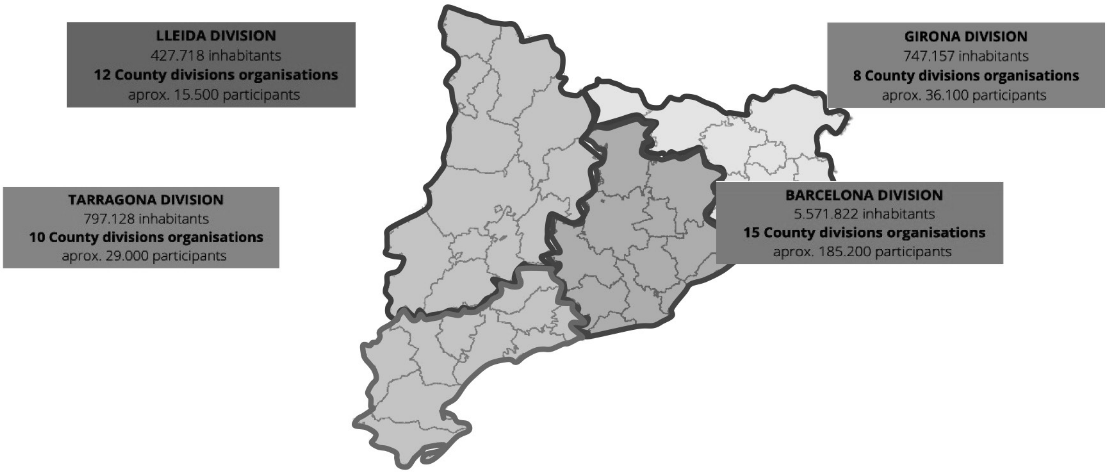

Figure 1. UCEC county division in Catalonia region and number of participants

According to a recent study (Itik Consultoria, 2019), the county divisions can be organised under 4 different categories according to their size and development level:

- 1st Category: A small county division with 1 or 2 employees, with a big dependency on public funding (90% or more), sporting services offer based on youth and children's championships and without website or social media communication.
- 2nd Category: A small-medium size county division with 3-5 employees, with still big dependency on public funding (60-90%), limited sporting services offer, apart from championships and basic website with no social media communication.
- 3rd Category: A medium-large size county division with up to 5 employees, with a balanced dependency on public funding (40-59%), with sporting services of-

fer aiming at a larger population scale and active website as well as active social media communication.

- 4th Category: A large size county division with more than 5 employees, with a low level of dependency on public funding, with a sports company view on generating services for a big scale of population and more advanced website as well as active social media communication.

However, and following the present research, we can assume that there are other multiple subcategories to be added to this classification, due to the lack of territorial private and governmental sporting programs and facilities, that force certain county divisions to develop a number of sporting services that would not be provided by any other public or private organisation.

Sport provision for children and adolescents in school ages

Although over the years more services have been added to the initial offer, UCEC county division’s main objective is to provide sport initiatives to children and adolescents in school ages by organising championships of several sports across the region. In Catalonia, school ages are those included between the age of 6 (1st grade of primary education) and 16 (4th grade of secondary education), this grouping has a direct correlation with mandatory education school years. If we have a look at the big picture, we can see that there is about 70% of sport practise during this period. We observe a peak in the 5th and the 6th grade of primary with up to 80,5% of participation and the lowest level in the 3rd and the 4th grade of secondary education with 67,7% (Itik Consultoria, 2019).

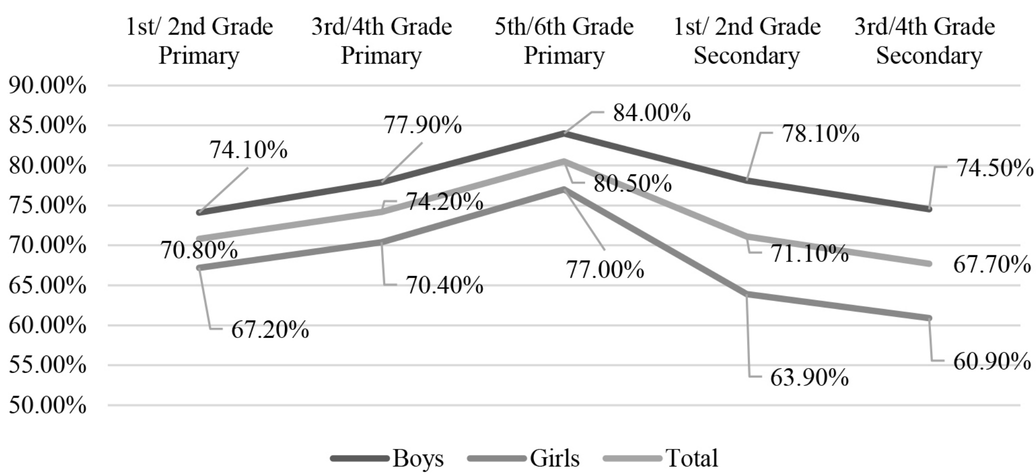

Figure 2. Percentage of participation during school ages in Catalonia

The whole level of practice is not only related to school sport, as from the 3rd grade of primary to the 4th grade of secondary education the irruption of club sport depending on sport federations increases from 34% to up to 72% of the total participation. This progression balances the decrease of school sport participation but cannot match the best of the 5th and the 6th grade of primary (Itik Consultoria, 2019).

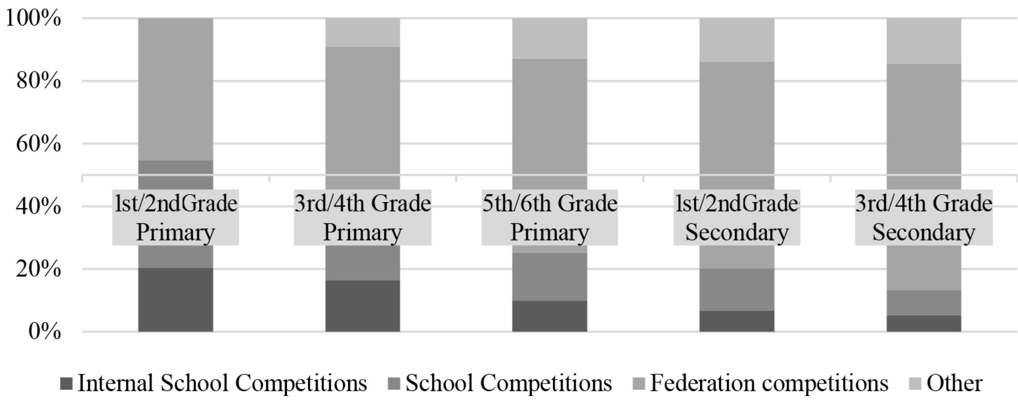

Figure 3. Sport activity distribution among facilitators

Following COVID-19 restrictive measures that have stopped school sport participation and according to the percentages of participation shown above, we can assume that between 30% and 40% of school participants in school ages, have been deprived from engaging in sport activities for several months. Besides, considering that sport club expenses for families are commonly higher than those of school sport, the situation provides a clear example of the social impact of these measures for lower income families across the region and the increment of social inequality.

COVID-19, an unexpected visitor

In March 2020, the whole world was paralysed due to a pandemic situation, many economic sectors were forced to close their businesses and general mobility was reserved to emergency and other basic services. The restrictions had a substantial impact on sport sector from the very beginning at different levels. The first emergency action was taken on 13 March 2020 and stated a lockdown initially planned for 15 days, but this first action lasted for over three months.

On 23 April 2020, UCEC released a press statement informing about the termination of school sport Games (JEEC) due to the pandemic impact in Catalonia. Alongside regional government officials, UCEC steering committee decided to seek out for a specific procedure to be able to resume school sport games in 2020-2021 season. Regarding other specific sporting activities, UCEC allowed all county division members to autonomously plan de-escalation following the specific sanitary guidelines.

On 9 September, once the 2020 summer season ended and according to all the adapted activities organised during that period, UCEC General Assembly approved a protocol to resume activities and school competitions. The importance of promoting physical activity, social inclusion, social cohesion, and equity, were some of the key points of the protocol based on three main ideas: managing sanitary protocols, security checks for individuals and the importance of facing the economic crisis. A specific document was also released on 17 September in order to stretch the social measures created to face discrimination, urging social services to secure enough funding provision for vulnerable families in every city across the region and UCEC.

Although all the protocols were ready to be deployed, on 10 October the government declared the closure of sport facilities and ceasing all training and sport competitions. Only school groups' social bubbles were allowed to carry on doing physical activity within school boundaries and avoiding any contact with other children or adults. On 30 October, UCEC formally asked Catalan Government to consider physical activity as an essential activity in order to guarantee future athletes' personal development and to be able to confront sports sector economic crisis.

In December 2020, UCEC started the campaign "Esport Segur" (Safe Sport) to highlight sport values and beneficial outcomes of doing physical activity. The campaign was one of the many initiatives taken by the sport sector in order to disseminate the safety measures released to fight COVID-19 and show all the social initiatives undertaken to secure sport and physical activity for vulnerable families in Catalonia. Although the campaign reached the general public, the government continued to stop school sport activities from taking place, arguing the importance of keeping children safe.

On 22 February 2021, PROCICAT, the government bureau in charge of policing COVID-19 measures, equalled school sport with federated sport and allowed UCEC county divisions to finally resume their activities acknowledging the inconsistence of stopping the normal functioning of school sport.

ORGANISATION OF THE STUDY

Setting and participants

The study was carried out between January and April 2021 with comprehensive news and literature review, and the participation of 44 UCEC county divisions in order to provide a clear view of the situation and 9 interviews to school sport professionals. Special attention to these leading figures was crucial in order to make a reasonable prospection on what is likely to be the situation in years to come.

Aims and hypothesis

The main aim was to analyse school sport situation after COVID-19 pandemic measures focusing on UCEC organisation as a main provider of this type of services across the region. The following dimensions were set in order to classify research findings:

1. County division's objectives and shared vision within the UCEC organisation.
2. Level of maintained activity during the pandemic period.
3. Restrictions' impact on daily basis activity and future provisions.
4. County divisions visibility, level of territorial impact within participants and general public.
5. Public administration relationship according to restrictions and perceived treatment.

The following hypotheses were established in order to examine the above research dimensions:

1. COVID-19 restrictive measures have reduced within 25% and 50% of School Sport activity.
2. COVID-19 restrictive measures have shown the need of reorganizing School Sport activity.
3. COVID-19 restrictive measures have shown the need of emphasizing UCEC attributions within Catalan Sports system.

METHODS

The data collection was set using a mixed method of both qualitative and quantitative instruments (Balcells et al., 2013). On one hand, a validated questionnaire using a representative sample, demonstrating adequate reliability and validity, was facilitated to all county divisions managers in order to collect data related to the second and third dimensions and with the will to provide a quantitative measurement of COVID-19 impact on county divisions. On the other hand, and after analysing the quantitative data provided, a prospective research was conducted under the form of 9 qualitative interviews administered to relevant leading professionals in order to recap more information about the particular situation of some county divisions and have a better understanding of their dissemination across the region.

OUTCOMES

The real impact of COVID-19

All county divisions members take part in school sport competition JEEC (Jocs Esportius Escolars de Catalunya) and the Catalan program for engaging sport in school placements called PCEE (Pla Català de l'Esport a l'Escola). If we look at the number of young athletes they provide to the school competition, we find that the majority (66% of all county divisions) provide less than 5.000 participants into the competition and only 34% have a significant impact of more than 5.000 participants during a school year. Due to the pandemic situation, we find that 36 out of 42 county divisions had more than 25% decrease in number of participants, being more than 50% in 14 of them. Only 6 county divisions had an impact below 25%. Most of the county divisions that had a lesser impact are those with lower participants in a regular season. This fact increases the overall decline of activity across the board.

The unknown, worrying insecurity and fear of not being able to continue with the planned activities after the pandemic measures taken were the most common feelings once the news about the lockdown arose in early March 2019. County division members struggled to offer activities back in that period as seen in the graphic below. Nine county divisions (more than 21% of the participants) stopped all the activities and did not provide any initiative, five other members provided activities reducing the number of participants (12% of the total participants). Social media was one of the most recurrent tools used during the peak of the pandemic stage as over 22 county division members (over 50% of the ones who answered the questionnaire) engaged in this type of channel to reach participants. The proposed activities ranged from virtual physical challenges to fitness sessions, and from physical activity routines to the need of emphasizing the aims of county division objectives. Online training for technical members and general population was another option chosen during the lockdown period. Two county divisions used this type of activity alongside 9 others.

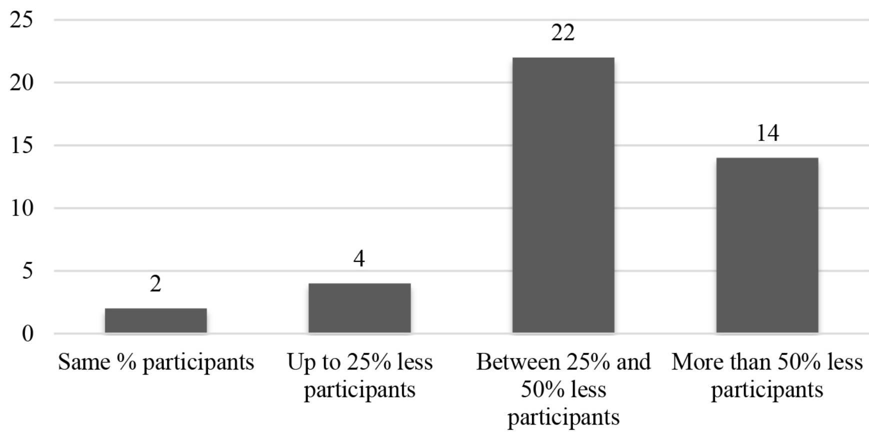

Figure 4. Participants decline between pre-COVID-19 season and COVID-19 season

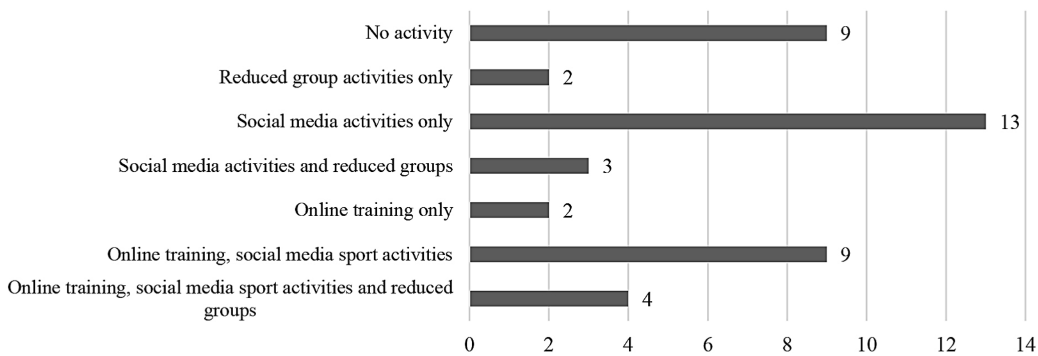

Figure 5. Type of preferred activities facilitated during the pandemic period

If we look at the sport disciplines affected, 37% of county divisions agreed that team sports were the most affected due to the social interaction involved in the activity, followed by 20% of UCEC members that saw no difference among disciplines, 14% of the answers recorded a big impact on multisport program, 12% experienced same level of disruption in team sports and individual sports, 11% in multisport and team sports, and finally only 6% of the total answers pointed out individual sports as the most affected discipline.

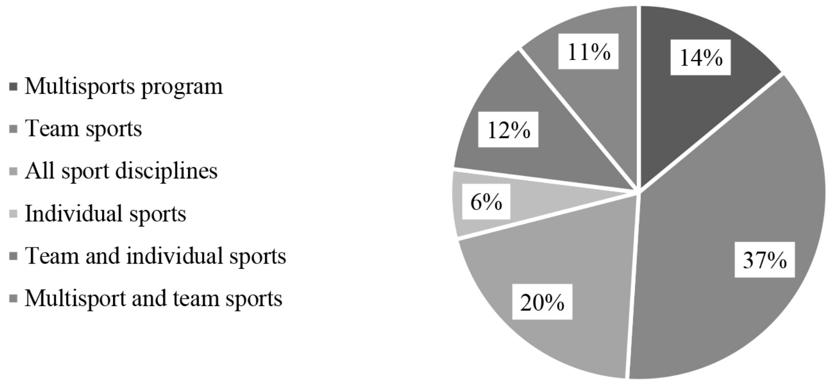

Figure 6. Most perceived disrupted programs and sport disciplines

When questioned about the perceived motivation of activity decrease after the COVID-19 restrictive measures, 12 county divisions responded that health fears were the most relevant reasons that families argued for stopping the sport activity of their children. Other 7 members believed that the economic situation was the key reason for not taking part in sport activity, as well as the lack of interest of families and children due to the restrictive measures in participating in sport competitions. At the end of the list, 2 UCEC members saw families change of priorities during the lockdown pandemic situation and grouping limitations that made the activity less appealing and motivating.

School Sport, new challenges and needed meaningful changes

Although UCEC county divisions were created in order to support school sport competitions in Catalonia, over the years they have adapted their objectives according to the managing territory. Therefore, we can find county divisions in small and less populated territories that have become the unique physical activity and sport facilitators as there are no other private or public organisations in charge of doing so. Regardless of size, many county divisions have seen the importance of promoting sports services outside the specific school sport provision and reaching more age groups. The need of generating more variated sport activity demands better sport facilities and specific funding from Catalan government and public organisations.

COVID-19 has forced county divisions to reinvent themselves and generalise the usage of social media to be close to the usual participants and the general public. Besides, the pandemic period has changed the perception about sport and physical activity in many areas of personal and social life, as well as the impact of inactivity in citizens' mental, emotional, and physical health. According to professionals, county divisions need to engage with this renewed interest in sport and increase the number of participants within the society. Although there is no clear evidence of the ultimate impact of COVID-19 in school sport in future years, professionals argue that there is a need of revising age group activities in order to face secondary education decline activity in favour of sedentarism and less interest in physical activity (Mera-Mamián et al., 2020). Asking youngsters about their preferred physical activities and avoid them from engaging with other social activities that can have a negative impact is another crucial future action to be taken in order to develop lifelong healthy habits (Marques et al., 2017).

The majority of the interviewed leading professionals have urged the need of redrawing the Catalan Sports System in order to highlight the importance of territorial knowledge and presence of UCEC organisation county divisions and set specific guidelines for all the other private and public organisations involved. According to territorial leaders, there is a need for increasing the presence of sport within the political and institutional debate, as well as providing more funding opportunities to be able to create a stronger system. There is a need of showing the importance of investing in sport and physical activity as a tool for preventing illnesses, creating a healthier society, and reducing the need of using public services such as doctors, hospitals, and drugs (Rodríguez, 1990).

CONCLUSIONS

Although further quantitative and qualitative research studies would be needed to incorporate information from Catalan government authorities and other public and private sport system key subjects such as UCEC, following the results reached during this research and in relation to the hypothesis raised at the beginning of the study we conclude that:

1. COVID-19 restrictive measures have reduced between 25% and 50% of School Sport activity. It is still to be seen if the decrease in school sport activities will be recovered over the following years. Particular measures will be needed in order

to tackle the situation of youngsters and adolescents from secondary education as the ones of major risk of abandoning school sport system.

2. COVID-19 restrictive measures have shown the need of reorganizing school sport activity. Most of interviewed leading professionals from school sport UCEC organisation clearly state that the school sport system must be prioritised and funded in order to secure its survival. The same professionals ask for a revision of objectives and strategies linked with territorial needs and demands.
3. COVID-19 restrictive measures have shown the need of emphasizing UCEC attributions within Catalan Sports system in order to protect the social view, the enhancement of sport values, the protection of equity and providing sport services to the most vulnerable citizens in Catalonia.

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ONLINE PHYSICAL EDUCATION CLASSES IN DIFFERENT TYPES OF SCHOOLS IN SLOVAKIA FROM THE PARENTS´ PERSPECTIVE

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ABSTRACT

Distance learning solutions were implemented during school closure to ensure continuity of education. Transition to online education significantly changed the teaching of school subjects, including Physical Education. The aim of the study is to increase the knowledge about physical activity and online physical education classes of students in primary and secondary schools from their parents´ perspective. The participants included 825 parents (women: 672; men: 153). A survey was conducted to collect data. The survey consisted of closed-ended questions. The closed-ended questions followed a Likert rating scale from 1 to 5. To determine a significant difference, the data were processed using chi-square test. The statistical significance was set at $p<.05$. The survey identified that majority of parents value physical education classes and they are interested in children´s participation in physical activities. The results of the survey do not correspond to opinion that Physical Education is not important from the parents´ perspective. There were no significant differences between parents in terms of type of school their child attends. The study is part of grant project research of Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Academy of science (VEGA) no. 1/0523/19.

Keywords: distance learning, COVID-19, physical activity, information and communication technologies

INTRODUCTION

The COVID - 19 pandemic has forced national governments to impose movement restrictions in an effort to eliminate the spread of the disease. Reduced movement restrictions also affected educational area. Traditional education transformed into online education (Coelho et al., 2020). Schools have their own forms of online teaching. From our point of view, inadequate attention is paid to Physical Education in primary and secondary schools in Slovakia. Movement restrictions significantly reduced physical activity of the population (Hossain et al., 2020). We consider it important to make physical movement part of children´s daily routine with the help of physical education teachers. Studies show that quarantine during COVID – 19 lockdown may significantly disrupt lifestyle activities, including participation in sport and physical activities (Oliviera Neto et al., 2020; Ammar et al., 2020b). We consider online physical education classes necessary to support children´s physical activity during COVID – 19 school closure. The current epidemiological situation supports the use of information and communication technologies. Mobile applications offer students different ways to learn, communicate and collaborate with each other. Modern technologies help to build students´ positive attitudes to lifelong physical activity (Smoleňáková, 2017). Physical education teachers should effectively integrate these technologies in their daily practice.

The curfew influenced physical activity participation among people and movement restrictions may result in decline in motor fitness. Low level of physical fitness reduces the body´s ability to cope with infections, immunological and cardiorespiratory complications (Bloch et al., 2020; Steinacker et al., 2020). The interruption of social relationships and movement restrictions can make children more vulnerable to boredom and anxiety (Coelho et al., 2020), and these factors are identified as risk factors for consuming foods with a low biological value (Adams, 2020).

Many parents are aware about the importance of active lifestyle, and they support physical activity of their children. According to Brockman et al. (2009) parents support children to participate in physical activities differently. The research also identifies factors related to lack of physical activity in families. The results show that time is the limiting factor to a family´s participation in physical activities. Children cope with social isolation and workload of parents. Therefore, school should ensure that children are provided with a range of opportunities to be physically active during this difficult period.

The aim of this study is to increase the knowledge about physical activity and online physical education classes of students in primary and secondary schools from their parents´ perspective.

MATERIAL AND METHODS

The survey was targeting parents of primary and secondary school students. A total of 825 responses were collected, including 672 (81.5%) from female respondents and 153 (18.5%) from male respondents. Nearly half of the survey responses (43.6%) were from parents aged between 41 – 45 years (see Table 1).

Table 1. The age of respondents

age (years)	n (%)	age (years)	n (%)
25 – 30	0.7 % (6)	51 – 55	5.2% (43)
31 – 35	5.2 % (43)	56 – 60	1.1% (9)
36 - 40	22.9 % (189)	61 – 65	0.4% (3)
41 – 45	43.6 % (360)	>65	0.1% (1)
46 – 50	20.7 % (171)		

According to parents´ highest level of education, the sample included respondents who held a university degree (n=446; 54.1%) and respondents who were high school graduates (n=375, 45.5%). Among survey respondents were also parents with no qualification (n=4, 0.5%). We focused on different types of schools. Among survey respondents were parents whose children attend primary school (n=474, 57.5%), eight-year grammar school (n=42, 5.1%), grammar school (n=128, 15.5%) and secondary vocational school (n=181, 21.9%). Among the 825 complete responses, 94.2% (n=777) participants reported that their children attend school in a city. Only 5.8% (n=48) children attend school in a village.

A survey was used to collect the data. The non - standardized questionnaire entitled "Importance and position of Physical Education in schools from the parents' perspective" was adapted to explore parents´ opinions on the teaching of Physical Education during the pandemic COVID-19 associated with the school closure. The questionnaire was converted to electronic form (Google Docs). The questionnaire consisted of closed-ended questions and followed a Likert rating scale from 1 to 5 (anchors: 5 = strongly agree, 4 = agree, 3 = undecided, 2 = disagree, and 1 = strongly disagree). The data were collected from January to February 2021 and were processed by statistical methods using software STATISTICA (StatSoft, version 12). To determine a significant difference, the data were processed using chi-square test. The statistical significance was set at $p<.05$.

RESULTS AND DISCUSSION

Opinions of primary and secondary school students´ parents on the teaching of Physical Education during the COVID - 19 pandemic is an important feedback for physical education teachers, school leaders and institutions that prepare future teachers. Parents´ opinions can positively affect the content and the way of teaching Physical Education even in this difficult period, which is characterized by social isolation of students.

Students´ attitude to Physical Education from their parents´ perspective

This section of questionnaire was focused on parents´ opinions on their children´s attitude to Physical Education. More than 90% of parents think that their child has a positive attitude towards this subject (see Table 2). A majority of participants (82%) reported that Physical Education is one of their children's favourite subjects in school (see Table 3). When asked how important Physical Education is to their children, almost 95% of parent sample ranked Physical Education as important part of children´s education (see Table 3). These results are different from survey results reported by Balga (2020) in which the largest number of teachers thought that parents consider Physical Education less important than other subjects.

Table 2. Students´ attitude to Physical Education from parents´ perspectives

	strongly agree	agree	undecided	disagree	strongly disagree
Σ (825)	52,2 % (431)	38,8 % (320)	3,5 % (29)	4,6 % (38)	0,9 % (7)
PS (474)	54,8 % (260)	36,7 % (174)	3,2 % (15)	5,3 % (25)	0 % (0)
8G (42)	61,9 % (26)	33,3 % (14)	4,8 % (2)	0%	0 % (0)
G (128)	51,6 % (66)	35,9 % (46)	4,7 % (6)	5,5 % (7)	2,3 % (3)
SVS (181)	43,6 % (79)	47,6 % (86)	3,3 % (6)	3,3 % (6)	2,2 % (4)
Note: Σ - sum value, PS – primary school, 8G – eight-year grammar school, G – grammar school, SVS – secondary vocational school					

Table 3. Children´s attitude to Physical Education and the importance of this subject from parents´ perspectives

	strongly agree	agree	undecided	disagree	strongly disagree
P.E. – important subject in education	54,2 % (447)	40,4% (333)	3,4 % (28)	0,9 % (8)	1,1 % (9)
P.E. – children´s favourite subject	36,7 % (303)	45 % (371)	8 % (66)	7,9 % (65)	2,4 % (20)

Most parents reported that their child has a positive attitude towards physical education classes. There were not statistically significant differences between parents in terms of type of school which their child attends. Only 3.5% of parents express themselves indifferently to the child's relationship to Physical Education. Balga and Antala (2015) examined the attitudes of girls to Physical Education in primary schools. When examining the data related to girls´ likes and dislikes about Physical Education, it was noted that 59.6% of girls had a positive attitude and 39% of girls had an indifferent attitude. The attitude probably changes over time because in the 9th grade of primary school 50.6% of girls reported an indifferent attitude and only 40.5% of girls reported a positive attitude. It may indicate that the students´ parents in our survey assessed the children´s attitude to Physical Education more positively than it is perceived by the students themselves.

Interruption of physical education classes due to COVID-19 pandemic

Parents took a different attitude to the interruption of physical education classes due to pandemic restrictions (see Table 4). Over 30% of parents indicated that they agreed with the interruption of physical education classes. Data indicated that a large group of parents (54%) did not agree with the interruption and 15% of parents could not express their opinion. There were no statistically significant differences between parents in terms of type of school their children attend.

Table 4. Interruption of physical education classes due to COVID-19 pandemic from the parents´ perspectives

	strongly agree	agree	undecided	disagree	strongly disagree
Σ (825)	8,5 % (70)	22,8 % (188)	15 % (124)	35 % (289)	18,7 % (154)
PS (474)	6,9 % (33)	22,2 % (105)	15,4 % (73)	35 % (166)	20,5 % (97)
8G (42)	7,1 % (3)	21,4% (9)	14,3 % (6)	40,5 % (17)	16,7 % (7)
G (128)	12,5 % (16)	19,5 % (25)	14,1 % (18)	40,6 % (52)	13,3 % (17)
SVS (181)	10 % (18)	27,1 % (49)	14,9 % (27)	29,8 % (54)	18,2 % (33)

Note: Σ - sum value, PS – primary school, 8G – eight-year grammar school, G – grammar school, SVS – secondary vocational school

Students´ physical activity during distance learning

The questionnaire also focused on parents´ opinions on their children´s physical activity during the school closure imposed by the COVID-19. The majority of parents (81%) reported that their children´s physical activity was significantly limited during distance learning (see Table 5). A number of parents (18%) indicated that their children´s physical activity was not limited. There were no statistically significant differences between parents in terms of type of school their children attend.

Table 5. Physical activity of my child is limited during distance learning

	strongly agree	agree	undecided	disagree	strongly disagree
Σ (825)	33,8 % (279)	47,5 % (392)	1 % (8)	14,1 % (116)	3,6 % (30)
PS (474)	36,1 % (171)	48,5 % (230)	0,8 % (4)	11,4 % (54)	3,2 % (15)
8G (42)	33,3 % (14)	47,7 % (20)	0 % (0)	11,9 % (5)	7,1 % (3)
G (128)	25 % (32)	49,3 % (63)	1,6 % (2)	18,6 % (24)	5,5 % (7)
SVS (181)	34,3 % (62)	43,6 % (79)	1,1 % (2)	18,2 % (33)	2,8 % (5)

Note: Σ - sum value, PS – primary school, 8G – eight-year grammar school, G – grammar school, SVS – secondary vocational school

Data related to the changes in children´s physical activity are consistent with Amar et al. (2020a) who focused on physical activity before and during the COVID - 19 pandemic. Amar et al. (2020a) reported that children's physical activity decreased whereas children's sedentary behaviour increased. 29% of respondents stated that they sat 6–8 hours per day. They revealed a disturbing trend that the number of children who sat more than 8 hours per day increased from 16% (before quarantine) to 40% (during quarantine).

These data support previous research by Tlučáková et al. (2016). In their survey of 750 secondary school students in Slovakia (305 boys and 445 girls) they found that during working days boys spent sitting an average of 6 hours 21 minutes, while girls spent sitting an average of 7 hours and 14 minutes per day. On weekends boys spent sitting an average of 5 hours and girls spent sitting an average of 5 hours and 30 minutes. The curfew and distance learning without physical education classes are risk factors for reducing physical activity and increasing sedentary behaviour at school age.

Insufficient physical activity of children, adolescents and adults is one of the risk factors for chronic diseases. According to statistics, the number of people who meet health recommendations for performing physical activities is significantly decreasing. One of the findings to come out of recent study by Tlučáková and Kačúr (2019) was the number of children who did not participate in physical activities. They reported that more than a third of boys and nearly half of girls in their survey of 712 students did not participate in any organized physical activities. Their findings also showed that school is the most stimulating environment for performing physical activities among underweight girls. Our findings are in direct contrast with Tlučáková and Kačur (2019). A majority of our respondents (60%) disagree with the statement that physical education classes are the only physical stimulus for their children (see Table 6). There were no statistically significant differences between parents in terms of type of school their children attend.

Table 6. Physical education classes are the only physical stimulus in child's daily routine

	strongly agree	agree	undecided	disagree	strongly disagree
Σ (825)	8,5 % (70)	26,9 % (222)	2,7 % (22)	44,3% (366)	17,6 % (145)
PS (474)	8 % (38)	25,1 % (119)	3,2 % (15)	46 % (218)	17,7 % (84)
8G (42)	7,2 % (3)	23,8 % (10)	0 % (0)	35,7 % (15)	33,3 % (14)
G (128)	5,5 % (7)	29,7 % (38)	1,6 % (2)	45,3 % (58)	17,9 % (23)
SVS (181)	12,2 % (22)	30,4 % (55)	2,8 % (5)	41,4 % (75)	13,2 % (24)
Note: Σ - sum value, PS – primary school, 8G – eight-year grammar school, G – grammar school, SVS – secondary vocational school					

Online physical education classes

In the last part of the questionnaire, we focused on online teaching of Physical Education. According to parents' reports, almost 60% reported that schools should provide online teaching of Physical Education as a supplement to regular teaching of Physical Education (see Table 7). Feelings of indifference were also prevalent to the responses. Over 20% of parents did not take a stand to this statement and about 15% of parents disagreed.

There were no statistically significant differences between parents in terms of type of school their children attend. From our point of view, there are many reasons of negative parents´ attitude towards online teaching. Some parents do not believe that online teaching can be beneficial. Another reason can be widespread apathy related to the COVID-19 pandemic situation. The interruption of education due to pandemic restrictions in Slovakia lasted from 30 March 2020 to 19 April 2021 with short breaks.

Table 7. Possibilities of online teaching of Physical Education (videos, textbooks, interesting facts) from the parents´ perspective

	strongly agree	agree	undecided	disagree	strongly disagree
Σ (825)	15,8 % (130)	47,8 % (394)	21,8 % (180)	12,2 % (101)	2,4 % (20)
PS (474)	16,9 % (80)	47,9 % (227)	20,7 % (98)	12 % (57)	2,5 % (12)
8G (42)	19 % (8)	45,2 % (19)	19,1 % (8)	14,3 % (6)	2,4 % (1)
G (128)	16,4 % (21)	48,4 % (62)	25,8 % (33)	7,1 % (9)	2,3 % (3)
SVS (181)	11,6 % (21)	47,5 % (86)	22,7 % (41)	16 % (29)	2,2 % (4)
Note: Σ - sum value, PS – primary school, 8G – eight-year grammar school, G – grammar school, SVS – secondary vocational school					

Table 8 shows information whether online physical education classes were being held during the interruption of education caused by the COVID-19 pandemic. Although online classes differ from traditional in-school Physical Education, 43% of parents reported that a physical education teacher used information and communication technologies to communicate with their children. More than 20% of parents did not report whether online physical education classes were being held. There is a possibility that online physical education classes were replaced by sending supplementary materials to students, so some parents did not have the opportunity to know that it was the teaching of Physical Education. Over 20% of parents confirmed that online physical education classes were not being held.

In a recent study Calcaterra et al. (2020) presented games, frequent, short-duration day-to-day tasks. In order to promote adherence to Physical Education, they suggested different games that should be chosen according to child´s personal preferences. Each school should offer students online physical education classes. Motivating students by teachers to engage in physical activity at least twice a week, even in isolation during quarantine, can be the step against sedentary behaviour. When asked how important Physical Education is to children, Narici et al. (2020) confirmed that in times of movement restrictions due to COVID – 19 pandemic it is important to interrupt long sitting with, for example, standing and seated exercises. It can significantly increase energy expenditure and support metabolic health.

Table 8. Parents' opinions on the statement: "My child's physical education teacher uses communication technologies to communicate with students during the distance learning (exchange of information, documents, assignment, etc.)"

	strongly agree	agree	undecided	disagree	strongly disagree
Σ (825)	13 % (107)	40,5 % (334)	21,9 % (181)	17,7 % (141)	7,5 % (62)
PS (474)	10 % (47)	37,6 % (179)	21,1 % (100)	22 % (104)	9,3 % (44)
8G (42)	19,1 % (8)	38,1 % (16)	16,7 %(7)	19 % (8)	7,1 % (3)
G (128)	22,7 % (29)	46,1 % (59)	21,1 % (27)	6,2 % (8)	3,9 % (5)
SVS (181)	12,7 % (23)	44,2 % (80)	26 % (47)	11,6 % (21)	5,5 % (10)

Note: Σ - sum value, PS – primary school, 8G – eight-year grammar school, G – grammar school, SVS – secondary vocational school

Table 8 shows that 40% of parents of primary school students confirmed the use of information and communication technologies for online teaching. But over 30% of parents of primary school students reported that their physical education teacher did not use information and communication technologies, so we assume that online physical education classes were not being held. On the contrary, 70%

of parents of students attending grammar schools and 60% of parents of students attending secondary vocational schools reported online teaching of Physical Education. Table 9 shows the statistically significant differences between parents in terms of type of school their children attend.

The results of the survey revealed that transition to the online mode of the teaching-learning process in Physical Education in Slovakia was not so successful. There are people who believe that information and communication technologies should be a part of Physical Education and there are others who believe technologies should not be implemented in Physical Education. Even though information and communication technologies are a part of our lives, their potential is not used (Gonzáles et al., 2016).

Table 9. The significance of differences in parents' opinions on the use of communication technologies for communication between teacher and students during distance learning

	PS	**8G**	**G**	**SVS**
	χ^2 / p	**χ^2 / p**	**χ^2 / p**	**χ^2 / p**
PS	X	1,39 / 0,498	25,30 / **0,00***	13,12 / **0,00***
8G	1,39 / 0,498	X	6,72 / 0,035	2,70/ 0,259
G	25,30 / **0,00***	6,72 / 0,035	X	5,00 / 0,089
SVS	13,12 / **0,00***	2,70/ 0,259	5,00 / 0,089	X
SVS (181)	12,7 % (23)	44,2 % (80)	26 % (47)	11,6 % (21)

Note: Σ - sum value, χ^2 - chi-square test, PS – primary school, 8G – eight-year grammar school, G – grammar school, SVS – secondary vocational school

There is evidence that information and communication technologies increase student´s motivation, confidence, and engagement in education process (Blamire, 2009). The support of information and communication technologies, such as fitness applications (Ammar et al., 2020a) can significantly support the motivation to physical activities. Modern technologies can enhance cooperative learning, project-based learning, and problem-based learning (OECD, 2015). The epidemiological situation provided opportunity for more effective involvement of modern technologies in the teaching process of Physical Education, but some schools and teachers were not able to take this opportunity. However, the use of technologies such as mobile phones or the Internet is part of children's lifestyles, therefore we should use new technologies in teaching Physical Education and contribute to its attractiveness (Antala & Masarykova, 2020).

Online physical education classes also took the form of sending videos that motivated students to exercise during the day. We focused on the parents´ opinion on the appropriateness of this method of teaching (see Table 10). Parents are aware of the importance of children's physical activity. More than 70% would accept videos containing exercises as part of online physical education classes. Taking into consideration that more than 80% of parents experienced a significant reduction in physical activity during a pandemic, this form of teaching could be beneficial. There were no statistically significant differences between parents in terms of type of school their children attend.

Table 10. Online teaching of Physical Education using video technology during the distance learning from parents´ perspective

	strongly agree	agree	undecided	disagree	strongly disagree
Σ (825)	20,2 % (167)	55,4 % (457)	11,9 % (95)	9,6 % (79)	2,9 % (24)
PS (474)	18,8 % (89)	57,4 % (272)	9,5 % (45)	11,2 % (53)	3,1 % (15)
8G (42)	19 % (8)	54,8 % (23)	9,5 % (4)	11,9 % (5)	4,8 % (2)
G (128)	24,2 % (31)	52,3 % (67)	16,4 % (21)	5,5 % (7)	1,6 % (2)
SVS (181)	21,5 % (39)	52,5 % (95)	15,5 % (28)	7,7 % (14)	2,8 % (5)

Note: Σ - sum value, PS – primary school, 8G – eight-year grammar school, G – grammar school, SVS – secondary vocational school

Implementation of online physical education classes is also difficult due to the absence of interaction between teachers and students (Meyer Payton, 2000). From a physiological point of view, important indicators of the teaching effectiveness are heart rate and volume of physical activity in total teaching time. We were interested in parents´ opinion whether their children can measure and control the intensity of physical activities (see Table 11). More than 60% of parents indicated that their children could control the intensity and ensure the effectiveness of exercise. There were no statistically significant differences between parents in terms of type of school their children attend.

Table 11. The ability of children to regulate the intensity of exercise from parents´ perspective

	strongly agree	agree	undecided	disagree	strongly disagree
Σ (825)	12,4 % (102)	50,5 % (417)	26,1 % (215)	8,3 % (69)	2,7 % (22)
PS (474)	10,3 % (49)	49,4 % (234)	27 % (128)	10,1 % (48)	3,2 % (15)
8G (42)	26,2 % (11)	35,7 % (15)	26,2 % (11)	4,8 % (2)	7,1 % (3)
G (128)	16,4 % (21)	55,5 % (71)	21,9 % (28)	4,7 % (6)	1,5 % (2)
SVS (181)	11,6 % (21)	53,6 % (97)	26,5 % (48)	7,2 % (13)	1,1 % (2)

Note: Σ - sum value, PS – primary school, 8G – eight-year grammar school, G – grammar school, SVS – secondary vocational school

It is necessary to mention that exercise intensity is not the most important factor in online teaching of Physical Education. Research by McManus (2012) explored that there were no differences between children of normal weight and obese children in the performance of medium or high-intensity exercises. The difference in the total daily energy expenditure is represented by physical activities with a low intensity.

CONCLUSION

Physical education centres on physical activity and is clearly distinct from general knowledge-based subjects. The research results suggest that parents of primary and secondary school students do not consider Physical Education less important than other school subjects and parents are interested in children´s physical activity. It does not correspond to general opinions that Physical Education is not important from the parents' perception. Parents also think that Physical Education should be part of online education during distance learning. Technologies and social media support an active lifestyle, so they should be used in education. From our point of view, social interaction is essential to every aspect of our health. In online lessons, a group of students can practice together. Students can be more motivated to perform exercise given by the teacher. In this situation, Physical Education should play an important role in supporting students´ physical and mental health. Although online physical education classes may require enough space and material equipment to effectively take part in physical activities, they should be a part of education of young people. The role of schools is to ensure the quality of the teaching process, to adapt to the situation and to fulfil the goals set by the state educational program ISCED at individual levels of schools.

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THE PAST, THE PRESENT AND THE POSSIBLE FUTURE. THE PHYSICAL INACTIVITY OF POLISH STUDENTS DURING THE COVID-19 PANDEMIC AND ITS IMPACT ON HEALTH

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ABSTRACT

The ongoing and everchanging situation caused by the global pandemic related to the Sars-Cov-2 virus has influenced the health condition of many people throughout the world. Something it has also affected is the participation rates of individuals of all ages in physical activity (PA). This study is an analysis of PA among Polish male and female students before and during the pandemic. Additionally, based on conducted analysis, the possible health consequences of increasing sedentary habits among young people due to the pandemic is discussed. The health-related outcome of the pandemic, resulting from social isolation, is also highlighted.

Keywords: physical activity, physical inactivity, student, COVID-19 pandemic

INTRODUCTION

The COVID-19 pandemic, present since March 2020, is a phenomenon that has led to a healthcare crisis in many countries, with Poland being one of them. Along with the pandemic being announced in the Republic of Poland by the government on 20 March 2020 (by Ordinance of 20 March 2020), various restrictions were introduced to inhibit the spread of the virus. The implemented restrictions have become a serious challenge for modern society. Due to the dynamic circumstances of the pandemic, many public facilities such as schools, shops, gyms, parks, and recreation areas were closed, which resulted in limitations to everyday life. Social isolation and social distancing were also introduced by law to combat the spread. Each of these elements contributed to changes in people's functioning at various levels, such as a decrease in PA among children and youth. The aim of this study was to review various scientific research studies regarding the impact of physical inactivity on health among children and adolescents as a result of the COVID-19 pandemic.

Physical activity among children and adolescents before and during the pandemic

The problem of physical inactivity has been an ongoing issue even prior to the pandemic. The world has been dealing with so-called physical inactivity or insufficient PA for many years. The scale of the problem is so significant that in 2012 the WHO referred to it as pandemic (Hall et al., 2020). It is claimed that low PA leads, either indirectly or directly, to a high death rate, especially in developed countries (Zapała et al., 2015). According to the Global Matrix 3.0 report, the level of PA in societies is unsatisfactory and constitutes to be the fourth highest mortality factor in the world (Aubert et al., 2018). Thus, physical inactivity is often referred to as "long-term suicide". However, one must bear in mind that physical inactivity does not constitute a direct cause of the disease, whereas it serves as a factor leading to it. Pursuant to the guidelines of the World Health Organization, children and adolescents should involve themselves in moderate to intensive PA, mainly aerobic, for at least 60 minutes every day (WHO, 2020a).

According to available research, Polish students do not meet the PA recommendations. The results published by the Institute of Mother and Child in 2018 indicate that only 15.6 % of students between the ages of 10-19 participate in PA of moderate intensity for minimum 60 minutes per day (Fijałkowska et al., 2018). The insufficient level of PA among young Polish male and female students was also evident in the results of the international research Global Matrix 3.0 (Aubert et al., 2018). According to its indications, approximately only 20% of Polish children meet the criteria of minimum daily PA. When referred to a grading scale from A to F, Poland, along with Germany, Estonia, and Denmark, was classified as D on the scale. Moreover, comparable research in 2016 showed a decrease in the level of PA among children and adolescents in Poland (Aubert et al., 2018). In the said report it was also highlighted that only 19% of Polish children participate in sport club activities outside of school (Zembura et al., 2018). Based on the collected data, it might be concluded that insufficient PA among children and adolescents in Poland as well as around the world has become a common phenomenon. In order to hinder its effects, the World Health Organization developed a global plan with the aim to increase PA by 15% by the year of 2030 (WHO, 2020b). However, this process was greatly hindered by the outbreak of COVID-19 and the development of the pandemic which, in an extremely short period of time, managed to paralyze the regular function of many countries, including Poland, and increased the risk of a higher percentage of people whose PA level is insufficient. Once the pandemic started, the Polish government implemented a set of restrictions and limitations to everyday life to halt the spread of the virus. Among the decisions, the government temporarily closed public places, including sport fields, swimming pools, and schools. Closure of school facilities was one of the most vital, yet controversial measures taken by the Polish authorities. It involved shifting from the traditional form of education to distance learning. Additionally, the prohibition of traveling and movement was introduced, people were only allowed to perform activities connected with essential duties which included use of healthcare or buying necessary food. These limitations particularly affected children and adolescents. Among the implemented restrictions, children and adolescents up to 16 years old were prohibited to leave their house without the supervision of an adult. The restriction applied from Monday to Friday from sunrise until 4:00pm. It was introduced at the end of October 2020 and revoked for the Christmas period, then re-introduced in January 2021 (MNiSW, 2020). Due to the restriction, children and adolescents lost the possibility of spending time outdoors. Thus, children were deprived of the possibility to play outside, participate in PE classes, or do sporting activities. Although all the decisions made by the government were to inhibit the increase of viral infections, at the same time there was a significant negative impact on the physical condition and level of PA among Polish children and adolescents. The possibility of active transport among students, their participation in obligatory PE classes and/or active outdoor leisure became limited. This was noticeable in the research conducted in 10 EU member states, including Poland. According to this research, two months after the outbreak of the COVID-19, PA participation levels diminished and 81% of students at the age of 6-18 did not adhere to the recommended daily amount of PA (Kovacs et al., 2021).

The onset of health consequences as a result of lockdowns in Poland

The above-mentioned decisions made by the Polish government have led to a set of serious health-related consequences for young people. The closure of public places, particularly those offering the possibility of PA, as well as of school facilities has resulted in a situation with increased risk on health problems and the development of chronic diseases.

During the pandemic it has been observed that vigorous PA has been replaced by activities of lower or more moderate intensity (Kovacs et al., 2021). As part of PE, sport training, and spontaneous open-air activity, adolescents were usually able to participate in PE of a vigorous intensity. Nowadays, due to the closure of school facilities and the temporarily suspended operations of sport facilities and clubs, adolescents have been forced to replace their usual forms of exercise with walks and other activities that enable them to engage in activities that increase their heart rate. Not being able to exercise at a moderate to vigorous intensity contributes to a higher risk of problems in relation to cardiovascular endurance, a problem that may even occur in the case of an unchanged volume of PA (Kovacs et al., 2021).

Another outcome of the pandemic is the increase in the so-called sedentary lifestyle among individuals. According to statistics, 80% of children in Poland live a sedentary lifestyle (Aubert et al., 2018). Now, due to distance learning at all levels of education and participation in online classes becoming mandatory, students are exposed to longer sitting times and screen times. According to surveys conducted by the Polish Foundation of Health Education and Psychiatry in February 2020, Polish adolescents would spend an average of 5 hours a day in front of a screen. However, in May of the same year, the reported average increased to 9 hours per day. Along with more time spent in front of screens, 62% of young people also reported sleep problems. What is more, such a remote style of learning has caused a deregulation of the students' daily cycle (Etat w sieci. Raport, 2020). Due to the lack of everyday routines such as morning hygiene, commuting to school, and participation in classes, a majority of adolescents have started to sleep during the day, which also resulted in their absence during morning classes (Buchner & Wierzbicka, 2020). Research shows that such a drastic change in an individual's lifestyle has a serious impact on their health. It has been proven that low level of physical effort, as well as long periods spent in bed with low levels of muscle activity, favours the development of cardiac atrophy and dysfunction, luminal narrowing of peripheral vessels and arterial stiffening. Just 3 to 6 hours of continuous sitting position may result in a significant deterioration of vascular functions (Peçanha et al., 2020). Additionally, a sedentary lifestyle contributes to fast loss of muscular mass and strength, especially antigravity muscles which are responsible for maintaining an upright body position, motion of desired quality, and body balance. This leads to a condition called paediatric dynapenia which is a muscular condition present in children with low levels of muscular strength (Faigenbaum et al., 2018). It has also been indicated that a lack of sufficient PA has a deteriorating impact on neuromuscular junctions and neural connections (Narici et al., 2020). Other effects of chronic physical inactivity involve various types of degeneration and pain, bad posture, or impairment of vision. Low PA levels and short amounts of time spent outdoors, something that has been evident in the pandemic, have been declared as one of the main factors favouring development of short-sightedness among children (Wang et al., 2021).

The pandemic has also changed the eating habits of children and adolescents that may lead to being overweight and suffering from obesity. Obesity is an issue that public healthcare had already struggled with before the pandemic. According to research, the percentage of Polish students aged 11, 13 and 15 being overweight increased by 2% in the period from 2014 to 2018 (Mazur & Małkowska-Szkutnik, 2018). Moreover, in accordance with WHO standards, almost 1/3 of Polish 8-year-olds are overweight or obese (Fijałkowska et al., 2018). During the pandemic and the related long-term isolation at home, a tendency of buying preserved food with long shelf-life has been observed. Among the most popular phrases input by Internet users during 2020 were: yeast, flour, rice (Popielewicz, 2020). Additionally, children's daily cycles have been disrupted and as a result the children are more likely to become involved in unhealthy behaviour and eating habits (Kovacs et al., 2021). Furthermore, children and adolescents, not only in Poland, have begun to stress-eat by consuming more easily accessible but also high-calorie meals and food, such as candy and sweet beverages (Pietrobelli et al., 2020). This behaviour inevitably influences an uncontrolled increase of body weight among children and adolescents. It is especially dangerous in the current circumstances of the pandemic since it is claimed that the child obesity rate will continue to grow proportionately in relation to the number of months that distance learning is a mandatory requirement (Cuschieri & Grech, 2020). As a result, the said tendency may increase the risk of contracting the virus and even lead to complications and hospitalization (Tsenolia et al., 2021).

Another outcome of the pandemic is the increase in mental health issues recorded among children and adolescents. While the suspension of school classes has already lasted for almost a year, Polish students have started to feel angry, frustrated, and overwhelmed. This being because of the lack of skills to cope with social isolation, no direct contact with other people, or distance between friends because of online education. Almost 70% of adolescents feel more nervous and irritated since the start of the pandemic (Etat w sieci. Raport 2.0, 2021). This situation leads to increased risk of depression which is something that is drastically increasing among young people. This has been proved by surveys presented in a report titled "Distance education during the pandemic. 2nd Edition", according to which social isolation contributed to the escalation of earlier mentioned problems that students have struggled with (Buchner & Wierzbicka, 2020).

SUMMARY

The COVID-19 pandemic has become an indirect factor that led to further development of pre-existing problems. Although the implemented restrictions successfully hinder the spread of the virus, the consequences resulting from restrictions such as the closure of schools, lockdowns, and the travel bans have negatively influenced the function of children and adolescents. Even though most young people have managed to avoid health problems connected with the virus, they are at risk of other health problems that might have developed and continue to develop for many years. Decreased intensity of PA, more sedentary lifestyles, more hours spent in front of screens and the deterioration of food habits are just examples of factors that pose a real threat connected with serious health issues. The pandemic will end one day, but the pandemic of physical inactivity will still be a problem for many years to come. In such situation, it is important to undertake the action required to increase PA levels in young people, especially whilst the pandemic is still ongoing. Parents, schools, and governing authorities should be encouraged to use robust preventive measures which should include the promotion of a structured daily routine, active online PA, and a particular encouragement in outdoor activity (Kovacs et al., 2021). Only such an active approach will be able to successfully minimize the health consequences that might affect future generations of young people as a result of the pandemic.

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THE IMPACT OF COVID-19 LOCKDOWN ON MALAYSIAN TRAINEE TEACHERS' ATTITUDES AND PARTICIPATION MOTIVATION TOWARDS PHYSICAL ACTIVITY

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ABSTRACT

INTRODUCTION: Physical inactivity has become a global concern which has pronounced changes that can severely challenge trainee teachers as a large proportion of them are still adopting to sedentary lifestyles that have further escalated their risks of morbidity during the COVID-19 lockdown. The focus on trainee teachers is crucial due to the fact that being physically active at this stage is crucial to sustain moderate to high levels of physical activity (PA) at adulthood and it can have a favourable effect on public health and school children (Telama, 2009). This study examined the impact of COVID-19 lockdown on Malaysian trainee teachers' attitudes and participation motivation towards physical activity. **METHODS:** The participants in the study were 260 undergraduate trainee teachers (72 males and 188 females) with a mean age of 18.10 + .45 years. The Attitude towards Physical Activity Scale (APAS; Mok et al., 2015) and Physical Activity and Leisure Motivation

Scale (PALMS: Keyvan, Morris & Khoo, 204) were utilised to measure the attitudes and participation motives. Description analysis and two-way ANOVA were utilised. **RESULTS:** In APAS, there were no statistically significant interaction between the effects of ethnicity (Malay versus Non-Malay) x gender (Male vs Female) between subjects ANOVA for benefits, importance, and self-efficacy. However, there was significant effect of gender on fun [F (1,256) = 4.56, *p* = 0.03], fitness [F (1,256) = 15.38, *p* = 0.00] and personal best [F (1,256) = 5.25, *p* = 0.02]. Whereas, for PALMS, there were no statistically significant interaction between the effects of ethnicity (Malay versus Non-Malay) x gender (Male vs Female) between subjects ANOVA for mastery, physical condition, psychological condition, affiliation, appearance, and enjoyment. However, there was significant effect of ethnicity on competition/ego [F (1,256) = 12.37, *p* = 0.00] and interaction between gender and race [F (1,256) = 3.92, *p* = 0.05]. In addition, there was significant effect of ethnicity on others' expectations [F (1,256) = 4.79, p = 0.03]. **CONCLUSION:** The promotion of physical activity interventions should address a range of behavioural determinants that can engage and sustain health-related behaviour change which favour active lifestyle over time.

Keywords: Trainee teachers, attitudes, participation motivation, physical activity

INTRODUCTION

With the COVID-19 pandemic engulfing the world into a global health crisis, the world has been isolated in terms of lockdown that has affected people across the globe. Though the lockdown has been utilised as the most effective measure across the globe to stop and contain the spread of COVID-19, it has alarming consequences on people's lifestyle in terms of reduced physical activity and inappropriate diet which have affected the physical and psychological health of the population globally (Ammar et al., 2020a, Varshney et al., 2020). Before the COVID-19 pandemic, one of the major contributors to non-communicable diseases has always been physical inactivity which has accounted for 41 million death per year globally (GBN, 2015) and an estimated 20,786 deaths in 2017 in Malaysia. The World Health Organisation (WHO, 2018) also showed that 81% of adolescents and 23% of adults did not meet the World Health Organisation global recommendations on PA for health (López-Valenciano et al., 2020). Whereas, in Malaysia, there has been a growing rate of PA which has contributed to 25.1% of Malaysians being physically inactive that accounted to 16.4% of deaths (Lee et al., 2012; NHMS, 2019; Khoo et al., 2020).

The COVID -19 pandemic which has confined people has led to a decrease in the levels of physical activity which has impacted the health and quality of life negatively for a long period of time. This has discouraged people in engaging in PA leading to a sedentary life, which also includes university students. Studies have found that the prevalence of inactivity among university students in 23 countries was 41% during the transition throughout the university years (Pengpid et al. 2015; Pullman et al., 2009). In Malaysia, the implementation of the Movement Control Order (MCO), the Conditional Movement Control (CMCO) and Recovery Movement Control Oder (RMCO) implemented throughout 2020 which has resulted in the increase in sedentary behaviour has affected the levels of PA among undergraduates in the Institute of Teacher Education campuses and universities. Though the trainee teachers have embraced new challenges of learning and teaching in times of COVID -19 pandemic, their physical and mental health need to be taken care of, as expectations will weigh heavily on them, not only when they are in the institute, but in the schools eventually.

In light of the challenges posed by the crisis towards the teaching profession, it is essential to know their attitudes and participation motivation of their adapted physical activities in order to mitigate and buffer the trainee teachers' sedentary behaviours working toward a better quality of life during the lockdown and confinement. Currently, no empirical studies in Malaysia have been found in examining the trainee teachers' attitudes and participation motivation towards physical activity during the COVID -19 pandemic which could have an impact on their health and mental well-being. The education support report (2020) revealed that the trainee teachers' mental health and well-being had declined due to COVID -19 pandemic which could be due to the lack of physical inactivity leading to sedentary behaviours and anxiety (Chen et al., 2020). Therefore, it is of the utmost importance to examine the impact of COVID -19 lockdown on the trainee teachers' attitudes and motivation as a determinant in their participation in physical activity to support their overall health and mental wellbeing.

METHODS

Participants

This is a cross-sectional study which was conducted online using Google form platform. There were 260 participants (males, *n* = 72; females, *n* = 188) - undergraduate trainee teachers between 18 and 23 years of age (18.11 + .45) from the Institute of Education Campus in Malaysia. The participants had given their verbal consent voluntarily with the assurance of anonymity. The study was approved by the Institutional Ethics Committee in accordance with the Helsinki Declaration.

Table 1. Socio-demographic variables of the participants (N = 260)

Characteristics	Frequency (F)	Percentage (%)
Gender		
Male	72	27.7
Female	188	72.3
Age		
17	14	5.4
18	204	78.5
19	42	16.2
Ethnicity		
Malay	154	59.2
Non-Malay	106	40.8

Table 1 shows the socio-demographic characteristics of the participants. A total of 260 students participated in the study comprising of 72 (27.7%) males and 188 (72.3%) females. The age group categories showed that 14 (5.4%) of the participants were 17 years old, 204 (78.5%) were 18 years old, and 42 (16.2%) were 19 years old. In terms of ethnicity, the majority of the participants were Malay with a total of 154 (59.2%), followed by non-Malay with a total of 106 (40.8%).

INSTRUMENTS

The instruments utilised were the Attitude toward Physical Activity Scale (APAS: Mok et al., 2015) and Physical Activity and Leisure Motivation Scale (PALMS-40: Molanorouzi et al., 2014). The APAS measures the attitudes and perceptions regarding various aspects of engagement in PA. The APAS consists of 58 items which make up seven subscales that measure benefits (10 items), importance (5 items), self-efficacy (4 items), learning (11 items), fun (14 items), self-confidence on physical fitness (8 items) and personal best (5 items). The items were rated on a 4-point Likert scale ranging 1 (strongly disagree), 2 (disagree), 3 (agree) and 4 (strongly agree). The internal consistency of APAS was high with an alpha value of .96. Whereas, the subscales of benefits (.88), importance (.76), learning (.89), self-efficacy (.73), fun (.91), fitness (.91) and personal best (.90) also demonstrated adequate consistency.

The second instrument, which is the Physical Activity and Leisure Motivation Scale (Molanorouzi et al., 2014), was utilised to measure the participants' motives in physical activity. It comprised of 40 items that measure participation in sports and physical activity. There are eight subscales comprising of mastery, enjoyment, psychological condition, physical condition, appearance, others' expectations, affiliation, competition/ego, which are attributes of intrinsic and extrinsic motivation. There are 5 items in each of the eight subscales rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The PALMS have shown acceptable factor structure, internal consistency (.78 to .82), test-retest reliability (.78 to .94) and criterion validity that can be applied in the physical activity contexts (Molanorouzi et al., 2015a, 2015b). In this study, the PALMS also demonstrated adequate internal consistency for all the subscales; mastery (.90), physical condition (.94), psychological condition (.90), affiliation (.85), appearance (.87), enjoyment (.90), competition/ego (.76), others' expectation (.61) and overall (.90).

DATA ANALYSIS

Descriptive analysis and two-way ANOVA was used to examine the interaction between gender and age groups on APAS and PALMS.

RESULTS

Table 2. Main effects of gender and ethnicity of APAS

Variables	Gender			Ethnicity			Gender vs Race
	M	F	p	Malay	Non-Malay	p	p
Benefits	4.35	4.22	.13	4.25	4.32	.46	.79
Importance	4.17	4.07	.28	4.11	4.13	.86	.81
Learning	3.15	3.28	.28	3.20	3.23	.80	.32
Self-efficacy	3.74	3.59	.16	3.67	3.66	.93	.72
Fun	4.20	3.98	.034*	4.13	4.05	.46	.62
Fitness	3.99	3.59	< .001*	3.80	3.78	.80	.91
Personal best	4.25	4.01	.023*	4.10	4.15	.64	.90

*p < .05

Table 2 shows the two-way ANOVA for APAS based on gender and ethnicity. The between-subjects ANOVA for benefits showed that there was no significant main effect of gender, F (1, 256) = 2.31, p = .13, η_p^2 = 0.009, and ethnicity, F (1, 256) = 0.46, p = .46, η_p^2 = 0.002. Also, there was no statistically significant interaction between gender × ethnicity, F (1, 256) = 0.07, p = .79, η_p^2 < 0.001 for benefits. The between-subjects ANOVA for importance showed that there was no significant main effect of gender, F (1, 256) = 1.20, p = .28, η_p^2 = 0.005, and ethnicity, F (1, 256) = 0.03, p = .86, η_p^2 < 0.001. Meanwhile, there was no significant interaction between gender × ethnicity, F (1, 256) = 0.06, p = .81, η_p^2 < 0.001 for importance. The between-subjects ANOVA for learning showed that there was no significant main effect of gender, F (1, 256) = 1.16, p = .28, η_p^2 = 0.004, and ethnicity, F (1, 256) = 0.06, p = .80, η_p^2 < 0.001. At the same time, there was no statistically significant interaction between gender × race, F (1, 256) = 1.00, p = .32, η_p^2 = 0.004 for learning. The between-subjects ANOVA for self-efficacy showed that there was no significant main effect of gender, F (1, 256) = 2.02, p = .16, η_p^2 = 0.008, and ethnicity, F (1, 256) = 0.01, p = .93, η_p^2 < 0.001. In addition, the interaction between gender × ethnicity, F (1, 256) = 0.13, p = .72, η_p^2 = 0.001, was not significant for self-efficacy. The between-subjects ANOVA for fun showed that there was statistically significant main effect of gender, F (1, 256) = 4.56, p = .034, η_p^2 = 0.018, yet no significant main effect of ethnicity, F (1, 256) = 0.55, p = .46, η_p^2 = 0.002. Also, there was no significant interaction between gender × ethnicity, F (1, 256) = 0.24, p = .62, η_p^2 = 0.001 for fun. The between-subjects ANOVA for fitness showed that there was statistically significant main effect of gender, F (1, 256) = 15.38, p < .001, η_p^2 = 0.057, but no significant main effect of ethnicity, F (1, 256) = 0.06, p = .80, $\eta_p^2 < 0.001$. Moreover, there was no significant interaction between gender × ethnicity, F (1, 256) = 0.01, p = .91, $\eta_p^2 < 0.001$ for fitness. The between-subjects ANOVA for personal best showed that there was statistically significant main effect of gender, F (1, 256) = 5.25, p = .023, $\eta_p^2 = 0.020$, whereas no significant main effect of ethnicity, F (1, 256) = 0.22, p = .64, $\eta_p^2 = 0.001$. Additionally, the interaction between gender × ethnicity, F (1, 256) = 0.02, p = .90, $\eta_p^2 < 0.001$, was not significant for personal best.

Table 3. Pairwise comparison of gender for APAS

Variables	μ Difference	*p*	95% Confidence Interval for Difference	
			Lower Bound	Upper Bound
		Benefits		
M vs F	0.13	.13	-0.04	0.30
		Importance		
M vs F	0.10	.28	-0.08	0.29
		Learning		
M vs F	-0.13	.28	-0.38	0.11
		Self-efficacy		
M vs F	0.15	.16	-0.06	0.36
		Fun		
M vs F	0.22	.03*	0.02	0.41
		Fitness		
M vs F	0.40	< .001*	0.20	0.60
		Personal best		
M vs F	0.24	.02*	0.03	0.44
		**p* < .05		

Results revealed that post-hoc Bonferroni adjusted comparisons for fun indicated that males rated 0.22 point higher than females, $p = .03$, 95% CI [0.02, 0.41]. Moreover, post-hoc Bonferroni adjusted comparisons for fitness indicated that males rated 0.40 point higher than females, $p < .001$, 95% CI [0.20, 0.60]. In addition, post-hoc Bonferroni adjusted comparisons for personal best indicated that males rated 0.24 point higher than females, $p = .02$, 95% CI [0.03, 0.44].

Table 4 shows the two-way ANOVA for APAS based on gender and age group. The between-subjects ANOVA for benefits showed that there was no significant main effect of gender, F (1, 254) = 0.90, p = .34, $\eta_p^2 = 0.004$, and age group, F (2, 254) = 0.74, p = .48, $\eta_p^2 = 0.006$. Also, there was no significant interaction between gender × age group,

$F(2, 254) = 0.06$, $p = .95$, $\eta_p^2 < 0.001$ for benefits. The between-subjects ANOVA for importance showed that there was no significant main effect of gender, $F(1, 254) = 1.66$, $p = .20$, $\eta_p^2 = 0.007$, and age group, $F(2, 254) = 1.44$, $p = .24$, $\eta_p^2 = 0.011$. Besides, there was also no significant interaction between gender × age group, $F(2, 254) = 0.42$, $p = .66$, $\eta_p^2 = 0.003$ for importance. The between-subjects ANOVA for learning showed that there was no significant main effect of gender, $F(1, 254) = 0.02$, $p = .88$, $\eta_p^2 < 0.001$, and age group, $F(2, 254) = 0.51$, $p = .60$, $\eta_p^2 = 0.004$. Additionally, there was no significant interaction between gender × age group, $F(2, 254) = 0.17$, $p = .84$, $\eta_p^2 = 0.001$ for learning. The between-subjects ANOVA for self-efficacy showed that there was no significant main effect of gender, $F(1, 254) = 3.68$, $p = .06$, $\eta_p^2 = 0.014$, and age group, $F(2, 254) = 0.24$, $p = .79$, $\eta_p^2 = 0.002$. Equally, there was also no significant interaction between gender × age group, $F(2, 254) = 0.89$, $p = .41$, $\eta_p^2 = 0.007$ for self-efficacy. The between-subjects ANOVA for fun showed that there was statistically significant main effect of gender, $F(1, 254) = 7.49$, $p = .007$, $\eta_p^2 = 0.029$, yet no significant main effect of age group, $F(2, 254) = 0.40$, $p = .67$, $\eta_p^2 = 0.003$. Moreover, there was no significant interaction between gender × age, $F(2, 254) = 1.01$, $p = .37$, $\eta_p^2 = 0.008$ for fun. The between-subjects ANOVA for fitness showed that there was statistically significant main effect of gender, $F(1, 254) = 13.02$, $p < .001$, $\eta_p^2 = 0.049$, while no significant main effect of age group, $F(2, 254) = 0.34$, $p = .71$, $\eta_p^2 = 0.003$. Meanwhile, there was no significant interaction between gender × age group, $F(2, 254) = 1.30$, $p = .27$, $\eta_p^2 = 0.010$ for fitness. The between-subjects ANOVA for personal best showed that there was statistically significant main effect of gender, $F(1, 254) = 4.46$, $p = .036$, $\eta_p^2 = 0.017$. On the contrary, the main effect of age group, $F(2, 254) = 0.95$, $p = .39$, $\eta_p^2 = 0.007$, was not significant. Also, there was no significant interaction between gender × age group, $F(2, 254) = 0.29$, $p = .75$, $\eta_p^2 = 0.002$ for personal best.

Table 4. Main effect of gender and age group for APAS

Variables	Gender			Age				Gender vs Age
	M	**F**	***p***	**17**	**18**	**19**	***p***	**p**
Benefits	4.28	4.15	.34	4.11	4.30	4.24	.48	.95
Importance	4.14	3.96	.20	3.85	4.13	4.18	.24	.66
Learning	3.22	3.24	.88	3.14	3.20	3.35	.60	.84
Self-efficacy	3.83	3.53	.06	3.66	3.64	3.74	.79	.41
Fun	4.25	3.84	.007*	3.95	4.11	4.06	.67	.37
Fitness	4.01	3.46	< .001*	3.68	3.80	3.72	.71	.27
Personal best	4.22	3.90	.036*	4.05	4.15	3.97	.39	.75

*$p < .05$

Table 5 Pairwise comparisons of gender for APAS

Subscales	μ Difference	*p*	95% Confidence Interval for Difference	
			Lower Bound	Upper Bound
Benefits				
M vs F	0.12	.34	-0.13	0.38
Importance				
M vs F	0.18	.20	-0.10	0.46
Learning				
M vs F	-0.03	.88	-0.40	0.34
Self-efficacy				
M vs F	0.31	.06	-0.01	0.62
Fun				
M vs F	0.41	.01*	0.12	0.71
Fitness				
M vs F	0.55	< .001*	0.25	0.85
Personal Best				
M vs F	0.33	.04*	0.02	0.63

*$p < .05$

Results revealed that post-hoc Bonferroni adjusted comparisons for fun indicated that males rated 0.41 point higher than females, $p = .01$, 95% CI [0.12, 0.71]. Besides, post-hoc Bonferroni adjusted comparisons for fitness indicated that males rated 0.55 point higher than females, $p < .001$, 95% CI [0.25, 0.85]. Additionally, post-hoc Bonferroni adjusted comparisons for personal best indicated that males rated 0.33 point higher than females, $p = .04$, 95% CI [0.02, 0.63].

Table 6. Main effects of gender and ethnicity on PALMS

Subscales	Gender			Ethnicity			Gender vs Ethnicity
	M	F	*p*	Malay	Non-Malay	*9 pt*	p
Mastery	4.29	4.14	.14	4.20	4.24	.72	.77
Physical Condition	4.48	4.41	.47	4.45	4.45	.99	.35
Psychological Condition	4.18	4.18	.95	4.16	4.21	.64	.63
Affiliation	4.02	3.91	.33	3.98	3.96	.88	.58
Appearance	4.11	3.96	.20	3.99	4.07	.48	.93
Enjoyment	4.35	4.15	.06	4.20	4.29	.39	.59
Competition-Ego	3.50	3.38	.25	3.63	3.25	.001*	.049*
Others' Expectations	2.78	2.80	.88	2.90	2.69	.03*	.07

*$p < .05$

Table 6 shows two-way ANOVA for PALMS based on gender and ethnicity. The between-subjects ANOVA for mastery showed that there was no significant main effect of gender, F (1, 256) = 2.21, p = .14, η_p^2 = 0.009, and ethnicity, F (1, 256) = 0.13, p = .72, η_p^2 = 0.001. Also, there was no significant interaction between gender × ethnicity, F (1, 256) = 0.09, p = .77, η_p^2 < 0.001 for mastery. The between-subjects ANOVA for physical condition showed that there was no significant main effect of gender, F (1, 256) = 0.51, p = .47, η_p^2 = 0.002, and ethnicity, F (1, 256) < 0.001, p = .99, η_p^2 < 0.001. Moreover, there was also no significant interaction between gender × ethnicity, F (1, 256) = 0.89, p = .35, η_p^2 = 0.003 for physical condition. The between-subjects ANOVA for psychological condition showed that there was no significant main effect of gender, F (1, 256) = 0.004, p = .95, η_p^2 < 0.001, and ethnicity, F (1, 256) = 0.22, p = .64, η_p^2 = 0.001. Furthermore, there was no significant interaction between gender × ethnicity, F (1, 256) = 0.24, p = .63, η_p^2 = 0.001 for psychological condition. The between-subjects ANOVA for affiliation showed that there was no significant main effect of gender, F (1, 256) = 0.97, p = .33, η_p^2 = 0.004, and ethnicity, F (1, 256) = 0.02, p = .88, η_p^2 < 0.001. Meanwhile, there was also no significant interaction between gender × ethnicity, F (1, 256) = 0.31, p = .58, η_p^2 = 0.001 for affiliation. The between-subjects ANOVA for appearance showed that there was no significant main effect of gender, F (1, 256) = 1.65, p = .20, η_p^2 = 0.006, and race, F (1, 256) = 0.51, p = .48, η_p^2 = 0.002. Additionally, there was no significant interaction between gender × ethnicity, F (1, 256) = 0.01, p = .93, η_p^2 < 0.001 for appearance. The between-subjects ANOVA for enjoyment showed that there was no significant main effect of gender, F (1, 256) = 3.59, p = .059, η_p^2 = 0.014, and ethnicity, F (1, 256) = 0.74, p = .39, η_p^2 = 0.003. Also, there was no significant interaction between gender × ethnicity, F (1, 256) = 0.29, p = .59, η_p^2 = 0.001 for enjoyment. The between-subjects ANOVA for competition-ego showed that there was no significant main effect of gender, F (1, 256) = 1.33, p = .25, η_p^2 = 0.005. However, there was statistically significant main effect of ethnicity, F (1, 256) = 12.37, p = .001, η_p^2 = 0.046. In addition, there was also statistically significant interaction between gender × ethnicity, F (1, 256) = 3.91, p = .049, η_p^2 = 0.015 for competition-ego. The between-subjects ANOVA for others' expectations showed there was no significant main effect of gender, F (1, 256) = 0.02, p = .88, η_p^2 < 0.001, yet significant main effect of ethnicity, F (1, 256) = 4.79, p = .03, η_p^2 = 0.018. The interaction between gender × ethnicity, F (1, 256) = 3.35, p = .069, η_p^2 = 0.013, was not significant for others' expectations.

Table 7. Pairwise comparisons of ethnicity for PALMS

Subscales	μ Difference	*p*	95% Confidence Interval for Difference	
			Lower Bound	Upper Bound
Mastery				
Malay vs non-Malay	-0.04	.72	-0.24	0.16
Physical condition				
Malay vs non-Malay	-0.00	.99	-0.19	0.19
Psychological condition				
Malay vs non-Malay	-0.05	.64	-0.25	0.16
Affiliation				
Malay vs non-Malay	0.02	.88	-0.21	0.24
Appearance				
Malay vs non-Malay	-0.08	.48	-0.32	0.15
Enjoyment				
Malay vs non-Malay	-0.09	.39	-0.30	0.12
Competition-Ego				
Malay vs non-Malay	0.39	.001*	0.17	0.60
Others' Expectations				
Malay vs non-Malay	0.21	.03*	0.02	0.40

*$p < .05$

Results revealed that post-hoc Bonferroni adjusted comparisons for competition-ego indicated that males rated 0.39 point higher than females, $p = .001$, 95% CI [0.17, 0.60]. Furthermore, post-hoc Bonferroni adjusted comparisons for others' expectations indicated that males rated 0.21 point higher than females, $p = .03$, 95% CI [0.02, 0.40].

Table 8. Pairwise comparisons between gender and ethnicity for PALMS

Subscales	μ Difference	*p*	95% Confidence Interval for Difference	
			Lower Bound	Upper Bound
Mastery				
M - Malay vs non-Malay	-0.07	.71	-0.42	0.28
F - Malay vs non-Malay	-0.01	.95	-0.21	0.19
Physical condition				
M - Malay vs non-Malay	-0.09	.58	-0.42	0.23
F - Malay vs non-Malay	0.09	.35	-0.10	0.28
Psychological condition				
M - Malay vs non-Malay	-0.10	.58	-0.45	0.26
F - Malay vs non-Malay	0.00	.99	-0.20	0.20
Affiliation				
M - Malay vs non-Malay	-0.05	.82	-0.43	0.34
F - Malay vs non-Malay	0.08	.48	-0.14	0.30
Appearance				
M - Malay vs non-Malay	-0.10	.64	-0.50	0.31
F - Malay vs non-Malay	-0.07	.53	-0.30	0.16
Enjoyment				
M - Malay vs non-Malay	-0.15	.42	-0.50	0.21
F - Malay vs non-Malay	-0.03	.75	-0.24	0.17
Competition-Ego				
M - Malay vs non-Malay	0.60	.002*	0.23	0.98
F - Malay vs non-Malay	0.17	.12	-0.05	0.38
Others' Expectations				
M - Malay vs non-Malay	0.39	.02*	0.06	0.71
F - Malay vs non-Malay	0.03	.72	-0.15	0.22

*$p < .05$

Results revealed that post-hoc Bonferroni adjusted comparisons for competition-ego indicated that Malay males rated 0.60 point higher than non-Malay males, p = .002, 95% CI [0.23, 0.98]. Besides, post-hoc Bonferroni adjusted comparisons for others' expectations indicated that Malay males rated 0.39 point higher than non-Malay males, p = .02, 95% CI [0.06, 0.71].

Table 9. Main effects of gender and age groups for PALMS

Subscales	Gender			Age				Gender vs Age
	M	F	*p*	17	18	19	*p*	p
Mastery	4.20	4.13	.63	4.19	4.25	4.05	.33	.85
Physical Condition	4.39	4.50	.45	4.50	4.46	4.37	.75	.38
Psychological Condition	4.08	4.15	.68	4.14	4.21	3.99	.25	.67
Affiliation	3.81	3.80	.91	3.63	4.05	3.74	.025*	.52
Appearance	3.91	3.94	.89	3.75	4.07	3.94	.30	.27
Enjoyment	4.23	4.05	.25	4.03	4.27	4.12	.29	.90
Competition-Ego	3.59	3.50	.58	3.59	3.49	3.54	.87	.57
Others' Expectations	2.94	2.87	.63	3.05	2.80	2.86	.39	.94

*$p < .05$

Table 9 shows two-way ANOVA for PALMS based on gender and age group. The between-subjects ANOVA for mastery showed that there was no significant main effect of gender, F (1, 254) = 0.24, p = .63, η_p^2 = 0.001, and age group, F (2, 254) = 1.12, p = .33, η_p^2 = 0.009. Also, there was also no significant interaction between gender × age, F (2, 254) = 0.17, p = .85, η_p^2 = 0.001 for mastery. The between-subjects ANOVA for physical condition showed that there was no significant main effect of gender, F (1, 254) = 0.59, p = .45, η_p^2 = 0.002, age group, F (2, 254) = 0.28, p = .75, η_p^2 = 0.002. Moreover, there was also no significant interaction between gender × age, F (2, 254) = 0.96, p = .38, η_p^2 = 0.008 for physical condition. The between-subjects ANOVA for psychological condition showed that there was no significant main effect of gender, F (1, 254) = 0.17, p = .68, η_p^2 = 0.001, and age group, F (2, 254) = 1.41, p = .25, η_p^2 = 0.011, In addition, there was also no significant interaction between gender × age group, F (2, 254) = 0.40, p = .67, η_p^2 = 0.003 for psychological condition. The between-subjects ANOVA for affiliation showed that there was no significant main effect of gender, F (1, 254) = 0.01, p = .91, η_p^2 < 0.001, but significant main effect of age group, F (2, 254) = 3.74, p = .025, η_p^2 = 0.029. Besides, there was also no significant interaction between gender × age group, F (2, 254) = 0.66, p = .52, η_p^2 = 0.005 for affiliation. The between-subjects ANOVA for appearance showed that there was no significant main effect of gender, F (1, 254) = 0.02, p = .89, η_p^2 < 0.001, and age group, F (2, 254) = 1.22, p = .30, η_p^2 = 0.009. Meanwhile, there was also no significant interaction between gender × age, F (2, 254) = 1.32, p = .27, η_p^2 = 0.010 for appearance. The between-subjects ANOVA for enjoyment showed that there was no significant main effect of gender, F (1, 254) = 1.33, p = .25, η_p^2 = 0.005, and age group, F (2, 254) = 1.24, p = .29, η_p^2 = 0.010. Furthermore, there was also no significant interaction between gender × age group, F (2, 254) = 0.11, p = .90, η_p^2 = 0.001 for enjoyment. The between-subjects ANOVA for competition-ego showed that there was no significant main effect of gender, $F(1, 254) = 0.31$, $p = .58$, $\eta_p^2 = 0.001$, and age group, $F(2, 254) = 0.14$, $p = .87$, $\eta_p^2 = 0.001$. Furthermore, there was also no significant interaction between gender × age group, $F(2, 254) = 0.56$, $p = .57$, $\eta_p^2 = 0.004$ for competition-ego. The between-subjects ANOVA for others' expectations showed that there was no significant main effect of gender, $F(1, 254) = 0.24$, $p = .63$, $\eta_p^2 = 0.001$, and age group, $F(2, 254) = 0.95$, $p = .39$, $\eta_p^2 = 0.007$. Additionally, there was also no significant interaction between gender × age groups, $F(2, 254) = 0.06$, $p = .94$, $\eta_p^2 < 0.001$ for others' expectations.

Table 10. Pairwise comparisons of age groups for PALMS

Subscales	μ Difference	*p*	95% Confidence Interval for Difference	
			Lower Bound	Upper Bound
Mastery				
17 vs 18	-0.06	.75	-0.45	0.32
17 vs 19	0.14	.54	-0.30	0.58
18 vs 19	0.20	.14	-0.06	0.46
Physical Condition				
17 vs 18	0.04	.85	-0.32	0.39
17 vs 19	0.12	.56	-0.29	0.53
18 vs 19	0.09	.49	-0.16	0.33
Psychological Condition				
17 vs 18	-0.07	.73	-0.46	0.32
17 vs 19	0.16	.49	-0.29	0.60
18 vs 19	0.23	.10	-0.04	0.49
Affiliation				
17 vs 18	-0.42	.05*	-0.84	0.003
17 vs 19	-0.11	.66	-0.59	0.37
18 vs 19	0.31	.04*	0.02	0.60
Appearance				
17 vs 18	-0.32	.16	-0.76	0.13
17 vs 19	-0.19	.46	-0.69	0.32
18 vs 19	0.13	.41	-0.18	0.43
Enjoyment				
17 vs 18	-0.25	.22	-0.64	0.15
17 vs 19	-0.10	.68	-0.54	0.35
18 vs 19	0.15	.27	-0.12	0.42
Competition-Ego				
17 vs 18	0.10	.65	-0.33	0.52
17 vs 19	0.05	.84	-0.44	0.53
18 vs 19	-0.05	.74	-0.34	0.24
Others' Expectations				
17 vs 18	0.25	.18	-0.12	0.61
17 vs 19	0.18	.39	-0.23	0.60
18 vs 19	-0.06	.62	-0.31	0.19

*$p < .05$

Results revealed that post-hoc Bonferroni adjusted comparisons for affiliation indicated that the age group of 17 rated -0.42 point lower than the age group of 18, p = .05, 95% CI [-0.84, 0.003] and the age group of 18 rated 0.31 point higher than the age group of 19, p = .04, 95% CI [0.02, 0.60].

DISCUSSION

The results are in line with past studies (Ahmad et al., 2020; Hill & Cleven, 2005) which supported that the males have fun and enjoy physical activity more than the females, regardless of their age. These are greatly reflected based on the norms of the societies and culture expectations that produce gender stereotyping which could also occur within the primary school setting. The social environment through the significant others such as parents and siblings could have encouraged males to participate and engage in masculine activities in the form of physical activities and sports as they would need to show forms of stereotypically masculine behaviours (Schmalz & Kertetter, 2006). The rating of fun as a factor is also related to developing competence and fitness which are intrinsically in nature rated higher by the males as compared to the females.

Inconsistent with past literature, which showed gender or age group differences in the motives of participation in physical activity, the results revealed significant main effect for age group only for the affiliation, which is of extrinsic in nature. A possible explanation would be the institution environment in which late adolescence, which is a pivotal transition stage to adulthood, is influenced by a sense of belonging, which is also related to interest and enjoyment in physical activity. The affiliation in the form of seeking approval, acceptance, recognition from their friends, developing friendship and belonging with significant others would provide confidence and foster positive physical activity experiences for the 3 age groups (Allen, 2003). This positive support and recognition will strengthen their competence as well as motivate them in their participation in physical activity.

However, the results showed that Malay males were more inclined toward competition-ego and others' expectations as compared to the non-Malay males. These two factors are determined by extrinsic motives which showed that the Malays are enjoying a higher positive competitive experience through their participation in physical activity. In addition, they must also develop some positive character traits in trying to improve their level of performance and fitness as they know that this will help to lead to a much healthier lifestyle in times of the COVID -19 pandemic. The others' expectations could be associated with a sense of belonging with their friends and community in the institute. As Tinto (2011) in his student integration model highlighted that peer culture in college greatly influences a student's engagement, commitment to the school and maintaining social relationships enhance the overall quality of life in the institute.

Intervention in the form of equality in physical activities and sports needs to be emphasized and promoted at a tender young age starting from the age of 7 in both coeducation and same-sex classes, while the children are in primary. The school system needs to provide equal support and opportunities for both genders to increase their level of physical activity (Telford et. al., 2016). Physical educators should use differentiated instructions to teach, train and assess the children within their skill and ability levels, providing and supporting appropriate and progressive challenges in the physical activity.

CONCLUSION

To conclude, understanding the attitudes and motives for physical activity participation during the COVID -19 lockdowns will enlighten a more thorough understanding of trainee teachers' participation in PA. The study recommends similar studies that can provide better insights in understanding PA among trainee teachers from different states in Malaysia in order to create better awareness of a balanced and healthy lifestyle in the current challenging environment. This would enable the PE educators to formulate more practical and effective interventions to suit the motives with suitable types of physical activity through the digital infrastructure such as digital workout sessions and instructional videos and apps tracking devices that can track the trainee teachers' degree of physical activity (Roe, Blikstad-Balas & Dalland, 2021). The combination of the intrinsic and extrinsic factors would further sustain the trainee teachers' attitudes towards physical activity making them engage in better and positive mental health and quality of life, considering the potential to reach out to overall population health of the school children in times of pandemic.

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IMPACTS OF COVID-19 LOCKDOWN ON PHYSICAL ACTIVITIES BEHAVIOUR AND ANXIETY AMONG COLLEGE STUDENTS

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ABSTRACT

The COVID-19 pandemic has prompted Malaysian government for cancellation of face-to-face educational activities, banning non-essential retail commercial activities and gatherings of people in order to protect its population. It has changed the lifestyle of university students and affected their psychological health. Thus, this research examined the physical activity behaviour and anxiety in a sample of college students during the COVID-19 Movement Control Order (MCO). A total of 190 university college students completed an online survey to gather information about their physical activity behaviour and anxiety (feelings and thoughts) during the pandemic lockdown. The popular physical activities were exercise without machine, aerobic exercises, and low impact cardio workout respectively. In terms of Physical Activity Index (PAI), only about 20 percent of the respondents were in the 'good category', and 18 percent were in the 'needs improvement' category. Total anxiety scores revealed that male students were more anxious than female students. Overall, the older student groups were more anxious during the lockdown as compared to the youngest student group.

Keywords: COVID-19, pandemic, lockdown, anxiety, physical activity

INTRODUCTION

In December 2019, the number of people affected by pneumonia has grown rapidly in Wuhan, China. This outbreak of viral pneumonia, caused by a newly discovered coronavirus (COVID-19), soon became a threat to global health. This has prompted WHO to officially declared the outbreak as global pandemic on the 11th of March 2020 (WHO, 2020). By June 2021, the COVID-19 pandemic has affected 222 countries worldwide, with 174 million confirmed cases and more than 3.7 million people have died from the disease (Worldometers, 2021).

In response to the COVID-19 pandemic announcement by WHO, the Malaysian Government implemented the Movement Control Order (MCO) on the 18th of March 2020 (Sukumaran, 2020). All the non-essential businesses such as shopping malls, hawker stalls, and education institutions were locked down with limited access to food and grocery outlets. Consequently, in order to curtail close contact of people to reduce the risk of virus infection, Malaysian Government has imposed strict rules on social distancing barring the gathering of people including exercising in public spaces.

MCO by Malaysian Government is stressful and challenging. The MCO which encompassed social distancing, home quarantine, school, and work closures, resulted in disruption of social support networks at a time when they might be needed the most (Limcaoco et al., 2020). The restrictions of MCO have changed the lifestyle of many Malaysians, and they have to deal with physical inactivity and sedentary behaviour. In that context, previous research has reported that increased sitting time, and the lack of leisure time physical activity (PA) has convincingly shown to be a significant predictor of adverse health outcomes (Patterson et al., 2018; Young et al., 2016). In addition, Mucci et al. (2020) acknowledged the fact that lockdown and social isolation have proven to be quite effective in terms of physical containment, but they cautioned that mental health appears to be undermined by the onset of feelings such as uncertainty, fear, and despair. Stress has been reported to be associated with decreased physical function over time, which contributes to ill health condition such as cardiovascular disease (Stults-Kolehmainen & Sinha, 2013). There is a need to be physically active as physical activity has antidepressant effects and helps individual to be physically fitter. In fact, more active individuals seem to be more biologically resilient to psychosocial stressors (Hamer, 2012).

The COVID-19 pandemic and restricted movement control are global crises that could be stressful for many people. The drastic changes to lifestyle, social life, personal freedom, and economic activity, all of these combined can cause anxiety and stress to the general population. Under the non-pandemic situation, and despite the highlights of health benefits for being physically active, individuals have become more inactive (Cerin et al., 2010; Katzmarzyk, & Mason, 2009; Smith et al., 2009).

Physical inactivity (PI) has increased the risks of NCDs, obesity, and other metabolic diseases and is recognised as the fourth leading risk factor for global mortality (Karthikeyan et al., 2015). PI has been accepted as a major health issue among university students in Southeast Asia. In a study of PI in 9 ASEAN countries (Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam), Peltzer and Pengpid (2018) revealed that only 39.0% men and 53.0% women engaged in low physical activity. Specifically, Indonesia reported 26.1% of the adults and 49% of university students were inactive (Sumardiyanto et al., 2019). Similarly, Sudikno et al. (2019) revealed that the PI rate was 64% among university students. In Malaysia, Karthikeyan et al. (2015) reported that 43.7% of Malaysians were physically inactive, with only 43.5% of students aged 22 - 25 years reported participating in high physical activity level. In other Malaysian studies, Yusoff et al. (2018) revealed that 66% of university students were sedentary with only 5% physically active. Similarly, Bakar et al. (2019) reported 55% of university students were physically inactive. However, the Malaysian National Institute of Health [MNIH] (2020) reported in the Malaysian National Health and Morbidity Survey 2019 that 25.1% of adults were physically inactive, a reduction compared to 2011 (35.7%) and 2015 (33.5%).

PI has caused overweight and obese syndromes. In a 25-year study involving 195 countries, it was reported that 603 million adults were obese due to PI (Afshin et al., 2017; WHO, 2014). Another study of 9 ASEAN countries (Peltzer & Pengpid, 2018) revealed that overweight and obesity rate was 27.5% for males and 17% for females. In Indonesia, Sudikno et al. (2019) revealed that the prevalence of obesity among university students was 31% (males 24%, females 38%). As for Malaysia, Yusoff et al. (2018) reported that 30% were overweight and obese. In addition, the Malaysian National Health and Morbidity Survey 2019 reported 30.4% overweight and 19.7% obese among adult population with 52.6% of adults have abdominal obesity (MNIH, 2020). This may be due to the fact that 27.0% of the population has low health literacy in health promotion and healthy lifestyle practices (MNIH, 2020).

The COVID-19 lockdown which includes home isolation and physical distancing was due to the high level of contagiousness of the disease, and the lack of appropriate treatments and vaccines. Numerous reports on the effects of pandemic on psychological health of individuals have revealed that the lockdown caused depression, anxiety, fear, panic, anger, and insomnia (Hao et al., 2020; Vindegaard & Eriksen, 2020; Zhang et al., 2020). Other research reported psychological consequences such as fear of contracting the disease, fear of dying, uncertainty and worries about the future, and separation from families (Adhanom, 2020; Gruber, 2020; Unützer et al., 2020; Wright et al., 2020). Numerous studies have demonstrated the benefits of exercise on mental and physical health outcomes (Arzu et al., 2006; Joseph et al., 2014; Lapa, 2015). Physical activity has been shown to enhance quality of life (Joseph et al., 2014). In addition, participation in physical activity has been shown to produce positive moods, increase general psychological well-being and life satisfaction (Lapa, 2015).

In the light of the above, this research examined the physical activity behaviour and psychological health effects of pandemic lockdown among a sample of college students in Malaysia.

METHODS

Participants

Participants were students attending a metropolitan University campus. All were enrolled in Sport Science Programme at the Faculty of Applied Sciences. A total of 190 students completed questionnaires online with 74% return rate.

Instrumentation

An 8-item questionnaire to measure anxiety was adopted from Lapa (2015). The reliability is 0.82 and the instrument is considered very reliable to measure anxiety (feelings and thoughts) during MCO. The questionnaire was divided into two sections. Section A involved demographic items, and Section B consisted of 8 anxiety items. Each item was rated on a 5-point Likert scale, from 1 (Strongly Agree) to 5 (Strongly Disagree).

Procedures

Approval to carry out this research has been obtained from The Ethnical Committee of the Educational Institution. A total of 257 questionnaires were distributed to the sport science students from the Department of Sport Science via email or via online Google Document. They were asked to answer the questionnaire from Section A to B in sequence. The sport science students were contacted via the class representatives of every class.

Data Analysis

Descriptive statistics such as frequency and percentages were used to report the demographic data of gender, age category, BMI category, and PAI category. For 'Feeling and thought' items, percentages were reported according to the scales of measurement. The Physical Activity Index (PAI) was determined by multiplying intensity, duration, and frequency. 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).

Inferential statistics such as t-test, and analysis of variance (ANOVA) were used to compare the mean scores of anxiety ('Feeling and thought') items, and Total Anxiety (Feeling and thought) according to gender, age category, BMI category, and PAI category. For the one-way ANOVA, where F-tests were significant, a post-hoc multiple comparison test using the Tukey-HSD test was employed. All data analysis including t-test and ANOVA were carried out using SPSS for Windows ver. 23.

RESULTS

The mean age of the respondents was 20.71+1.59 with 76.8% (n=146) of males. Results in Table 1 showed that majority (53.2%) of the respondents were in the age group of 20-21. In terms of BMI, majority of the respondents were in the normal weight group (70%) with 21.6% overweight. As for the Physical Activity Index (PAI), 38.9% of the respondents were fairly active with almost 18% of the respondents required improvement in their physical activity levels.

Based on the results of Table 2, the top three most popular physical activities were 'exercise without machine', 'aerobic exercises', and 'low impact cardio workout'. The unpopular physical activities include yoga, badminton, and basketball. Further analysis of the three most popular activities according to gender revealed that males were more involved in 'exercise without machine' (male: 78.3%, female: 21.7%), 'aerobic exercises' (male: 69.7%, female: 30.3%), and 'low impact cardio workout' (male: 89.5%, female:10.5%).

Table 1. Profiles of the Respondents (N = 190)

Socio-demographic characteristics		Frequency (n)	Percent (%)
Gender			
Male		146	76.8
Female		44	23.2
Total		190	100
Age Category (years)			
18-19		41	21.6
20-21		101	53.2
22 & above		48	25.3
Total		190	100
BMI			
< 18.5	Underweight	13	6.8
18.5 – 24.9	Normal	133	70.0
25.0 – 29.9	Overweight	41	21.6
30.0 – 34.9	Obesity Class I	3	1.6
Total		190	100
PAI Score & Rating			
<20	Need improvement	34	17.9
20-39	Fair	74	38.9
40-59	Average	44	23.2
60-99	Good	38	20.0
Total		190	100

Table 2. Type of Physical Activity

Physical activity	Frequency (n)	Percentage (%)
Exercise with machine	47	24.7
Exercise without machine	143	75.3
Aerobic exercises	89	46.8
Yoga	14	7.4
Dancing such as Latin, Zumba etc.	18	9.5
Fitness walk	36	18.9
Low impact Cardio workout	75	40.0
High impact Cardio workout	56	29.5
Toning exercises (upper body, mid body, lower body)	53	27.9
HIIT exercises	73	38.4
Boxing, Kung Fu, and Muay Thai	21	11.1
Basketball	3	1.6
Badminton	8	4.2

Table 3 shows the frequency distribution of the feelings and thoughts of the respondents based on a 5-point Likert Scale. Results revealed that 68 (35.8%) of the students agreed that they were upset, restless and sad with the unexpected lockdown. Due to the lockdown, 69 (36.3%) of the students experienced nervousness, stress and distress. The uncertain situation of lockdown indicated that 104 (54.8%) worried about what would happen next, and to their family/ relatives/ friends. Sixty-eight (35.8%) of them were worried about the availability of food, having money to buy food, and also worried about losing their jobs.

In addition, 91 (47.9%) of the students were anxious about the ability of government in handling the pandemic when the situation worsens, and 64 (33.6%) students felt that current measures such as social distancing and washing hands were not enough to control the pandemic. However, 119 (62.7%) of the students disagreed that social isolation and loneliness would kill them and their family.

Table 3. Perceived Stress in Pandemic Disaster: Statement of Feelings and Thoughts During MCO

Statement about feelings and thoughts	SA	A	N	D	SD
1. I am upset, restless and sad with the unexpected lockdown in my country.	19 (10%)	49 (25.8%)	72 (37.9%)	38 (20%)	12 (6.3%)
2. I feel nervous, stressed, distressed in this difficult situation.	13 (6.8%)	56 (29.5%)	72 (37.9)	39 (20.5%)	10 (5.3%)
3. Most of the time, I am worried about what will happen next, to my family/ relatives/ friends.	25 (13.2%)	79 (41.6%)	55 (28.9)	26 (13.7%)	5 (2.6%)
4. Most of the time I prefer watching news, websites, and social sites about the updated number of cases of infection and death.	27 (14.2%)	45 (23.7%)	69 (36.3%)	41 (21.6%)	8 (4.2%)
5. Most of the time, I am worried about what will happen tomorrow as there is no food to eat and no money to buy and even what will happen if I lose my job.	29 (15.3%)	39 (20.5%)	68 (35.8%)	37 (19.5%)	17 (8.9%)
6. I am worried that my country is not able to deal with the situation if the spread intensifies.	16 (8.4%)	75 (39.5%)	73 (38.4%)	20 (10.5%)	6 (3.2%)
7. I think just social distancing, washing hands or similar measures are not enough to control the situation. I think some miracle needs to happen to control the situation in my country.	28 (14.7%)	36 (18.9%)	81 (42.6%)	32 (16.8%)	13 (6.8%)
8. I think this social isolation and loneliness will kill me and my family.	5 (2.6%)	21 (11.1%)	45 (23.7%)	60 (31.6%)	59 (31.1%)
Notes: SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree					

Table 4 shows the relationship of the 8 items based on gender, age category, BMI category, and PAI category. The results revealed that male students were more upset, restless, and sad with the unexpected lockdown than female students (p=0.009). Male students' experience of nervousness, stress, and distress was more intense as compared to female students (p=0.012). In addition, male students were more worried about what would happen next, and to their family/ relatives/ friends when compared to female students (p=0.016).

The relationship analysis on age groups showed that the oldest student group (22 and above) was more upset, restless, and sad due to lockdown as compared to the youngest student group (18-19 years old) (p=0.04). Similarly, the older student group was more stressed as compared to the youngest student group (p=0.001). The oldest student group was more worried about their future and their friends, relatives, and family members than the younger students (p=0.001). The result also revealed that the oldest student group was more worried on the shortage of food and the ability to obtain them as compared to the younger students (p=0.001). As for social isolation and loneliness, the oldest student group, 22-year-olds, felt more isolated and lonelier as compared to the younger student groups (18-19, and 20-21 years). However, the 18-19 and the 20-21 years old groups showed no difference.

In terms of BMI category, the underweight students were worried about their future, and the welfare of their friends, relatives, and family members more than the normal weight students, and obese students (p=0.2). The normal weight students were more concerned about the ability of the government in handling the worsening of the pandemic situation (p=0.025).

The analysis of students according to the PAI category revealed that the 'Fair' and 'Average' student groups were more nervous, stressed, and distressed as compared to the 'Good' student group. Similarly, the 'Fair' student group experienced more isolation and loneliness during the lockdown as compared to the 'Average' and 'Good' student groups.

In order to examine the total anxiety, the scores of the 8 statements were compounded as a single mean score. Overall, the older students were more anxious during the lockdown as compared to the youngest group (18-19 years old) (p=0.001). Similarly, male students were more anxious than female students (p=0.001).

Table 4. Association of Perceived Anxiety (Feelings and Thoughts) and demographic variables

Statement	p-value/post-hoc							
	Gender	Mean	Age Category	Post-hoc	BMI Category	Post-hoc	PAI Category	Post-hoc
1. I am upset, restless and sad with the unexpected lockdown in my country.	0.009	M > F	0.044	C > A	0.283	-	0.757	-
2. I feel nervous, stressed, distressed in this difficult situation.	0.012	M > F	0.001	B > A C > A	0.751	-	0.001	F > G A > G
3. Most of the time, I am worried about what will happen next, to my family/ relatives/ friends.	0.016	M > F	0.001	B > A C > A	0.020	U > N U > O	0.084	-
4. Most of the time I prefer watching news, websites and social sites about the updated number of cases of infection and death.	0.309	-	0.006	B > A C > A	0.139	-	0.243	-
5. Most of the time, I am worried about what will happen tomorrow as there is no food to eat and no money to buy and even what will happen if I lose my job.	0.001	M > F	0.001	B > A C > A	0.109	-	0.169	-
6. I am worried that my country is not able to deal with the situation if the spread intensifies.	0.110	-	0.325	-	0.025	N > O	0.568	-
7. I think just social distancing, washing hands or similar measures are not enough to control the situation. I think some miracle needs to happen to control the situation in my country.	0.181	-	0.264	-	0.118	-	0.733	-
8. I think this social isolation and loneliness will kill me and my family.	0.001	M > F	0.003	C > A C > B	0.105	-	0.001	F > A F > G
Total anxiety	0.001	M > F	0.001	C>A B>A	0.133	-	0.101	-
		F = Female M = Male		A: 18-19 B: 20-21 C: 22 & >		O: Over-weight N: Normal weight U: Under weight		G: Good A: Average F: Fair

In addition, Figure 1 shows that the ‘Fair’ PAI group has the highest anxiety as compared to ‘Need improvement’ group and ‘Average’ group.

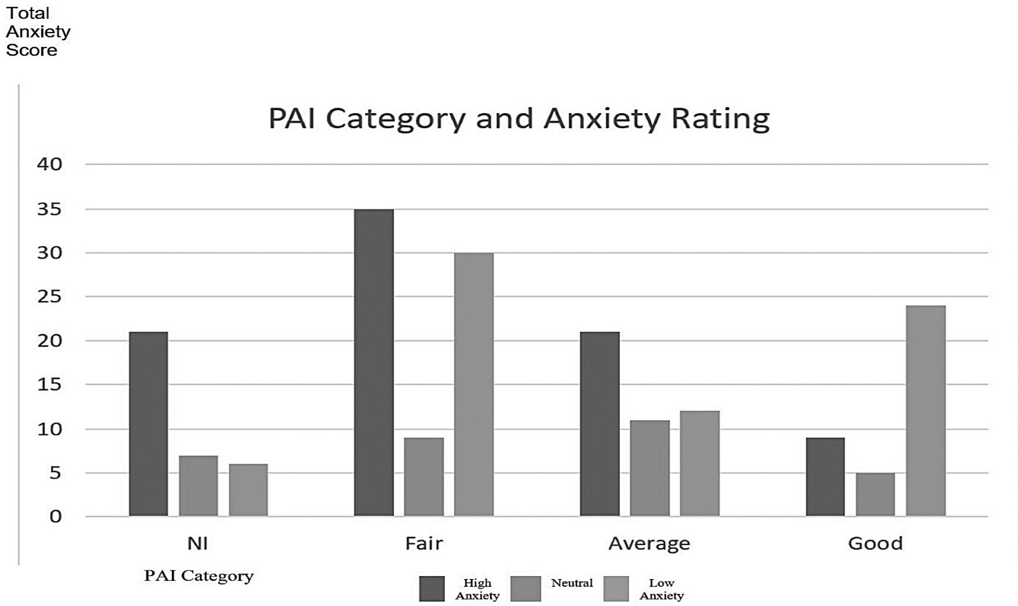

Figure 1. Association of PAI Category and Anxiety Rating
Note: Physical Activity Index (PAI) Category: ‘NI” = Need Improvement (PAI score = < 20), ‘Fair’ (PAI score =20-39), ‘Average’ (PAI score =40-59), ‘Excellent’ (PAI score = 100 or more).

DISCUSSION

Staying at home during the COVID-19 crisis is associated with a considerable rise in body weight. Physical inactivity of the students in this study might have contributed to the almost 23% of the prevalence of overweight and obese. Due to an apparent lack of research in PAI during pandemic situation, we draw a parallel to research under normal situation for undergraduates in Malaysia. The finding of this research was similar to the findings of two previous studies conducted by Wee et al. (2013) and Wee et al. (2012) during the normal non-pandemic environment where it was reported that 20.7% and almost 18% of the undergraduate respondents were overweight and obese respectively. Thus, these findings could not support the notion that pandemic has contributed to the increase in weight among undergraduates. On the contrary, physical inactivity of the respondents of this study is supported by three Malaysian studies conducted during the MCO. Ida Lim (2020) reported Ipsos Malaysia market research on 500 Malaysian respondents that 9 percent did not engage in physical activities at all during MCO, 47 percent performed less physical activity than usual. On the contrary, 28 percent reported no change in their physical activities, and 16 percent exercised more than usual. In another study, Hirschmann (2020) revealed that only 40 percent of respondents reported that they exercised during the MCO. Similarly, Syed Shiekh and Marathamuthu (2021) reported the physical activity behaviour during MCO of 307 respondents (aged 13 to >35 years old) and found that 42.3% exercised regularly (3 to 7 days), 38.8% exercised irregularly (1 to 2 days), and 18.9% did not exercise at all.

Physical Activity Index (PAI) rating of this research revealed that only 20% of the students surveyed was in the ‘Good’ PAI category, and almost 18% was in the ‘Need improvement’ category. As compared to previous Malaysian studies on undergraduates which were conducted during the non-pandemic situation, Wee et al. (2013) reported 11.3% and 37% excellent and good physical fitness levels respectively among the participants. In addition, Wee et al. (2013) also reported only 11% of the respondents were in the "need improvement" physical fitness category. Similarly, current findings differed from another study by Wee et al. (2012) where it was reported that undergraduates had good and excellent physical fitness levels (39.5%). However, current findings on ‘need improvement’ category was only slightly higher than that reported by Wee et al. (2012) with 15.2%. The results of this study are similar to the study of sport science students by Elijah and Eric (2012) under non-pandemic situation. Elijah and Eric (2012) examined the perceived physical health status of 50 university sport science students who have participated in sport and exercise activities. They reported that 28% of sport science students perceived their physical health status to be good, and 8% to be very good. However, 40% of the students perceived their physical health status to be fair, and 20% perceived themselves to be in the poor category. In addition, there were no significant differences in the perceived physical health status according to gender.

The effects of COVID-19 on mental health were mixed; Li et al. (2020) observed a decrease in symptoms of anxiety and depression after two weeks of movement control order, whereas other researchers (Elmer et al., 2020; Zimmermann et al., 2020) reported an increase in the severity of anxiety. This research showed that male students were more upset, restless, and sad with the unexpected lockdown than female students. Male students were more stressed and were more worried about the future of those who were close to them. According to Ali and Kunugi (2019), negative emotions developed due to social isolation, and the uncertainty was associated with life during the pandemic. This is supported by other researchers that it was common for participants during COVID-19 to report feeling more depressed and anxious during lockdown (Shevlin et al., 2020; Daly et al., 2020). Pandemic restriction such as social distancing has contributed to poor mental health during COVID-19. Smith et al. (2020) in a study of adults in the United Kingdom found that 36.8% of the respondents had poor mental health. Similarly, WHO has recognised that social distancing measures may result in people becoming more anxious, angry, stressed, agitated, and withdrawn (World Health Organisation, 2020). On the contrary, numerous studies reported the association of poor mental health with females and not males (Elmer et al., 2020; Jacob et al., 2020; Naser et al., 2020; Wang & Zhao, 2020). In fact, Amendola et al. (2021) reported that females were associated with a higher risk of anxiety. However, other studies did not find a gender effect on anxiety (Cao et al., 2020; Li et al., 2020; Zimmermann et al., 2020).

The findings on the relationship between anxiety and age revealed that the older students were more anxious during the lockdown as compared to the younger students. They were also more upset, restless, sad, nervous, stressed, distressed than the younger students. This is supported by Amendola et al. (2021) who revealed that older age is associated with higher symptoms of anxiety. However, these findings were not supported by Jacob et al. (2020) who reported that poor mental health was associated with younger age individuals.

In terms of BMI and mental health, this study found that underweight and normal weight students were worried about their future, and the welfare of their friends, relatives, and family members, and more concerned about the ability of the government in handling the worsening of the pandemic situation respectively. However, Robinson et al. (2021) found that a higher BMI was not significantly associated with perceived change in mental health. In terms of concern of self and others, Amendola et al. (2021) reported that 44% (n=300) of the study participants showed a high concern for their own health, and 37.1% (n = 251) of them reported to be worried about the health of family members. Students were more worried about the health of family members than about their own health (Amendola et al., 2021). These findings were supported by other studies (Cao et al., 2020; Li et al., 2020; Liu et al., 2020; Naser et al., 2020). In fact, students' worry about the health of family members was higher than their concern about family members' financial situation.

The analysis of the association of anxiety rating and PAI category in Figure 1 shows that the 'Fair' PAI group has the highest anxiety as compared to 'Need improvement' group and 'Average' group. Numerous studies have reported a significant reduction in the physical activity levels of adults (Giustino et al., 2020; López-Bueno et al., 2020) during the COVID-19 movement control order. Moreover, it was also indicated that adults who experienced higher reductions of physical activity levels, or who performed lower levels of physical activity during the COVID-19 pandemic, have poor mental health and low levels of well-being (López-Bueno et al., 2020). This is in line with the findings of this study.

CONCLUSION

Demographic data analyses revealed that majority of the respondents were in the normal weight category. Most of the respondents were physically fit with only 17.7 percent who need improvement in the physical fitness level. Comparison of the three most popular activities according to gender revealed that more male participants (70-90%) were involved in 'exercise without machine', 'aerobic exercises', and 'low impact cardio workout' as compared to the female participants. In terms of mental health aspects, male students were more affected by the MCO as compared to females; they were more stressed and anxious about their future. The older students were sad, stressed and anxious about the future, and lonely as compared to the younger students. While the underweight students were worried about their future, the normal weight students doubted government ability to contain the pandemic. The less physically fit students were more anxious during the lockdown and were lonely as compared to the fitter students. Psychological stress and physical activity levels are related to each other. Experiencing stress can negatively influence one's motivation to perform physical activities (Stults-Kolehmainen & Sinha, 2013). Meanwhile, performing exercise has been known to help improve mental health, reduce anxiety and stress, and enhance physical health.

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PHYSICAL EDUCATION AND TEACHER TRAINING IN ITALY DURING THE COVID-19 PANDEMIC

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ABSTRACT

The global pandemic of the COVID-19 virus began in March 2020 and it forced the closure of most schools, universities, sport recreational grounds, swimming pools, dance and fitness centres, parks, playgrounds, and gyms. This meant that it was not possible for individuals to participate in normal sporting activities outside of their homes. Due to this, children and adolescents were less physically active, meaning that they spent longer periods in front of their PCs, tablets, TVs and doing sedentary activities. This in turn led to a reduction in physical activity (PA) levels and an increase in weight gain, irregular sleep-wake habits, and incorrect eating habits. The objective of this study was to analyse the main issues in teaching physical education (PE) online during the pandemic, as well as identifying how the physical literacy process took place in this period and what the repercussions were on the curriculum. Focusing on the schooling and PE/PA situation in Italy, some questions that we ask are: what are the disciplinary areas through distance learning, what should the contents of the curriculum be, and can motor abilities be taught remotely. It was found that children in primary and secondary schools were the most affected when it came to teaching PE remotely, with this most likely being down to the lack of structured motor activities and interpersonal relationships present in remote reaching.

Keywords: COVID-19, motor competencies, Physical Education, physical activity levels, prevention

Problem: The impact of COVID-19 on PA

It is evident that the pandemic has changed and reduced people's daily involvement in PA and the main evidence is shown through the closure of most sporting spaces and restrictions requiring people to stay inside their homes. Whether this be activities at school, clubs, or in their free time, the closure unsurprisingly saw a rise in various non-communicable diseases such as obesity, diabetes, and heart disease. People with pre-existing medical conditions have been negatively affected by the restrictions and seen dangerous repercussions on their health (Sport e Salute, 2021). The interruption of daily or periodic motor activities subsequently exposes people to the dangers of sedentary habits. Due to the suspension of school PE and sporting activities, children and young people have had to pause their in-person PE which creates significant and unavoidable issues in learning as well as the development of social relationships.

A further consequence in the lack of PA has seen the increase in social inequalities which have accentuated educational poverty. To correct this, national governments need to urgently adapt their activities to increase the promotion of health through PA. Whilst staying at home to prevent the spread of the virus, remaining active through aerobic exercise has shown to help individuals with their physical and mental state (Hammami et al., 2020).

The current WHO recommendations for daily exercise in children and young adults is to exercise for at least one hour per day at moderate to vigorous intensity (WHO, 2020). It is also suggested that these individuals should do 10 -15 minutes of extra exercise during each day totalling to an extra 150 minutes per week (WHO, 2020). Furthermore, these guidelines also provide methodological and organizational indications. For example, it is suggested that individuals increase the amount of time spent on outdoor activities such as walking to school, using the stairs, and using the walking tracks and cycle paths to reach the daily targeted amount of PA. WHO also suggests that at home, individuals should frequently interrupt sedentary activities with muscle stretching and posture exercises. Individuals are advised to also systematically time and record the amount of time spent on each activity.

In Italy, research conducted by the Gaslini Institute of Genoa (www.gaslini.org) has highlighted psychosomatic problems that are evident during home isolation in children and young people. A questionnaire was proposed to a sample of 3,251 children and adolescents (N = 6800) between March 24 and April 3, 2020, which was aimed at identifying behavioural problems during the lockdown period. The analysis of the data showed that because of the pandemic, issues arose in 65% of children under the age of 6, and 71% of those aged between 6-18 years old. For children under the age of 6, the most frequent issues reported was increased irritability, sleep disruption and anxiety, and restlessness issues. In children between 6-18 years of age the most frequent issues reported were anxiety, psychosomatic disorders, emotional instability with irritability and mood changes, sleep disorders and the struggle to wake up for online classes.

As well as these issues, the pandemic has had a major impact on PA levels, PE classes and participation in sport among young children and adolescents. Recent studies have highlighted the health risks of prolonged amounts of time spent inside due to the increased health issues they pose (Jimenez-Pavon et al., 2020; Lippi et al., 2020). However, data regarding the impact of COVID-19 on moderate to vigorous PA levels in children and adolescents is still limited (Guan et al., 2020).

It is well known that schools closed and education was moved to online classes and distance learning during this period. However, each school carried out many different teaching methods and used different teaching content.

The combined effects of a stressful environment and physically inactive lifestyles in young people increase adverse lifestyle behaviours such as reduced attention to hand hygiene, increased screen time, high calorie food intake and incorrect posture. Research shows that this negative combination of physical and psychosocial behaviours could lead to weight gain and deterioration of mental health, which has been named as "depreobesity" (Mediouni et al., 2020). Young people are not immune to the vicious circle that lockdowns and restrictions have created, the consequences of the pandemic on psychosocial health and physical well-being in youth is something that cannot be ignored (Liu et al., 2020).

Online Teaching and Teacher Education in Italy

During the first lockdown in March 2020, teachers suddenly had to restructure their teaching routines and switch to online distance teaching. The impact was significantly more evident in kindergarten and primary school compared to secondary schools. The reshaping of learning objectives and assessment methods has been successfully established in the curriculum of the kindergarten and primary school, but not that of middle and high schools. The redefinition of the objectives and teaching strategies took place in a very short period of time, requiring an increase in the activity of teachers in order to create an effective curriculum for their students (Lucisano et al., 2021).

The inability of having direct contact with their students forced teachers to use different tools for effective communication to continue teaching. Didactic choices were conditioned by the degree of in-service training in teaching technologies and by the different equipment, accessibility, and familiarity in the use of these tools by teachers, students, and their families.

A study by Lucisano et al (2021) collected the opinions of 16,133 primary and secondary school teachers and aimed to describe the problems of distance learning. The study highlighted that, to carry out online teaching, the least used tools were social networks and school websites, with the most used tools being digital platforms and instant messaging. It is evident that the school websites could have been set up in a way to be useful tools for distance and online learning, but they were not designed for such instructional functions and instead were used for school advertising (Lucisano et al., 2021).

According to some studies conducted in Italy during the pandemic, it is evident that for many teachers there are gaps in their digital competence which therefore created challenges (Ceccacci, 2020; Ciurnelli & Izzo, 2020). A research study conducted by Censis (2020), on 2,800 head teachers throughout Italy found that there are serious discrepancies in the digitization of the Italian schools' curriculum. The study also highlighted the inhomogeneity between different regions and different schools, both in terms of curriculum choices related to media and technological equipment.

A study by the Organisation for Economic Co-operation and Development (OECD) in 2020 used data found in the 2018 PISA Survey to see that learning remotely during the lockdowns proposed problems in schools all around the world. On average in OECD countries, 9% of 15-year-old students stated that they do not have a quiet place to study at home, and in Indonesia, the Philippines and Thailand this number rises to over 30%. Whereas in Italy, around 90% of students have a quiet place to study in their homes. The closure of schools and the immediate shift to online teaching has led teachers to conduct and reorganize educational content for distance and online learning. Technology has had a major impact throughout the population in recent years, as since 2018, 97% of the EU has had broadband coverage and 57% of the population has basic digital competencies, which luckily allows for situations like online learning (European Commission, 2019).

Online PE

Distance and online teaching during global lockdowns prompted a review of academic content and teaching methods as well as student assessment methods and tests. The methods of teaching were different, and technology brought out the potential as well as the limits of didactic communication. Questions were raised about teacher training and whether teachers should initially be taught more about online teaching methods, especially in relation to student disciplinary methods. The didactic problems for PE in primary and secondary school that emerged during the pandemic were attributable to the reduction in opportunities to carry out structured and unstructured motor activities (Guan et al., 2020). The consequent reduction in daily PA levels is a determining factor in the decrease in motor performance that limited the effects of human movement during this period.

Various social media platforms have developed useful guidelines and documentation for teachers to help them organize online PE lessons (https://padlet.com/capdilsm/educazionefisica). Advances in technology provide various ways of teaching and learning, some examples could be grouping pupils in different virtual classrooms that can be used to observe and provide personalized feedback to one another or proposing adapted and inclusive individual virtual sessions for pupils with special educational needs.

PE is a discipline that allows all students to learn motor competencies and acquire significant educational knowledge related to the human body. The contribution of practical experience to the educational process in the developmental age of young children is supported by numerous studies which also highlight the need, as well as the importance of didactic mediation in the proposal of activities (Bailey, 2006; UNESCO, 2015; Singh et al., 2019).

PE is considered a curricular subject for promoting health in children and adolescents, both in and out of school (Barkoukis et al., 2020; World Health Organization Regional Office for Europe, 2018; Escriva-Boulley et al., 2018, Wang & Chen, 2020). Through practical learning, various methods are proposed to involve all students as PE is a compulsory school subject in Europe, something that provides all students with equal opportunity to learn transferable motor skills in different disciplinary areas (Barkoukis et al. 2020; Gallè et al., 2016; González-Cutre et al., 2014). Furthermore, is it a requirement that PE is offered by qualified teachers who propose educational lessons which guarantee the involvement of pupils and promote the integral development of the person (Bailey et al., 2013).

In an online survey conducted by Füzéki et al. (2021), the evaluation of the effect of the lockdown on PA in Italy was carried out. The European Health Interview Survey questionnaire was completed by 1,500 individuals and the study found a significant decline in PA in all participants. In relation to the WHO recommendations, PA through walking and cycling decreased from 34.9% to 24.6%.

In line with previous Italian studies, a considerable decrease in habitual PA has been shown during the lockdown in spring of 2020. Sustained or recurrent reductions in PA are likely to cause detrimental effects on both physical and mental health.

Guan et al. (2020) state that international guidelines recommend that preschool children, aged 3 to 4 years, should partake in at least 180 minutes of PA per day, engage in no more than 1 hour of sedentary activity and have 10-13 hours of good quality sleep per night. For school children and adolescents aged 5-17 years, the recommendations are to perform at least 60 minutes of moderate to vigorous intensity PA per day, with sedentary periods not exceeding 2 hours and maintain at least 9-11 hours of good quality sleep every night. Children generally carry out daily PA through walking to school; PE lessons and recreation; organized sports, games and dance, active play, and through free time spent at playgrounds and parks. Following the pandemic, opportunities for children to comply with activity guidelines have been affected by school and park closures as well as the social distancing measures implemented by many governments (Guan et al., 2020; Hammami et al., 2020).

In Italy, the regulations set by the Ministry of Education have required students to practice PE at home as well as provided precise regulations for carrying out PE classes in gyms and outdoor spaces (Table 1).

Peçanha et al. (2020) warn that emerging data indicates a substantial reduction in daily PA levels during lockdowns adopted around the world in order to reduce the spread of the disease. Reducing the levels of PA and increasing sedentary behaviour can cause rapid deterioration in cardiovascular health. In these critical and unprecedented times, the educational courses of motor activities carried out at home or in the garden present themselves as a clinically relevant intervention to promote health benefits. It was shown that individuals of the adult and elderly age used social media and TV as sources to facilitate PA whilst at home, which was a tool that children also used to facilitate their PE during lockdown in order to remain active (Edwards et al., 2017).

As for the inclusion of disabled students, it is evident that teachers must be taught or have the knowledge on how to incorporate less able-bodied students into online PE lessons. Children with disabilities are largely disadvantaged and could feel excluded if teachers do not plan the educational activities in a way which is beneficial for all students through online teaching. If teachers are competent in designing inclusive lessons through PA, then a school's curriculum is successfully inclusive for all students (McNamara & Dillon, 2020).

Tab.1 - In Italy, with reference to **physical education** activities carried out indoors, the Technical Scientific Committee - CTS - reiterated what was already approved on May 28, 2020, relating to the "Technical document on the hypothesis of remodelling of containment measures in the school sector", later recalled in the ministerial decree n. 39 of 26 June 2020 concerning the "School Plan for the year 2020-2021".

In this Document it was specified that *"For physical education activities, if carried out indoors (e.g., gyms), adequate ventilation and an interpersonal distance of at least 2 meters must be guaranteed (in analogy to what is regulated in annex 17 of DPCM 17 May 2020).*

In the early stages of school reopening, team games and group sports are not recommended, while individual physical sports activities that allow physical distancing are to be favoured. (……) Pupils must wear a surgical or community mask of their own equipment for the entire stay in the school premises, subject to due exceptions (e.g., physical activity, meal break); … "

The educational institutions, in compliance with the epidemiological situations of their respective territories, will pay particular attention to interpersonal distances, safety measures and to prefer outdoor or individual activities, considering the following parameters:

• exclusion from the obligations of protective devices for subjects who carry out educational physical education activities outdoors, with the obligation of interpersonal distancing of at least two meters;

• exclusion from the obligations of protective devices for those who carry out didactic activities of physical education indoors, with the obligation of respecting the interpersonal distance of at least 2 meters with adequate ventilation, preferring individual physical sports activities;

• obligation of protective devices for ordinary educational and / or motor activities, organized by individual schools in alternative spaces located outside the school buildings, in any case in compliance with the interpersonal safety distance of at least one meter.

In this regard, the educational institutions were invited to observe the provisions as well as in the context of physical education didactic activities, carried out internally also for the same curricular and extracurricular activities organized outside at sports facilities, parks or alternative spaces, similarly to what has already been specified with the departmental note no. 1870 of 14 October 2020.

What is the relationship between skills, knowledge, and the teaching of motor competencies?

Physical literacy is learnt through the face-to-face, pupil-teacher task environment at the developmental age (Garn & Byra, 2002). Teaching and learning are activities that are based on mutual listening, socialization and the sharing of knowledge and emotions, these all being factors that are absent in online teaching.

Online teaching can educate students using technology, meaning the motor competencies usually required have been significantly altered. The essential factors of teaching PE are motor competence, motor skills and knowledge, each taking equal value in the learning process. If the teaching process becomes imbalanced it means that the structure, internal relationships (tasks-teaching styles-context) and the training value of motor competencies have been altered.

In this regard, teaching motor competencies without showing physical skills is practically impossible and therefore requires a transformation of the educational process when teaching PE through online classes.

The EUEPEA recently published a position statement regarding the teaching of PE during the pandemic and is shown in Table 2 below.

Tab. 2- EUPEA statement on the teaching of physical education in schools during the COVID-19 pandemic

The EUPEA calls for ministers, Head Teachers and teachers to actively promote human development by ensuring the quality of education during the Covid 19 crisis.

EUPEA believes that:

- Physical education is the only compulsory subject through which children and young people can learn motor skills and acquire the knowledge to participate in a variety of physical activities. It is the only subject for which physical activity is a primary means of achieving educational goals.
- Quality physical education is unique in providing children and teenagers with the opportunity to develop self-management abilities to become independent and physically active adults. Physical education must be developed and strengthened.
- Physical education is essential for personal education and requires a quality program, taught by a qualified generalist teacher in Physical Education or by a specialist physical education teacher.
- Stakeholders should support the implementation and evaluation of quality, evidence-based physical education to promote physical activity and to help reduce sedentary behaviour.

European physical education association (EUPEA). Position statement on physical education in schools, during the COVID-19 pandemic. https://eupea.com/

Using an approach of teaching PE theory when teaching online can undoubtedly give a relevant contribution to students learning. This could be in terms of learning the regulations of sports disciplines, cause-effect links on the functioning of organs, systems and apparatus and the values of sport and fair-play. However, this also means removing the functional dimension that contributes to enriching the person's experience of learning, consisting of the experience lived with and through the body by movement and the interpersonal relationships experienced with teachers and other students.

The International Research Consortium for Motor Development (I-MDRC) (https://www.i-mdrc.com/) has also published a position statement on PE teaching during the COVID-19 crisis. It states that the pandemic is an unprecedented time in our history and has caused children around the world not to be able to have the desired amount of face-to face teaching and physical school experiences. Most COVID-19 restrictions limit PE, organized sport, and unstructured play with other children. This in turn will negatively affect children's motor development, physical efficiency, and social and cognitive development. The removal or probable reduction of PE for children will adversely affect their developmental process, health, and well-being. Children are susceptible to high levels of insecurity and anxiety associated with the significant disruptions that have occurred since the start of the pandemic. If the regular practice of PA is reduced, the levels of anxiety or depression have been seen to increase. The research by the I-MDRC also states that all schools must continue to carry out PE lessons by adjusting the structure of the programs. Furthermore, these programs must be implemented by experienced PE teachers who can engage all students in their practice. Where restrictions still prevent normal face-to-face education, quality online programs will need to be created for children to be educated at home (2020, https://www.i-mdrc.com/).

Promotion of PA and sporting activity and educational poverty

Physical and social distancing measures and the closure of schools and sport associations and sport leisure clubs have become common practice to reduce the spread of the disease, in turn disrupting many aspects of social life, including sport and PA in peoples' leisure time (Bas et al., 2020). Because of the global pandemic, for the first time in the history of the modern games, the Olympics and Paralympics were postponed and took place a year later than scheduled. In addition to the economic repercussions, the cancellation of the games also affects many social aspects of regional and national sporting events. Sport can be considered as a valuable tool for fostering communication and building bridges and bonds between communities and generations. Through the practice of physical and sporting activity it is possible to overcome prejudices and social conditioning to reduce the widespread phenomenon of educational poverty in many countries. Curricular and extracurricular PE in Italy has been interrupted and is unfortunately yet to be replaced with other organizational and operational methods; the pandemic has limited the sporting practice of children and young people, preventing participation, interpersonal relationships, and dialogue between people from different socio-economic classes.

As a result of COVID-19, online PE has become essential to support physical exercise in the school curricula. Webster et al. (2021) investigated the positive factors of remote and online PE; the study suggests that the PA model of a school defines a multicomponent structure of PE within the school as well as defined in objectives and outputs.

At the heart of this framework, the differences between school PE and family and community activity are seen. The model provides a platform for training PE teachers to help advance online education and support the promotion of public health through high quality and effective PE.

The perspective of PE in primary and secondary schools

The current debate on the present and future teachings of PE is assisted by the issues of safety now required at most schools because of the pandemic. In Italy, the recurring political debate unfortunately concerns the problems of masks, the presence or absence of plexiglass walls, social distancing and on how to lead teacher training.

It is key to remember that an essential and unavoidable positive aspect to in-person teaching is the educational and interpersonal relationship between students and teachers that technology cannot re-create, especially during the motor experiences that PE provides.

The debate on newer teaching methods cannot and must not be anchored to the sole problem of safety. The issue of safety could be a prerequisite for reopening the debate on the school and its aims around discipline, the teacher training process and on the role of the school in society.

PE has re-immersed itself at the centre of a worldwide debate and, together with other school disciplines, is called upon to reshape its teaching structure. Firstly, significant learning spaces and environments that seek inclusive content are key. Finding new spaces and environments to enable PE to return to green spaces, neighbourhoods, city centres and reintegrating it into the social life of children and young people with appropriate safety measures will enable young people to remain active despite there still being some restrictions in place. This re-evaluation of the space and environments in which activity is carried out requires a clear strategy in terms of content taught and equipment used for students and teachers to benefit.

Furthermore, the reshaping of PE teaching prompted by the current emergency should be a driving reason for rethinking the process of teacher training. Equipping teachers with more diverse qualifications from the initial stages of their teacher training will ensure that they are equipped for any future situation such as the one the pandemic created and will leave them not having to adapt within an extremely short space of time to continue delivering education to students.

CONCLUSION

The contexts in which physical and sporting activities usually take place have suffered during the pandemic. Whether it be the interruption of sporting activities, or the difficulties experienced in carrying out school PE during this time, children and adolescents have suffered considering levels of physical and psychological health that will be greatly discussed in years to come; particularly in relation to the Italian minors, as they are among the least active of all minors in Europe. The COVID-19 pandemic has radically changed the way in which educational institutions operate and has also clarified the need to prioritize the safety, health, and well-being of pupils of all ages whilst being educated. While new educational and organizational models are hypothesized for the school year 2021-2022, it is vital that head teachers and teachers have a clear vision towards the promotion of PE and PA for the benefit of the students physical and mental health.

As in all situations, critical periods such as the one created by the pandemic can be used to confirm the effectiveness of current policies or to address changes needed to be improved by traditional policies for future generations. The current situation can become a relevant opportunity to trace a profound change in our model of curricular PE and sports practice, a change that will allow us to promote health in an even more beneficial way.

Therefore, when the world has recovered from the pandemic, we should remember some of the lessons that the pandemic has taught us in relation to PE and PA: (a) today we have an educational alternative ready for use on various virtual platforms which is usable, affordable and certainly more interactive than many conventional fitness apps; (b) users with a low level of digital literacy can easily participate and benefit from an intervention regarding health-oriented physical exercise through social media; (c) those with special educational needs or who cannot participate in PA classes can resort to this new exercise alternative which is supervised by experts, socially interactive and above all, performed safely even at home.

The lockdown due to the pandemic is considered as a historical rather than a chronological watershed and this period requires an adequate commitment to further research and/or a re-conceptualization of the formative values of PE and PA in schools.

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EXPERIENCES OF TEACHING PHYSICAL EDUCATION DURING THE COVID-19 PANDEMIC IN FINLAND

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ABSTRACT

The purpose of this study was to define physical education (PE) teachers' experiences of teaching remotely during the COVID-19 pandemic. A questionnaire was sent to all the members of the Association of physical and health education in Finland and a total of 199 (69 % female, 21% male) PE teachers (mean age 46.2 years, SD=9.1) responded.

The study showed that 40.3% of the PE teachers stated that they used remote assignments, with 2.2% of them teaching with live video and 52.7% of teachers using both tools together. While the remote teaching period had many negative aspects such as the lack of social contact with and between students, the narrowing number of sporting activities carried out and the sedentary behavior of teachers themselves, most of the PE teachers also reported positive teaching experiences during this period. These included the positive effect that remote teaching had on shy and sensitive pupils as they gained an opportunity to showcase their skills and knowledge, the creativity of pupils when doing PE homework and the positive messages received from parents stating that the remote lessons meant that some family members also partook in the activities. For PE teachers themselves, the positive aspects reported were the diminished workload and improved technology skills.

It should be acknowledged that PE also creates many opportunities to improve physical activity (PA) outside of regular lessons. Giving PE homework not only increased pupils' PA but also the PA of a pupil's whole family. Additionally, homework can be an important way for pupils who are not so extravert or competent in PE lessons to feel comfortable.

Keywords: COVID-19, physical education teachers, physical education, pupils

INTRODUCTION

In autumn 2020, World Health Organization released new guidelines in relation to physical activity and sedentary behavior. According to these guidelines, all children and adolescents aged between 5-17 years old should partake in an average of 60 minutes of moderate to vigorous PA per day (Bull et al., 2020). Achieving the recommended amount of PA during childhood and adolescence can reduce the risk factors of sedentary behavior which leads to higher chances of health issues such as obesity, poor mental health and lower levels of PA in adulthood (De Craemer et al., 2012; De Decker et al., 2014).

Statistics show that the pandemic has had an influence on PA for individuals of all ages. For example, the daily steps completed by adults in France decreased by 40% when the lockdown period started (Tison et al., 2020). One of the reasons for this was the closure of recreational facilities such as fitness clubs, swimming halls and recreational centers (Bertrand et al., 2021; Slater et al., 2020). On the other hand, the closure of work places negatively influenced daily activity by diminishing active work commutes (Stockwell et al., 2021). Also, for children and youth, closure of primary, secondary, and post-secondary schools and organized sports clubs was immediate and created a drastic decrease in daily PA (Shahidi et al., 2020, Teare & Taks, 2021). This has also been reported in Finland, as the decline in steps has been found in all primary and lower secondary school students of both sexes. This decline is most evident in boys in grades 1-3 and girls in grades 7-9 (Vasankari et al., 2020). In addition, active commuting to school stopped, something that has been reported to be an essential example of PA (Tremblay et al., 2014; López-Bueno et al., 2021; Medrano et al., 2021). While in some countries the outbreak of COVID-19 was rapid and mortality was high, in Finland the situation was less so and mortality rates were much lower.

During the pandemic, the arrangement of PE varied drastically on a global scale. In some countries PE was either cancelled or the time was given to subjects with a "higher status and priority" (Cruickshank et al., 2021; An, 2020). In many countries PE continued through distance learning and with differing tasks and assignments to usual (Varea et al., 2020). In Finland, two 45-minute PE lessons were allocated per week for students in grades 1-9 (ages 7-15). In addition, in grades 3-6 and 7-9 there was one extra 45 minute PE lesson allocated to one grade per week and the decision on who receives it is made by the education officials of the municipality (Salin & Huhtiniemi, 2018). As of spring 2020, all teaching was carried out through distance learning until the end of May. The last two weeks of PE teaching in the academic year were carried out through face-to-face teaching, but social distancing was required at all times for the lesson to go ahead. That being said, it is worth noting that PE teachers have found it challenging to execute PE without being able to have face-to-face encounters between students (Varea et al., 2020).

Whilst there is already some information about levels of PA during the pandemic, less is known about the execution of PE during this period. In addition, the PE teachers' experiences about the negative and positive effects of pandemic on PE and pupils is also largely unknown. This paper aims to reveal the opinions and perspectives of PE teachers in Finland during the pandemic.

METHODS

The purpose of this study was to examine the perspectives of PE teachers in relation to teaching throughout lockdowns. An optional web-based questionnaire was sent to all 1,349 PE teachers who are members of the Association of Physical and Health Educators in Finland. In total, 199 (14.7%) of the teachers responded and, by answering the questionnaire, teachers gave their consent to be a part of the study. Of the respondents, 69% were female and 31% were male. This is an accurate representation of the gender proportions of the members of the Association of Physical and Health Educators in Finland. The mean age of the participants was 46.2 years (SD=9.1 years) and mean working experience was 18.4 years (SD=9.3 years).

QUESTIONNAIRE

The questionnaire required participants to provide basic personal information including their teaching level, the grades they teach, their work experience and the average number of students they teach per class. The questionnaire included questions related to the style of teaching they used during the pandemic, open-ended questions related to the positive and negative aspects of remote teaching and use of social media and different mobile applications during the pandemic. Additionally, the open-ended questions were related to the positive experiences during the period of remote teaching and whether teachers thought these positive teaching experiences could remain in PE after the pandemic. Additionally, questions related to the influence of the pandemic and the arrangement of PE were included in the questionnaire.

RESULTS

A high percentage of the teachers were teaching in lower secondary school (35.7%), upper secondary (19.4%), or a combination of the two (24.5%). Only a small number of the teachers involved in this study were involved in the primary level or a combination of primary and secondary level. The PE teachers had an average of 18.3 (9.3) years of work experience and the teachers in primary and lower secondary school had the least work experience (M=10.8, SD=8.2), while teachers in upper secondary school were the most experienced (M=20.8, SD=8.3) (p=.004). Most of the teachers had a master's degree in PE (86.1%), with some having a further master's degree (13.4%). The mean class size was 21.6 (4.3) students, and a higher number of students were reported in the upper secondary level of PE (F =3,249 (186, 4), p=.008).

Most of the teachers mentioned that they provided PE classes during the pandemic via different kinds of assignments (40.3%) or via combination of online sessions and assignments (52.7%). Only a small number of teachers carried out their classes by using only online sessions (2.2%). The final 4.8% of teachers reported other teaching techniques they used to carry out classes. In the open-ended question section, the teachers were asked to describe the positive and negative aspects that the pandemic had on teaching PE. They identified that some students were difficult or even impossible to reach and that assignments were not always completed. These students experienced a lack of PA and were shown to be the students who had already been physically inactive in their regular PE lessons. In addition, a concern also developed around who had completed the assignments that were set at home, for example, activity tracking assignments could be done by friend, sibling or relative without the teacher being aware.

The huge change that the teachers reported regarding themselves was that their active job was changed to a very passive one since moving to online education and an increase in workload was also reported by most of the teachers. In addition, they also mentioned that they were concerned about safety and how to effectively give instructions to the students without being physically present.

However, many positive aspects were also reported. Many teachers reported that more sensitive or shy students had a good opportunity to involve themselves compared to regular classes. This was due to there being no external pressures created by other students and the fact that they had several attempts to perform specific exercises. In doing so, some students even showed skills that teachers had never seen before. Additionally, some students reported family bonding, meaning that they completed their PE homework with family members, an aspect that was reported to be a positive experience for both parents and the children. The teachers also reported that during lockdown they could give more feedback to students and differentiating their teaching was easier than during normal classes.

At a personal level, the teachers reported that the regular feeling of hurry and being late to work disappeared during this period, and this also reduced some stress among some teachers. Also, a reduction in negative behavior was recorded by the teachers, but they did state that they missed the social aspects in teaching, such as succeeding together, peer support and the joy experienced during the face-to-face lessons. Teachers also reported that they improved their digital technology knowledge, something that would not have happened during a regular year of teaching, with students also stating that they found the technology applications used enjoyable. The teachers mentioned that some of the applications they became familiar with during the pandemic would be used in future classes regardless of the global health situation, with students also stating that they had purchased some of the applications to continue using them throughout the summer holidays. Students stated that they liked how the applications collected and recorded data throughout the day as well as during their PE lessons.

While there were also many positive things experienced by teachers at personal level during the lockdown, increased sedentary time was also reported. Normally they are constantly on the move, whereas lockdown saw them transfer their teaching to online and being sat down at a computer or on a mobile phone. The structure of PE in the autumn of 2020 had changed drastically compared to the year before. For example, no equipment could be used by multiple different students, no game vests were allowed and of course a safe distance between students as well as teachers was always maintained. However, only 14 % of teachers mentioned that the use of their gym was restricted, and whilst the National board of education recommended splitting large PE classes, only 6% of teachers reported that this was carried out.

More than 50% of teachers reported that they used Google classroom and other linked Google applications such as Google Forms as a platform for their teaching. Other platforms used were Wilma, peda.net and Microsoft teams, which are all widely used online teaching services in Finland. In addition to these services, teachers reported that students used WhatsApp as an application to submit their assignments. Other widely used mobile applications were Sport Tracker, a mobility tracking application similar to Strava, HeiaHeia, a wellbeing application where people can log their PA sessions and follow and support their friends, and Sportyplanner, a fitness app used partly because of the free usage provided during the pandemic.

In addition to the aforementioned statements, 86.7% of PE teachers stated that they used social media as an educational tool during the remote teaching period. One fifth mentioned that they used social networking services such as Facebook and Twitter and another fifth mentioned that they used different picture and video sharing platforms such as Instagram. Over 50% of the teachers mentioned that they used messaging applications such as Snapchat and WhatsApp as educational tools. Unsurprisingly, the most used apps were different video services with 91% of teachers stating that they used them to aid their teaching. An interesting statistic that should be mentioned is that over 85% of teachers felt that social media could be used as an educational tool, not only during the pandemic, but following on from it as well. Some reasoning behind the continued use of technology in PE was due to the fact that videos could be used more often to differentiate teaching for pupils with different skill levels. Teachers also felt that this kind of work assignment could be used as homework or for students who are absent. It was felt that group chats were useful too when used by a whole class to share their involvement in PE and also to give encouragement to each other.

DISCUSSION

The purpose of this study was to investigate the influence of the global pandemic and the restrictions it placed on PE teaching in Finland. 199 PE teachers were asked about the negative and positive aspects of remote teaching during the pandemic. One of the most positive aspects reported was the increased participation of less active and introverted pupils. Additionally, the pandemic forced teachers to change their daily routines and rapidly change to digital teaching. A positive aspect of this being that some teachers mentioned that they will continue to use some of the tools and solutions they discovered during the remote teaching period. On the other hand, there was also a shared concern for some of the students who were notoriously inactive in PE and general activity prior to and during the pandemic. In addition, there was uncertainty around the idea of who had completed the remote assignments, as students were not required to complete them in person and there was also a problem with several students who did not complete any assignments at all.

It was also shown that teachers missed face-to-face teaching and sometimes felt a lack of emotion and passion from the students, something that has also been reported in previous studies around remote teaching (Varea & González-Calvo, 2020). Additionally, there has been some previous concern around PE losing its identity during the pandemic due to the requirement for it to be switched to online teaching (Varea & González-Calvo, 2020), but the Finish PE teachers in this study did not report any kind of concern. This could be down to the fact that children were still allowed to leave their house to complete physical activities in parks and outdoor facilities.

Instead, a negative perspective was felt by the teachers due to their feeling of uncertainty in technological capabilities for teaching PE online and also the safety issues involved in teaching from afar. That being said, the teachers also reported that they experienced a change in perspective towards using technology, this being due to the professional development in technology and it being able to provide adequate capabilities for teaching PE (Almusawi et al., 2021).

As stated in previous literature, some teachers in differing schools and countries had reported feeling alone and isolated. However, the Finnish teachers did not report having any of these feelings (Mercier et al., 2021). This could be down to the social support that was received from various sources including Facebook groups, and guidance and regulations offered by the Association of Physical and Health Educators in Finland as well as the National Board of Education.

In recent years, the concept of physical literacy has gained more attention in the field of PE (Durden-Myers et al., 2018). Research shows that doing PE remotely could have some positive influences on students when viewed from the perspective of physical literacy's basic concepts. These concepts state that motivation, confidence, competence and knowledge and understanding can be enhanced through remote learning (Whitehead, 2019). When students have the opportunity for autonomy in PE, they may feel higher motivation levels than in normal classes. In addition, when they can choose the difficulty level in which they do their PA, they might feel higher levels of competence, especially as they are not comparing themselves to other students, in turn also increasing the student's confidence.

This research also showed that some teachers gave some written tasks for students. Written assignments can increase the self-awareness of a student and require them to look at PA from a different perspective, in turn allowing them to learn more. In addition to this, the data collected showed that social networks as a part of PE could be one route to activate students. Previous studies show that social networks play important role in increasing student motivation and involvement and can also be used to encourage families to partake in PA together (Franks & Krause, 2017; Hortigüela-Alcalá at al., 2019). However, one challenge in the use of social media is the reliability and validity of the information provided, as this cannot always be monitored.

During the pandemic, students learnt to do different types of assignments than they normally would. While this was a very new situation for PE, similar assignments have been used before. Research shows that voluntary PE homework is an effective way to increase PA among lower secondary school girls and also enables them to reach their suggested levels of daily PA (Gabbei & Hamrick, 2001; Kääpä et al., 2019). These kind of assignments have been found to be connected to family members also as during the pandemic parents were able to participate in their children's PE and benefit from the situation (Kääpä et al., 2019). In doing this, parents were able to familiarize and educate themselves about PE and what is required form the students, as research shows that some parents attitudes and knowledge about the subject can be outdated (Williams & Hannon, 2013; Gabbei & Hamrick, 2001). Similarly, PE homework could also potentially promote physical literacy of students, if there were to be theoretical assignments (Gabbei & Hamrick, 2001).

However, it is also noted that giving too much responsibility to students in relation to their PA may be too much responsibility for some students, leading to a lack in exercise. Parents raised this concern and highlighted the importance of a teacher being present, at least in the sense of instructional videos through digital workouts (Roe et al., 2021). This still highlights the need for a qualified PE teacher as they are capable of designing tasks and assignments in lessons as well as remote lessons that are simple yet challenging enough for children of a certain age to learn and gain benefit from (Napper-Owen et al., 2008).

Strengths and limitations

The Association of Physical and Health Education teachers in Finland has more than 1,500 members, 199 of which answered the questionnaire provided. Although an in-depth opinion was generated from the participant responses, a potential limitation to this study is that the sample size of participants could have been bigger. Another limitation can be seen in the teaching grade of the participants, most of the PE teachers involved in the study were teaching either in lower or upper secondary school, meaning that although we have a good understanding of the situation in PE at this level of schooling, we do not have clear view on primary school PE during the pandemic.

CONCLUSIONS

This study showed, that whilst the COVID-19 outbreak had negative influences on PE and PA in general, some positive insights were also seen. This should be seen as an opportunity for PE teachers and teaching authorities to rethink the idea of educating students outside of dedicated PE lessons. For example, giving homework could potentially give opportunities to some students show their skills and capabilities that may not be well presented during a regular lesson.

CONFLICT OF INTEREST

The authors of this paper have no conflict of interest.

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EXPLORING SOCIAL AND SCHOOL SUPPORT FOR PHYSICAL ACTIVITY DURING COVID-19 PANDEMIC LOCKDOWN IN YOUTH

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ABSTRACT

OBJECTIVES: This study aimed to explore social and school support for physical activity during COVID-19 pandemic lockdown in adolescents, to investigate how those young people interacted with their school environment during the spring 2020 lockdown, and to examine how this could have impacted their practice of physical activity. This study also meant to provide an international perspective to these outcomes. **METHODS:** Between December 2020 and March 2021, 2,948 Canadian and 1,356 Belgian high school students completed an online questionnaire assessing their perceived change in physical activity, their interaction with schools regarding physical activity, and the physical activity-related resources offered to them by their schools. **RESULTS:** During the spring lockdown, most of the participants from both Canada and Belgium perceived a decrease in their practice of physical activity in comparison to prior to the spring lockdown, reporting important barriers caused by the COVID-19 pandemic. Moreover, a significant decrease in the proportion of participants reporting a strong or a very strong support was observed during the spring lockdown for family, friends, community, and school. Finally, most of the participants indicated that they did not have contact with any of the school team members to discuss about physical activity during that period. **CONCLUSION:** Results of the present study describe a perceived decrease in adolescents' physical activity levels an unsatisfactory overall picture of the social and school support provided to them during the spring 2020 lockdown, encouraging to take a step back and reflect on subsequent adapted strategies.

Keywords: adolescents, physical activity, secondary school, social support, school support, lockdown, COVID-19

INTRODUCTION

In March 2020, daily lives of most human beings worldwide shifted to numerous restrictions as WHO declared the COVID-19 outbreak as a global pandemic (World Health Organization, n.d). Social restrictions were implemented by country authorities such as physical distancing, quarantining, limited travel distances, schools, and border closures. These restrictions, advising people to stay home, have impacted people's lives habits and subsequent reductions of physical activity (PA) levels (Meyer et al., 2020; Stockwell et al., 2021). A recent large-scale study suggested that physical inactivity is the strongest risk factor for severe COVID-19 outcomes (Sallis et al., 2021). Among youth populations, widespread school closures have led to classroom lessons being replaced by home-schooling and online learning. According to Guan et al. (2020), children are mostly active through active travel to school; physical education (PE) and recess; organised sports, games, and dance; active play; and spending time in playgrounds and parks. With the closure of most of those indoor and outdoor places for youth to engage in PA, major declines of PA participation were observed during the COVID-19 lockdown. In Canada, a survey conducted during the COVID-19 pandemic in parents of 1,472 children and adolescents (5-17 years old) revealed that only 3.6% of children (5–11 years) and 2.6% of adolescents (12–17 years) were meeting the international recommendation guidelines (World Health Organization, 2010) of achieving at least 60 minutes per day of moderate to vigorous PA (Moore et al., 2020). Those measures are drastically lower than the 12,7% reported school-aged children/adolescents (5-17 years) meeting the guidelines in 2019 (Rhodes et al., 2019). However, healthy movement behaviours are associated in youth with notable physical and mental health benefits (Carson et al., 2017), including a more robust immune system (Lasselin et al., 2016).

COVID-19-related restrictions bring then additional challenges in engaging youth population in an active lifestyle. To contextualise strategies to this end, socio-ecological models of health behaviours provide a useful framework in which each person is influenced by intra-individual (e.g., enjoyment, motivation), inter-individual (e.g., social support from friends, family, or teachers), physical environment (e.g., sports facilities) and policy (e.g., health care policies) levels of determinants (Sallis et al., 2008). On each level of the socio-ecological model, both physical and social environment prompts for PA were disrupted during the COVID-19 pandemic and it seems interesting to explore whether those determinants were associated with a potential decline of PA practice in youth. Before the COVID-19 outbreak, the review of Martins et al. (2015) highlighted the significant influence of friends, family, school, and community toward the participation of adolescents (13-18 years) in PA. Friends support, presence and practice have a positive influence on adolescents PA (Bélanger et al., 2011). Parental support is also critical and could be subdivided into logistical support (e.g., transportation to sport activities), encouragement (e.g., providing information and praise for healthy behaviour), and co-activity (e.g., practicing activity together) (Rhodes et al., 2013). The school environment is identified as a privileged place to integrate different interventions targeting young people's PA (McMullen et al., 2015), including those directly undertaken by the PE teacher. School is considered as a cornerstone for increasing daily PA through its influence on inter-individual (e.g., fellow pupils or teachers), physical environment (e.g., PA facilities at school) and policy levels (e.g., school-community partnerships), given that most youth attend school regularly. Martins et al. (2015) observed that PE teachers had a positive influence on youth PA by their encouragement and their engagement in school and community PA. Those statements sound even more relevant as Kovacs et al. (2021) observed that safeguarding PE lessons online contributed to maintain active lifestyle in youth from 10 European countries during the first wave of the COVID-19 outbreak. However, whether the social support is perceived insufficient or sufficient, it could act as a barrier or facilitator of the adoption of an active lifestyle in youth population. For example, Nathan et al. (2018) identified in schools that the availability of the PA staff, the support from school boards, or the teachers' ability to implement the policy were reported as barriers or facilitators to implement school PA policies. The principal aim of this study was then to explore social and school support for PA during COVID-19 pandemic lockdown in youth. Adolescents already represent a population struggling to adopt healthy movement behaviours and the restrictions due to the COVID-19 pandemic could decrease their propensity to succeed. In this context, another specific goal of the study was to investigate how those young people interacted with their school environment during the lockdown and how this could have impacted their actual practice of PA. Surveys have been conducted in Canada (Montréal, province of Quebec) and Belgium (Wallonia Brussels Federation) to provide an international perspective to those outcomes.

METHODS

Overview

The results of this study are based on data collected within two distinct countries using the same methodology. First, in Canada, 17 public secondary schools of the island of Montreal accepted to participate in the study. Seven of the participating secondary schools were English-language schools, while ten of them were French-language schools. The data collection was performed from December 2020 to January 2021. Thereafter, in Belgium, 15 public secondary schools of the Wallonia Brussels Federation accepted to participate in the study. Participating schools were all French-language schools. The data were collected from January to March 2021. In both countries, inclusion criteria for schools were: 1) to offer the regular secondary education program of the region where it stands and 2) to serve the complete secondary education curriculum, which represents grades 7 to 11 in Montreal and grades 7 to 12 in the Wallonia Brussels Federation. All participants and their parents or guardians were fully informed about the nature, goals and protocols of the study and gave their informed consent. All procedures were approved by the Research Ethic Committee on addictions, social inequalities and public health of the Montreal Public Health's department and the Hospital-Faculty Ethics Committee of the University of Liege.

Participants

Inclusion criterion for participants was to be a regular student of one of the participating schools. Two thousand nine hundred and forty-eight Canadian high school students (grades 7 to 11; girls: 52.9%, boys: 43.6%, gender-diverse or unknown: 3.5%) and 1,356 Belgian high school students (grades 7 to 12; girls: 58.4%, boys: 39.7%, gender-diverse or unknown: 1.9%) completed this study.

Questionnaire

Students completed a 15-minute online questionnaire during one of their classroom periods (virtual or in-class). This non-standardized questionnaire was developed by a collaborative research team involving University of Sherbrooke researchers, the Montreal Public Health, the school boards of the Montreal area, the City of Montreal as well as public organizations engaged in the promotion of a physically active lifestyle in adolescents to investigate the adolescents' PA during the spring lockdown period. Within the questionnaire, they were asked to qualitatively compare their PA participation during the spring lockdown period (from the middle of March to the end of June 2020) to prior to the spring lockdown period (before the middle of March 2020), referring to the last regular in-class learning period. Participants indicated if their PA practice varied during the spring in comparison to the previous winter on a five-level scale (from "decreased significantly" to "increased significantly"). Participants also indicated the perceived social support to PA for two different periods, namely prior to the spring lockdown period and during the spring lockdown period. They were asked to qualitatively qualify on a five-level scale (from "no support" to "very strong support") the support to PA they perceived from family, friends, community, and school. Moreover, participants reported through multiple choice questions how they interacted with their school environment regarding PA during the spring lockdown. Finally, participants reported their perceived barriers and facilitating factors to PA participation by selecting them from a list, creating new items if needed, and ranking the selected items.

Statistical analysis

Descriptive statistics were calculated for all study variables. Gender and school's level differences in the perceived change in PA were assessed using chi-square tests. A two-proportion bilateral z-test was performed to assess proportional differences in the perceived change in PA and in social support between "prior to the spring lockdown" and "during the spring lockdown" periods. Finally, chi-square tests were performed to assess the differences in the associations between the perceived change in PA with the perceived social support, the school's interaction, and the perceived impact of the use of school's resources during the spring lockdown. Significance was defined at $p < 0.05$. Statistical analysis was performed using SPSS 27 for Windows (IBM Corp., NY, USA) and RStudio software (R Core Team, Vienna, Austria).

RESULTS

During the spring lockdown, most of the participants from both Canada and Belgium perceived a decrease in their practice of PA in comparison to prior to the spring lockdown (see Figure 1). Differences between genders were observed in Canada only. That is, in Canada, a larger proportion of girls than boys perceived an increase in its PA participation during the spring lockdown (20.0% vs 15.7%; $p < 0.05$), while a larger proportion of boys than girls reported having experienced similar level of PA during the spring lockdown in comparison to prior to the spring lockdown (28.9% vs 22.8%; $p < 0.05$). Proportions of girls and boys who have perceived a decrease in their PA participation during the spring lockdown were similar in both Canada and Belgium. Also, differences between school's levels were observed in both countries, as a larger proportion of older than younger students perceived an increase in their practice of PA during the spring lockdown in comparison to prior to the spring lockdown. Also, in Canada only, a larger proportion of younger than older students reported having experienced similar level of PA during these two periods ($p < 0.05$). Proportions of older and younger students who have perceived a decrease in their PA participation during the spring lockdown were similar.

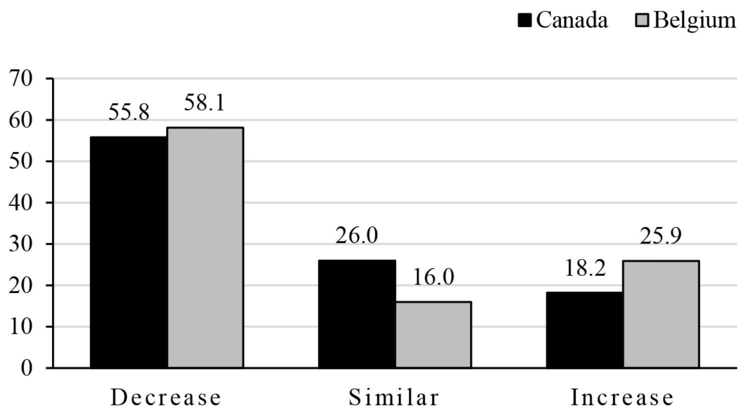

Figure 1. Perceived change in physical activity, in percentage, during COVID-19 spring lockdown in Canadian and Belgian adolescents

Participants have indicated that the COVID-19 pandemic had brought important barriers to their PA participation, such as the unavailability of their desired activity (Canada: 57.4%; Belgium: 59.8%) and the compliance with the sanitary measures (Canada: 31.6%; Belgium: 34.0%). Their lack of motivation also hindered their PA participation (Canada: 35.8%; Belgium: 38.6%), while the three most often identified facilitating factors to PA were to improve their physical fitness (Canada: 56.7%; Belgium: 58.8%), to be with friends (Canada: 57.1%; Belgium: 49.6%), and to get enjoyment from participating in PA (Canada: 40.0%; Belgium: 50.5%).

Table 1 presents the social support toward PA perceived by participants prior to the spring lockdown as well as during the spring lockdown. Significant decrease in the proportion of participants reporting a strong or a very strong support was observed during the spring lockdown for family, friends, community, and school. Participants who perceived at least one strong support from family, friends, or community in regard to their PA during the spring lockdown were more likely to report an increase (Canada: 21.7% vs 13.5%; Belgium: 31.6% vs 20.6%; $p < 0.05$) and less likely to report a decrease (Canada: 51.5% vs 62.1%, $p < 0.05$; Belgium: 56.0% vs 63.0%; $p = 0.07$) in their PA participation for the same period. Moreover, in Canada strong school support during the spring lockdown was associated with a smaller proportion of participants reporting a decrease in their PA participation (50.6% vs 56.9%; $p < 0.05$) and a larger proportion of participants reporting similar PA (32.1% vs 24.4%; $p < 0.05$) during that period.

Table 1. Perceived social support toward physical activity during COVID-19 spring lockdown in Canadian and Belgian adolescents

Perceived social support	**Prior to the spring lockdown**		**During the spring lockdown**	
	Canada	**Belgium**	**Canada**	**Belgium**
Family support, *n (%)*				
Strong or very strong support	1,552 (55.2)	487 (54.3)	1,327 (47.6)*	427 (47.6)*
No strong support	1,259 (44.8)	410 (45.7)	1,461 (52.4)*	470 (52.4)*
Friends support, *n (%)*				
Strong or very strong support	1,070 (38.5)	289 (35.0)	834 (30.2)*	260 (31.5)*
No strong support	1,712 (61.5)	537 (65.0)	1,926 (69.8)*	566 (68.5)*
Community support, *n (%)*				
Strong or very strong support	762 (27.6)	351 (45.0)	487 (17.8)*	214 (27.4)
No strong support	1,995 (72.4)	429 (55.0)	2,251 (82.2)*	566 (72.6)
School support, *n (%)*				
Strong or very strong support	902 (32.6)	253 (28.9)	549 (19.9)*	171 (19.5)*
No strong support	1,869 (67.4)	623 (71.1)	2,203 (80.1)*	705 (80.5)*

*Significantly different ($p < 0.05$) from "prior to the spring lockdown".

Furthermore, most of the participants indicated that, during the spring lockdown, they did not have contact with any of the school team members to discuss about PA (Canada: 54.2%; Belgium: 59.6%). Participants who had exchanged about PA with one of the school team members did it mostly with their PE teacher (Canada: 17.7%; Belgium: 20.4%). Main contents covered during these exchanges were practice of PA (Canada: 63.9%; Belgium: 60.3%), physical condition (Canada:

48.3%; Belgium: 55.6%), lifestyle habits (Canada: 43.6%; Belgium: 23.0%) and sanitary measures (Canada: 31.8%; Belgium: 13.8%). Resources proposed by school and used by the participants who had contact with one of the school team members during the spring lockdown to discuss about PA differed between Canada and Belgium. That is, in Canada, resources used were mainly websites (18.5%), participation in activities organized by the school (e.g., virtual running, activity breaks; 11.7%), private channels with teachers (e.g., teachers' YouTube channel; 11.5%), and programming proposal including the practice of physical activities (11.3%). In Belgium, resources used were mainly learning kits (40.1%), applications (30.6%), and private channels with teachers (12.5%). In Canada, 36.7% of the participants who had received resources related to the practice of PA from their school had not used them, compared to 18.5% in Belgium. Finally, in Canada, 52.9% of the participants who used these school's resources during the spring lockdown indicated that it has helped them maintain or increase their participation in PA, compared to 35.8% in Belgium. However, no association was observed between the perceived change in PA during the spring lockdown with the fact of having kept contact with one of the school team members to discuss about PA or with the perceived impact of the school's proposed PA-related resources.

DISCUSSION

The present study aimed to explore social and school support for PA during COVID-19 pandemic lockdown in youth, to investigate how those young people interacted with their school environment during that period and how this could have impacted their PA levels. Results of the present study indicate that, in Canada as well as in Belgium, most of the high school students perceived a decrease in their practice of PA during the lockdown. These findings are consistent with previous studies (Bates et al., 2020; Moore et al., 2020) and appear to be directly related to the social restrictions imposed during that lockdown. As expected, the COVID-19 pandemic lockdown had brought important barriers to adolescents' PA participation and has also harmed one of their most important facilitating factors to PA in limiting their capacity to practice PA with friends (Dubuc et al., 2021). Furthermore, we observed that increase in PA during that period was higher in girls and in older students. This result raises questions on how high schools ensure meeting older girls' needs in term of physical activity. Further studies should consider examining this question.

Moreover, during the spring lockdown, participants reported significant decrease of strong or a very strong social support toward PA from family, friends, community, and school. This massive decline in social support is closely related to the global recommendation that individuals must stay home to avoid social interactions and restrain the disease spread. This relative social isolation during the COVID-19 outbreak could potentially increase physical inactivity (Peçanha et al., 2020). Even if staying home mostly meant spending more time with the household family members (e.g., parents, brothers and/or sisters), the perceived reduction of support for PA from those close relatives may seem surprising. A possible explanation could be tied to the multiplicity of tasks that parents had to deal with during teleworking. Work tasks, house tasks, children-related tasks (e.g., homework) at hand simultaneously could result in additional fatigue, reported as a barrier for co-participation, whereby parents facilitate activities in which they can be active with their children (Rhodes & Lim, 2018). However, when present, parental encouragement during COVID-19 outbreak is associated with higher child indoor and outdoor PA, time spent walking and biking, and family PA (Moore et al., 2020). The latter also found that families tended to shift toward more inside and sedentary activities such as crafts, puzzles, games, and video games. Initiatives that could help parents and carers to incorporate PA into youth's daily routines should therefore be supported. Active family breaks, outdoor hikes or "geocaching", co-participation in active video games or channels, or using online health and/or PA apps are examples of activities that could help to achieve the recommended levels of PA in youth (World Health Organization, 2010).

This home-centred lifestyle is also associated with a significant decline in support from friends in both countries. Considered by the participants as the most important facilitating factor for PA, their influence during the lockdown was highly restricted. Before the COVID-19 outbreak, friends' preference and participation in leisure activities being linked or not linked to PA had a major influence on the adoption of physically active behaviours among adolescents (Martins et al., 2015). During the lockdown, those interactions were weakened and probably led to the observed decreased PA participation for those who declared less social support from friends. The study of Tulchin-Francis et al. (2021) exposed that PA with friends, especially outdoor, also decreased in the US during the first lockdown. Common form of social communication between friends has then even more shifted to an online video/chat interaction during this period and could partly explain this reduced support and shared participation in PA. However, those who perceived strong enough support from their friends could have potentially preserved or adjusted their PA habits to the context they went through. For example, some adolescents could have challenged their friends by taking part in trackers/online fitness challenges or in performing viral dances (e.g., TikTok), whereas others increased their screen-based sedentary inside activities (e.g., video games, phone, or tablet) to keep a social connection with their friends. Helping adolescents to engage in any practice of PA that they would enjoy, valuated by friends and that strengthened social relationship provides avenues for PA actors from community and school contexts.

In a socio-ecological perspective of PA promotion (Sallis et al., 2008), those actors are highly valuable, but their support perceived by the participants of this study was also reduced during the COVID-19 spring lockdown. Community impact on PA participation in youth was highly reduced during the first lockdown due to the closure of most of the sport and recreational infrastructures, and subsequently to the coaches and local PA stakeholders who usually manage and supervise activities undertaken in those places. Moreover, because children and adolescents are more active outside than inside, Kovacs et al. (2020) considered that closing outdoor facilities for PA should be considered only as the last resort during lockdowns. Community policies and stakeholders could therefore be informed about the benefits of outdoor play and should be encouraged to set up and facilitate the access of the youth population to those environments. For example, Bates et al. (2020) suggested that local governments could open parks with one-way traffic patterns to promote social distancing outside.

The inclusion of strategies that target environmental changes is also a matter of school-based PA policies. Social support in this specific context is multifaceted and could encompass the principal and teachers' support for PA. This social influence in schools has been highlighted as, together with the availability of PA resources, the most frequently cited facilitators of youth participation in PA (Martins et al., 2015; Nathan et al., 2020). However, due to the schools' closures during the first lockdown of the COVID-19 pandemic, contacts and supports from the school stakeholders were also drastically reduced. Our study revealed that most of the youth had not had any contact with the school team members during this period to discuss about PA. These findings address an important issue because of the essential and cornerstone role of the school environment in the contribution of the adoption of an active lifestyle in youth (Cale & Harris, 2006; McMullen et al., 2015). Evidence also shows that children are less active during unstructured or non-school days (Lin et al., 2018). This appears to be supported by the study results showing that a strong school support during the spring lockdown was associated with a smaller proportion of participants reporting a decrease in their PA participation. During this first lockdown, PE teachers were the most cited actors within schools for their support of PA in youth. This confirms their central position in PA promotion (Carson et al., 2014). Main contents covered during these exchanges were similar in Canada and Belgium except for lifestyle habits. The recommendation of Guan et al. (2020), outlining that teachers should know and promote active behaviours and embrace opportunities to incorporate healthy movement messages, practices, and policies into daily home-school routines and lessons, foster the need to include health-related learnings in PE.

School and PE teachers' initiatives to promote an active lifestyle were highly challenged during the COVID-19 breakout, resulting in a diversity of PA-related resources that were employed during the first lockdown. In Canada and Belgium, those materials originated mostly from the school in general, the PE teacher online teaching or private channels, or even the use of external PA applications. Considering that more than one out of two participants did not receive social support from the school team members about PA and that a significant number of those who received at least a resource related to the practice of PA from their school had not used them or declared that those resources did not help them to maintain or increase their participation in PA, school support provided to students during the spring 2020 lockdown was insufficient.

There were some limitations to the present study. First, our findings are limited to populations of students from public high schools in Montreal, Canada or in the Wallonia Brussels Federation, Belgium. Nonetheless, our results are strengthened by studying two homogenous populations in very large sample sizes. Also, as the participants completed the questionnaire between December 2020 and March 2021, their answers may be subject to recall biases.

In conclusion, results of the present study describe an unsatisfactory overall picture of the social and school support provided to adolescents during the spring 2020 lockdown, encouraging to take a step back and reflect on subsequent adapted strategies. Creating enjoyable, creative, remote or hybrid learning contents that promote social support and interaction in the youth population is therefore a challenge involving all stakeholders of PA promotion at each level of the socio-ecological model. For example, a comprehensive school PA programs, linking of school PE, the family, and the community, could serve to promote PA in youth with the support of the new online content that has been deployed during the COVID-19 pandemic (Webster et al., 2021).

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THE IMPACT OF PHYSICAL ACTIVITY ON MENTAL HEALTH DURING THE COVID-19 PANDEMIC ON YOUTHS IN UKRAINE

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ABSTRACT

This study was conducted between the months of March 2020, and March 2021, in Kiev, Ukraine. The study involved 128 participants from Kiev aged between 18-25 years old. The participants were split into two groups known as the Main Group and the Control Group. The 74 of the participants in the Main Group had previously contracted COVID-19 and suffered from mild symptoms, and the other 74 participants in the Control Group had not previously contracted COVID-19.

Firstly, we identified the individuals in the whole participant group who tried to maintain their usual level of physical activity (PA) during the pandemic, as well as those participants who noted a decrease in their level of PA during the pandemic. This research studied the PA characteristics and levels of the participants using the Framingham method. Based on the results, the participants were divided into two groups. These being, those who maintained the same level of PA, despite the quarantine restrictions, and those whose level of PA decreased.

Throughout this research study, we recorded the indicators of the participants' well-being through questioning and pedagogical observation. The survey was carried out using a questionnaire created by the Ukrainian National Institute of Mental and Physical Health and enabled us to establish the nature and severity of mental health issues reported among the respondents. The use of pedagogical observation provided information on the changes and indicators on the well-being characteristics of the participants. The wellbeing indicators were collected both before and after the study. Once collected, they were compared and enabled the assessment of how PA levels affect young individuals' well-being, as well as the impact the pandemic had on well-being.

Keywords: physical activity, quarantine restrictions, mental health

INTRODUCTION

Considering that a person's motor activity can significantly affect the state of their health, it is important to carry out research studies in order to define how we can best understand the relationship between an individual's PA and well-being. Whilst the world is currently suffering due to the pandemic, it is of the utmost importance to adapt and find ways to solve the deterioration of young people's mental health. The decline in mental health has been strongly linked to the occurance of lockdowns, restrictions, and the general tone the global pandemic has set. In many countries, it was a lawful requirement to introduce national lockdowns to prevent the rapid spread of COVID-19 (Haskell, 2008). Because of this, the level of PA in children and adolescents significantly decreased. This is highly detrimental as individuals in this age range experience a lot of physical and mental development from PA and, by it ceasing, understandably problems are created (Kohl, 2015; Trots, 2016).

For the adult population, physical inactivity and the development of chronic diseases are linked, meaning that PA is one of the most important sources of human movement (Hillman, 2009). As a result of this, governments all over the world are looking for effective ways to combat inactivity. As well as the highly important need to develop vaccines to combat COVID-19 and enable the world to open up again, it is also highly important for solutions to be found in order to combat physical inactivity in relation to this pandemic (Antala, 2001; Ivashchenko, 2019).

Modern literature presents the importance in PA and the need for ever-growing developments of new and innovative ways to uphold the required levels of PA in individuals despite the global restrictions and national lockdowns (Finny, 2018).

Research also highlights the very present need to improve the systems in place to enable and encourage PA in young individuals (Tendon, 2018). Through studying the mechanism of the human body, it is clear that efficient exercise can be completed using a limited space, something that became a very necessity during the pandemic (Charges, 2017). However, there is still limited research and data on the influence that PA has on mental health and this is an issue that we touch upon in this paper.

METHODS

This study was conducted in Kiev, Ukraine from the start of the global pandemic in March 2020 until March 2021. Young people who were registered at regional outpatient clinic in the Darnytskyi district of Kiev and aged between 18-25 years old were selected for participation in this study. This being the criteria because we believe that participants aged between 18-25 would provide the most indicative data in relation to their physical and intellectual development. All participants selected were of similar age, height, and weight.

Firstly, based on their medical records, 74 participants who had suffered from mild coronavirus symptoms in 2019 were selected and placed in the Main Group. Following this, a further 74 participants that had not contracted coronavirus were selected and placed in the Control Group. Following this, participants' PA levels were assessed using the Framingham method in order to understand which participants, despite the quarantine restrictions, maintained their usual level of PA and which participants' PA level decreased. Throughout the study, participants maintained online contact with the researchers to monitor their health during this period. A questionnaire developed at the Ukrainian Institute of Cognitive Behavioral Therapy was also used to assess the well-being of the participants throughout the study. Pedagogical observation was used to observe changes in the participants' well-being throughout this time period with the data subsequently being compared between participants. To assess the degree of reliability of the data obtained, at the final stage of the study, a correlation analysis was used to compare the mean values recorded. The application of these research methods allowed us to collate the necessary information to develop conclusions and practical recommendations.

RESULTS

Results showed that some participants retained their usual level of PA, whereas for others it decreased significantly. The quantitative data collected can be seen in Table 1 below.

Table 1. Participant information

№	Levels of PA	Previous history of coronavirus infection		No previous history of coronavirus infection	
		Male	Female	Male	Female
1	Maintained usual levels	18 (12, 2 %)	20 (13, 5 %)	14 (9, 5 %)	16 (10, 8 %)
2	Reduced levels	20 (13, 5 %)	16 (10, 8 %)	24 (16, 2 %)	20 (13, 5 %)

As mentioned, throughout the entire observation period, participants' well-being was recorded using a questionnaire developed by the Ukrainian National Institute of Mental and Physical Health. In addition to this, participants kept a self-assessment journal to note any changes in this mental health and well-being during this process.

While maintaining their self-assessment journal, the participants considered the nature of any issues experienced as well as the severity.

The most common complaints were:

1. Headaches
2. Sleep disturbances
3. General weakness
4. Nausia
5. Dizziness

The participants defined the severity of each of their complaints in points. For this, a scale was established for assessing the intensity of the symptoms felt.

If there was an effect on well-being, but it did not affect the performance of day-to-day functions of the participants, one point was given. If the symptoms had a small impact on daily activities, two points were given. If the symptoms had a moderate impact on daily activities, three points were given. If the symptoms significantly limited usual activities, four points were given. Finally, if symptoms were so intense that habitual activity became impossible, five points were given.

According to the data recorded in the self-assessment journal, symptoms and severities were recorded as and when they were felt.

Following this, we collated the total number of points which characterized the degree of deterioration in the participants' well-being and then compared the data between the two participant groups.

The collected data is shown in Table 2 below.

Table 2. Indicator points scored in participant mental health and well-being.

Group	Participants PA levels	Male	Female
1	Maintained usual PA levels	168, 4 ± 3,6 P. < 0,05	166,8 ± 3,6 P. < 0,05
2	Decreased PA levels	247,6 ± 5,4 P. < 0,05	239,9 ± 5,2 P. < 0,05

Following this, we compared the data from Table 2 in relation to the Control Group who did not suffer from coronavirus. The results can be seen in Table 3 below.

Table 3. Participant well-being points scored in The Control Group**.**

Group	Participants PA levels	Male	Female
1	Participants who maintained their PA levels	135,9 ± 2,9 P. < 0,05	133,8 ± 2,9 P. < 0,05
2	Participants whose levels of PA decreased	211, 4 ± 4,5 P. < 0,05	209, 6 ± 4,5 P. < 0,05

The results show that among young people in Ukraine, due to the restrictions in place because of the global pandemic, there was a rise in the deterioration of individual's health. In particular, the frequency and severity of well-being issues suffered in young people who had mild coronavirus symptoms in 2019 were 33 points (19.6%) higher than in people who did not contract the virus.

By comparing the results, it was discovered that participants who maintained the same level of PA reported 79 points (31.9%) less in mental health and well-being indicators than those who had a significant decrease level in PA. Thus, the results of this study indicate that individuals who contracted coronavirus and suffered from mild symptoms had also experienced a decline in their mental health and well-being. Furthermore, the mental-health and wellbeing of the participants declined even further due to the quarantine restrictions and the limit placed on PA.

DISCUSSION

During the pandemic, a huge number of people were forced to adhere to restrictions that were put in place to limit the spread of the virus and because of this the PA levels in most individuals decreased.

The results of this study showed that limiting the normal activity of individuals is detrimental to their physical and mental health. This finding is in line with previous research that looks at the effects of mental health and well-being in relation to the global pandemic (Liang, 2020; Copeland, 2021).

Research also shows that physical inactivity in individuals also leads to the development of pathological conditions and diseases, leading to the deterioration of an individual's general health. Specific age groups were more affected when it came to PA levels during the pandemic, these being students in junior schools and state colleges (Thakur, 2020).

It should be noted that despite the restrictions leading to physical inactivity in adolescents, junior and senior athletes training for professional events such as the Olympic Games mostly continued their training activities, of course with them being carried out in compliance with sanitary and safety measures (Bloch, 2020).

Therefore, at present, one of the main tasks required from doctors as well as PE teachers is to find ways to solve and improve individuals' health in a situation like this and to also increase or maintain people's PA levels.

To successfully increase the PA of individuals, it is important to consider all aspects of their life, such as their living conditions and the nature of their usual activities. It is also extremely important to know the psychological state of individuals as stress has a significant impact on the central nervous system (Novak, 2015). To regain normality in the PA levels of people, it is advisable to carry out a gradual process of slowly increasing complex physical exercises. These exercises should be adapted to the capabilities of individuals depending on their physical abilities, age range and physical health.

Further research should consider ways in which individuals are able to maintain PA through any social situation or restriction with a limited amount of space available.

Undoubtedly, the most important role in the creation of a modern system is to increase participation levels in motor activity and further recommendations should only be applied by experienced specialists working in the field of health care and PE.

An important factor in this study which should be taken into consideration is that the research was carried out in real time during the pandemic and therefore provides real factual data in terms of the feelings and well-being of participants during the study.

However, there are several limitations to this study that could be considered as grounds for further research. The first is that the participant pool could have been bigger, and the second is that the study was carried out on individuals aged between 18 and 25 years. A wider age range of participants as well as a greater number of participants would give a more in-depth finding to this research topic.

CONCLUSION

Based on the data obtained throughout the course of the study, the following conclusions were drawn:

1. A decrease in the level of PA in people under strict quarantine conditions had a negative effect on the participants' mental health and well-being.
2. Compliance with the usual motor regime during government restrictions helped to maintain participants' mental health and is effective for individuals who have suffered from mild coronavirus symptoms as well as individuals who have not.

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CHAPTER 2

THE INFLUENCE OF PHYSICAL INACTIVITY ON PHYSICAL HEALTH DURING COVID-19 PANDEMIC

Damir Knjaz, Dario Novak, Branislav Antala

Physical activity is an important protective factor against the development of chronic diseases at any age. It has been shown that physical activity and adopting an active lifestyle have positive effects on multiple health outcomes among young and elderly people (i.e., obesity, diabetes, cardiovascular disease, and infectious diseases). Studies suggest that physical activity and active lifestyle are an important asset for health and wellbeing, including mental health. The COVID-19 pandemic has caused a horrific epidemiological crisis and the entire world has been affected. A highly effective method for slowing the spread of the virus is self-isolation or quarantine, especially before the development of a vaccine. This method is an effective precautionary measure to protect those around you - your family, friends, colleagues - from contracting COVID-19. It means taking simple common-sense steps to avoid close contact with other people as much as possible. However, a long stay at home and social isolation can have strong health consequences, especially by limiting access to physical activity of the general and more vulnerable population. Studies have showed that all pandemic restrictions are negatively associated with the health-related quality of life. This chapter provides the latest evidence on the influence of the COVID-19 virus pandemic on physical health.

SINGAPORE'S LEVELS OF PHYSICAL ACTIVITY AND ASPECTS OF HEALTH DURING COVID-19 PANDEMIC

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INTRODUCTION

The Coronavirus Disease 2019 (COVID-19) is the first pandemic caused by a novel coronavirus and on 11 March 2020, the World Health Organisation (WHO) declared it a global pandemic (Ding et al., 2021; WHO, 2020; Cucinotta & Vanelli, 2020). As stated by Dr. Tedros Adhanom Ghebreyesus, WHO Director-General, the number of cases in China in the early weeks increased 13-fold, and the number of countries with identified cases increased three-fold. During the early phase, WHO encouraged people with mild respiratory symptoms to isolate themselves and practice social distancing. These safety measures apply to other countries with no reported cases of infected individuals (*CIDRAP*, n.d.).

In Singapore, the Ministry of Health (MOH) expanded temperature screenings to all travellers coming in from China from 22 January 2020. Although there were some suspected cases, all of them were tested negative. A multi-ministry task force was formed, chaired by Health Minister Gan Kim Yong and Education Minister Lawrence Wong. On 23 January 2020, Singapore had the first confirmed COVID-19 case that involved a 66-year-old Chinese national from Wuhan who arrived in Singapore. He was hospitalised at the Singapore General Hospital and tested positive for the novel coronavirus (Channel News Asia (CNA), 2020). Following, the number of local cases (imported, community, work permit holders and dorm residents) were tracked (Figure 1). More precautionary measures were put in place to prevent clusters from emerging. The Disease Outbreak Response System Condition (DORSCON) level was raised from yellow to orange as part of the precautionary measures on 7 February 2020 (CNA, 2020; Figure 2). Transiting from green to red of the DOSCORN level signifies increase in disease severity, easier and higher transmission rate within community and severity of the outbreak. Each level is also associated with the WHO Pandemic Alert Response System (Ng et al., 2020).

Thereafter, many governments from various countries implemented "lockdown", "quarantine", "stay-at-home" policies and rules, which took place for weeks and/or months (Ding et al., 2021; Anderson et al., 2020). Singapore's government implemented a "lockdown", and the citizens went through a "circuit breaker" period from 7 April to 1 June 2020. These policies and rules have disrupted usual routines of people all around the world (Ding, et al., 2021; Brooks et al., 2020). As the citizens may have been affected (mentally, physically, and emotionally) during the circuit breaker, this study aimed to look into their mental health and physical activity levels particularly during this period of time.

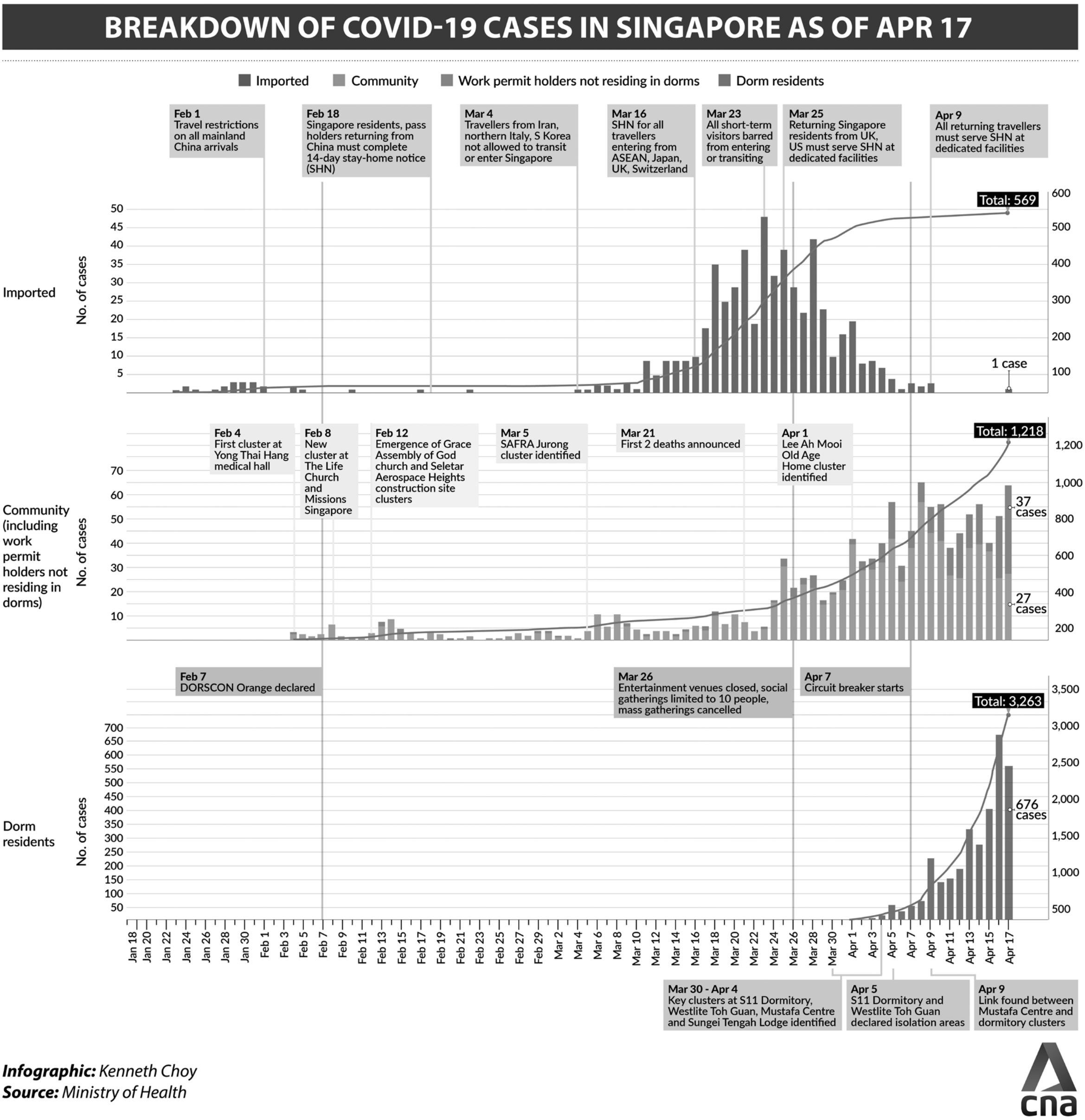

Figure 1. Breakdown of COVID-19 cases in Singapore from 1 February – 17 April 2020 (adapted from CNA, 2020).

Colour	Nature of Disease	Impact on Daily Life	Advice to Public
Green	Disease is mild **OR** Disease is severe but does not spread easily from person to person (e.g. MERS, H7N9)	Minimal disruption e.g. border screening, travel advice.	• Be socially responsible: if you are sick, stay home • Maintain good personal hygiene • Look out for health advisories
Yellow	Disease is severe and spreads easily from person to person but is occurring outside Singapore. **OR** Disease is spreading in Singapore but is **(a)** typically mild i.e. only slightly more severe than seasonal influenza. Could be severe in vulnerable groups (e.g. H1N1 pandemic) OR **(b)** being contained.	Minimal disruption e.g. additional measures at border and/or healthcare settings expected, higher work and school absenteeism likely.	• Be socially responsible: if you are sick, stay home • Maintain good personal hygiene • Look out for health advisories
Orange	Disease is severe **AND** spreads easily from person to person, but disease has not spread widely in Singapore and is being contained (e.g. SARS experience in Singapore).	Moderate disruption e.g. quarantine, temperature screening, visitor restrictions at hospitals.	• Be socially responsible: if you are sick, stay home • Maintain good personal hygiene • Look out for health advisories • **Comply with control measures**
Red	Disease is severe AND is spreading widely.	Major disruption e.g. school closures, work from home orders, significant number of deaths.	• Be socially responsible: if you are sick, stay home • Maintain good personal hygiene • Look out for health advisories • Comply with control measures • **Practise social distancing: avoid crowded areas**

Figure 2. Disease Outbreak Response System Condition (DORSCON) levels in Singapore

METHODS

This was a cross-sectional survey study, whereby a total of 1000 adults (≥21 years old) completed the survey. Voluntary participants recruited were informed of the details of the study. The online survey link was sent to each participant, and it took about 15 minutes to complete. This study was part of a larger collaboration conducted in 10 other countries. The first ethical approval received was from the Institutional Review Board (IRB) at Nationwide Children's Hospital (in the US, IRB ID Number STUDY00001110). The local ethical approval was granted by Institutional Review Board (IRB) (IRB-2020-05-038), Nanyang Technological University (NTU), Singapore.

Procedures

On the first page of the online survey, participants were asked to give their consent in participating in the study. Following, each individual was required to verify that he/she is ≥21 years old before proceeding to complete the survey questions. Data collection was between 11 June 2020 and 31 August 2020. A total of 1000 participants residing in Singapore during the circuit breaker completed the survey (Table 1). Thereafter, the survey data was collated for analysis.

Demographic variables consisted of gender, age group, highest level of education, marital status, type of employment, income changes (start of pandemic), number of people in household during lockdown and history of mental disorder (if any).

Country-level COVID-19 factors were measured using data extracted from https://ourworldindata.org/. One of the variables included the cumulative increase in number of confirmed COVID-19 cases per million people in Singapore between its 100th case and 31 August 2020, divided by the number of days between these two dates. For the other variable, the level of strictness of governmental policy response to COVID-19 was derived from the Government Stringency Index (GSI). The GSI covers nine policy areas (e.g., travel bans, contact tracing, school closures) and scored between 0 and 100 (0 = no policy response, 100 = strictest policy responses). The average scores between the two dates were used to represent GSI.

Statistical Analysis

The descriptive statistics of participants' demographic, country-level COVID-19 factors, mental health variables (anxiety, depression, resilience coping and hope) and levels of physical activities were calculated using Statistical Package for the Social Sciences (SPSS) 23.0.

RESULTS

A total of 1000 participants volunteered for this study and there was an almost equal representation of both genders (51.4% females vs. 48.6% males) and with higher population from those aged 25-34 years old (42,7%). Majority of the respondents had a bachelor's degree or higher (57.8%) and were single (57.9%) (Table 1). Singapore had a GSI score of 52.9 (0 = no policy response, 100 = strictest policy response) and 60.5 increase in confirmed cases per million people per day (Ding et al., 2021).

The overall average scores for mental health in Singapore were calculated for anxiety (19.99%), depression (25.00%), resilience coping (25.00%) and hope (24.96%) with 99.5% of participants who indicated no history of mental disorder and 0.5% of the participants who have a history of mental disorder. The breakdown of each individual's mental health scores can be found in Figure 3.

Table 1. Descriptive Statistics of All Participants (n = 1000).

Descriptive Variables	Percentage (%)
Gender	
Males	48.6
Females	51.4
Age	
21-23 years	19.2
25-34 years	42.7
35-44 years	22.9
45-54 years	12.4
55-64 years	2.1
≥ 65 years	0.7
Education Level	
Less than high school	3.7
High school	16.3
Associate degree	22.2
Bachelor's degree	41.8
Graduate degree	16.0
Marital Status	
Single	57.9
Married, or in a domestic relationship	41.2
Divorced	0.5
Widowed	0.4
Race/ Ethnicity	
Chinese	66.0
Malay	18.1
Indian	15.1
Caucasian	0.1
Arab	0.6
Boyanese	0.1
History of Mental Disorder	
Yes	0.5
No	99.5

Results indicated that 75.9% of participants took part in vigorous physical activity at least 1 day or more, 24.1% of participants did not partake in vigorous physical activity, and 2.7% of the participants were unsure. Furthermore, 78.6% of the participants took part in moderate physical activities at least 1 day or more, 21.0% of the participants did not partake in moderate physical activity, and 0.4% of the participants were unsure. Moreover, 76.2% of the participants walked at least 1 day or more, 23.4% of the participants did not walk, and 0.4% of the participants were unsure (Table 2).

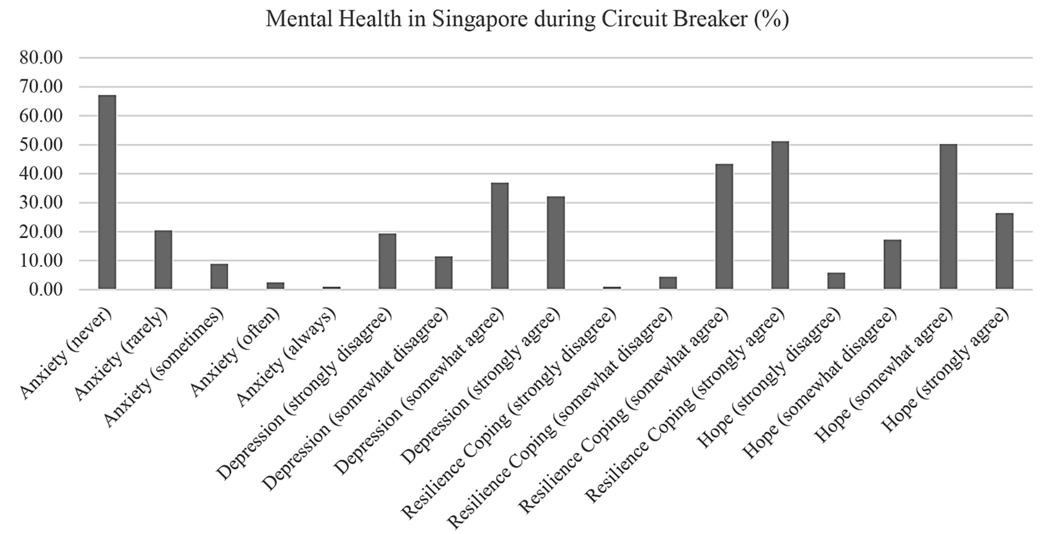

Figure 3. Overall Scores for Mental Health in Singapore during Circuit Breaker

Results also revealed that 49.5% of the participants did not rely on online visual programmes (OVP) to assist with their physical activities (e.g., YouTube, online websites etc.), 8.2% of the participants relied on OVP most of the time, 30.0% of the participants relied on OVP sometimes, 4.0% of the participants relied on OVP about half the time, and 7.4% of the participants always relied on OVP (Table 2). Statistics also showed that 10.4% of the participants were unsure if their levels of physical activities differed between pre- and post-circuit breaker, 23.8% of the participants had an increase in their levels of physical activities, 25.5% of the participants had a decrease in levels of physical activities, and 40.3% of the participants had almost no change to their levels of physical activities (Table 3).

Participants rated the level of threat the coronavirus is to humanity as not at all (1.8%), slightly (6.7%), somewhat (7.7%), moderately (22.1%), and extremely (61.7%) (Table 4). Participants also rated the level of importance of health and well-being in everyone's life after the pandemic as extremely important (59.0%), very important (36.9%), moderately important (3.1%), slightly important (1.0%), not important at all (0%) (Table 5).

Table 2. Physical Activities by Participants during the Circuit Breaker

Vigorous Physical Activity (Number of Days)	Percentage (%)
No vigorous physical activity	24.1
1 day	10.4
2 days	21.0
3 days	19.9
4 days	5.8
5 days	7.8
6 days	5.0
7 days	3.3
Don't know/ Not sure	2.7
Moderate Physical Activity (Number of Days)	**Percentage (%)**
No moderate physical activity	21.0
1 day	17.4
2 days	20.2
3 days	20.2
4 days	6.0
5 days	4.1
6 days	6.7
7 days	4.0
Don't know/ Not sure	0.4
Walking (Number of Days)	**Percentage (%)**
No walking	23.4
1 day	7.9
2 days	17.7
3 days	16.5
4 days	7.5
5 days	9.5
6 days	2.9
7 days	14.2
Don't know/ Not sure	0.4
Online Visual Programmes (OVP)	**Percentage (%)**
Never	49.5
Most of the time	8.2
Sometimes	30.0
About half the time	4.0
Always	7.4
Don't know/ Not sure	0.9

Table 3. Levels of Physical Activities Pre- and Post-Circuit Breaker

Change in Level of Physical Activities	Percentage (%)
I don't know/ Hard to tell	10.4
Increased	23.8
Decreased	25.5
Almost the same	40.3

Table 4. Participants' Responses to COVID-19 as A Level of Threat to Community

Type of Response	Percentage (%)
Not At All	1.8
Slightly	6.7
Somewhat	7.7
Moderately	22.1
Extremely	61.7

Table 5. Participants' Responses to The Level of Importance of Health and Well-being

Type of Response	Percentage (%)
Very Important	59.0
Moderately Important	36.9
Slightly Important	3.1
Not Important At All	1.0

DISCUSSION

Despite the circuit breaker, mental health status in Singapore indicated low anxiety and depression scores. Compared to the 10 other countries that also participated in the international study, Singapore had the lowest scores in terms of anxiety and depression (Ding et al., 2021). As of 1 June 2020, there were 408 dormitory cases and 0 community case. The low number of community cases and death cases could have attributed to higher scores in resilience coping and hope and lower scores in anxiety and depression. As of 20 March 2021, there were 132 active cases, 17 who were hospitalised and in stable condition, 115 in community facilities, 60,022 discharged and 30 deaths. The number of recovery cases were kept at a high rate as compared to death cases (Government of Singapore, n.d.; Ministry of Health Singapore (MOH), 2020).

Although there is a low score in the mental health consequence of COVID-19 in Singapore, there are still local hotlines available for those who may be affected by the pandemic. This may be caused by the lockdown measures, loss of job, insufficient incomes for some families and households. To help and support these people, relief packages (e.g., SGUnited) were distributed by the government to households and individuals who were in need of them.

During the circuit breaker, sports community facilities such as swimming pools, gyms and sports courts were closed. However, the citizens could participate in common individual physical activities such as cycling, running, jogging, and walking. The citizens were required to put on their masks if they participated in low-moderate physical activities that included walking. The citizens were also required to only exercise with their family members from the same household and within their neighbourhood. Our study also indicated that there was also a drop in levels of physical activity. Another study conducted locally also indicated moderate-vigorous physical activity (MVPA) decreased by 13 minutes and average step count reduced by approximately 4 thousand steps (Ong et al., 2021). This could be due to the restrictions and policies implemented whereby the locals could only go out for essentials (e.g., to buy food, buy groceries, essential work and/or participate in physical activity).

Furthermore, all local schools have been issued for closure and students went into home-based learning (HBL) for all subjects, including physical education (PE). The use of virtual platforms was the only option to conduct PE as learning was still on-going. PE lessons during COVID-19 evolved into tailoring activities that could be conducted safely with minimal supervision within their home as compared to face-to-face teaching in schools where the students are able to interact and play with their classmates. In order to maintain their physical activities, some of the participants from this study also mentioned playing modified badminton and table tennis in the comfort of their homes.

CONCLUSION

With the declination in new community cases, circuit breaker ended on June 1, 2020. Since June 2, 2020, Singapore launched a series of 're-opening' phases with restrictive measures in place. Fitness gyms and community sports complex were still closed and PE for schools could still carry on with strict safe management measures (SMM) as directives from the government - no more than 5 in a group, no sharing of equipment and cross court movement, social distancing measures of 1m between individuals and 3m between groups. In January 2021, the number of students in a group increased to 8.

As studies have shown the positive impact of exercise with improvement on mental health (Sharma et al., 2006), more encouragement is needed to get more people to take part in physical activities. On a positive note, a higher percentage of the total cohort recognises the importance of health and well-being in relation to the coronavirus as a threat to mankind. Hopefully, this will serve as a motivation and encouragement for more individuals to participate in physical activities as a lifetime habit.

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JUMP ROPE - A TOOL USED IN PHYSICAL EDUCATION AT SCHOOLS IN MEXICO TO CONTINUE THE GROWTH OF PHYSICAL ACTIVITY DURING PERIODS OF CONFINEMENT DUE TO THE ONGOING GLOBAL PANDEMIC

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ABSTRACT

Due to the viral outbreak of COVID-19 in 2020, a global pandemic was declared which has undoubtedly left a void that no one could have foreseen. A drastic change occurred from one day to the next, with students having in-person face-to-face classes to suddenly being confined to their homes. Due to home learning being introduced, the practice of educational and physical activity ceased.

This study took place in Veracruz State, Mexico, where an intervention was developed through physical education (PE) classes using rope jumping. Rope jumping, often known as skipping or jump rope, is a practical movement option which could be performed in a small amount of space by students whilst at home. During the period from July 13, 2020, to March 10, 2021, a selection of 700 participants were chosen to partake in the intervention. The intervention split the participants into two groups of 350. One group partook in jump rope PE classes to develop their skills through practice and the other 350 students did not participate in jump rope classes, but normal activity classes instead. The two groups were subsequently compared in terms of participation levels over the course of 9 months. Both groups consisted of participants between the ages of 10-12 and were known as Group A, the jump rope group, and Group B, the regular activity group.

A quantitative research approach was used to collect and analyse the data and subsequently make a comparison between Group A and Group B. Results showed that the percentage of participant dropout in Group A was 6% (21/350 students) and 32% in Group B (112/350 students). This paper discusses the elements surrounding the participants involvement and why jump rope was deemed to be an effective tool to increase and attain physical activity in young students during the global pandemic.

Keywords: exercise, COVID-19, health, confinement, pandemic

TEXT

The current and ongoing pandemic caused by the SARS-CoV-2 virus has affected the entire population. Due to the widespread outbreak and the fact that each individual country was significantly affected by the virus, a clear gap in junior educational system was highlighted, specifically in relation to PE and recreation. The world hit an unforeseen standstill meaning that everyone's lives were severely disrupted. For the purpose of this research, this article focuses on the cease of physical activity for school students aged between 10-12.

Through adaptation, alternative PE methods were developed for students to be able to maintain their PE and physical activity status. Due to the sudden lockdown of cities and nations, faculties were limited in preparation time to develop new programs for students that could be conducted online and from the safety of both students' and teachers' homes. This undoubtedly influenced the consistency of PE activities and saw a dive in student participation levels.

It is evident that there was no strategy in place for teachers during this period, nor was it clear when the health emergency, that initially began in March 2020, would end. Having lasted over the period of one year, the current situation as of October 2021 shows signs that the global pandemic, although improving, is still clearly evident.

The virus has affected people differently depending both on their demographic as well as their current health status, among many other aspects. Individuals who struggled more when contracting the virus tended to be those who suffer from already apparent health issues, some of them being obesity, high blood pressure and type I/II diabetes. Individuals with these characteristics, in addition to being more prone to suffering when contracting COVID-19, were found to suffer from "confinement at home worsening these pathologies by increasing body weight levels putting a greater number of people at risk, a situation that can be regulated through a healthy diet and regular practice of physical exercise" (Enríquez, 2020: 2)

The implementation of physical activity, mainly aerobic activity at a low to moderate intensity level, helps the body adapt to create a healthier environment, a stronger immune system, improved hormonal response, weight loss and to lower the risk of respiratory infections as well as many other benefits. The benefits of exercise in this study were seen specifically in relation to the confinement that the global pandemic had enforced.

When asked about exercising in confinement, individuals stated that if they were not allowed to occupy sporting grounds where physical activity was carried out, then they were unsure where they were supposed to exercise. This is when remote options were sought as a possibility for individuals of a younger demographic to maintain their PE as well as physical activity. Previous literature states that the benefits of physical activity regarding obesity and illness were strongly linked to variables associated with COVID-19:

> Despite the fact that to date there is no evidence about the effects of physical activity, or the time spent doing physical exercise in patients who have acquired or overcome COVID-19, there has been a strong relationship with variables associated with it. Physical exercise and the reduction of diseases in those patients who have acquired the virus; Therefore, it is recommended to perform physical exercise of moderate intensity at home, with a minimum of 300 minutes per week as a strategy to help strengthen the immune and cardiorespiratory system (Enríquez, 2020).

The recommendations given by the American College of Sports Medicine (ACSM) to maintain physical activity during the global lockdown were to actively walk inside your house, walk up and down the stairs, perform dance routines using virtual platforms that serve as support, use a stationary bike, stair climber or elliptical, as well as yoga, push-ups, sit-ups and squats at a level and intensity appropriate to the individual who performs it. Also, as the state of Veracruz, Mexico mentioned, jumping rope for a minimum of 10 minutes, two times per week, can be beneficial in strengthening the immune and cardiorespiratory systems.

In addition, the ACSM stated that:

> Every exercise session, particularly dynamic cardiorespiratory exercise involving the whole body, instantly mobilizes literally billions of immune cells, especially those cell types capable of performing effector functions such as recognition and elimination of cells infected with virus. Mobilized cells first enter the blood from marginal vascular repositories, the spleen, and bone marrow, then transiting to particular secondary lymphoid tissues and organs of the lungs and intestine where increased immune defence may be required. The immune cells that are mobilized by exercise are activated and "looking for a fight." Its frequent recirculation between the blood and the tissues works in a way that increases the immune surveillance of the host, which, in theory, makes us more resistant to infection and better equips us to deal with any infectious agent that has established itself. Exercise also releases several proteins that can help support immunity, particularly muscle-derived cytokines such as IL-6, IL-7, and IL-15. The cytokine IL-6 has been shown to direct the transit of immune cells to infected areas, while IL-7 can promote the production of new thymic T cells and IL-15 helps to maintain the peripheral compartments of the cells. T and NK cells. (Simpson, 2020)

It is worth mentioning that a neglected point of view is that the stress symptoms, depression, and anxiety caused by social confinement and isolation can also reduce the body's functioning immune system. With exercise working as a catalyst agent to eventually distract the mind and secrete neurotransmitters such as serotonin or dopamine, which are stimulated by physical activity, the body is able to better cope with continuous stress and, in some cases, to avoid psychological illnesses (Sallis & Pratt, 2020).

In line with the aforementioned literature and due to the fact that spaces in confinement are reduced, as well as the educational authorities' lack of planning due to the current global situation, the State of Veracruz, Mexico, proposed that young people and students should be able to perform physical activity if they have access to 2 square meters and a jump rope. The ACSM indicates and suggests that individuals wishing to engage themselves in the jump rope activity should only do so if they are in a state of good health, as well as have a low body mass index (BMI), so that an individual's weight allows beneficial exercise without increasing the risk of injury.

An article by Enríquez (2020) also recommends that we "keep children active during the coronavirus pandemic". It further states that children between the age of 6 and 12 require 60 minutes of physical activity, involving their cardiorespiratory system, muscles, and bones every single day.

In this study, participants carried out set exercises through their PE classes. Group A performed jump rope activity for 50 minutes 5 times per week, and Group B performed other types of exercise activities without a set time frame or exercise amount. This led to a wide intake of results which were then compared and discussed.

Both samples consisted of 350 students between the age of 10 and 12. To increase the validity and reliability of the results, both groups shared the same socio-economic backgrounds, and the conditions in which the study was conducted were as similar as possible in order not to enhance or skew the results. A weekly record was kept by observing the participants' behaviour in terms of attendance, absence, and dropout.

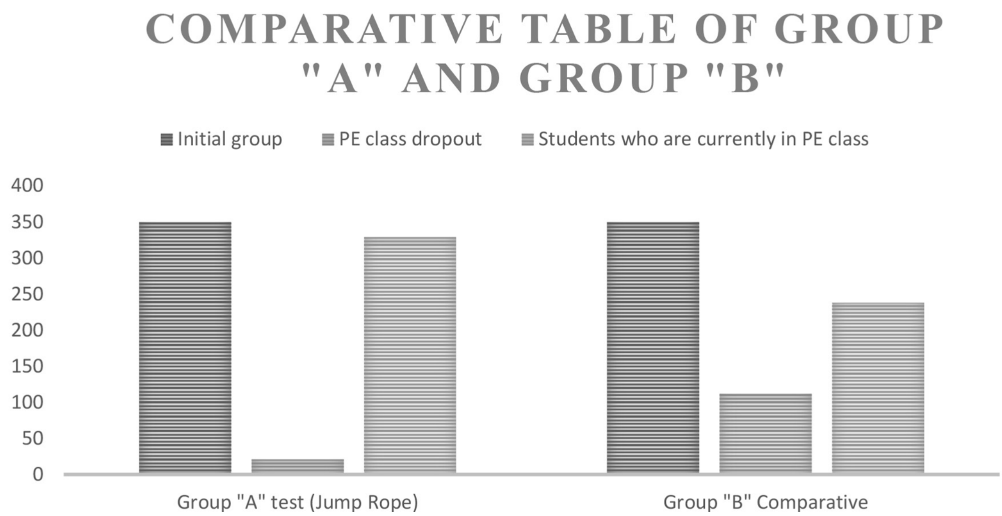
It is useful to specify that mixed research type was used in this study, where both documentary and field research were carried out from a distance. There was a follow-up using social networks as a means of communication, registration and evidence, and data was collected through a quantitative approach. This way, the data collected was placed into a graph and the findings were compared. The key findings through data collection are stated below.

Some recorded results were surprising due to the contrast in dropout rates in Group A compared to Group B. As mentioned, in Group A the dropout rate of the participants was 6% (21 students), which shows that 329 students were still active and regularly attend PE classes as of ispraviti u March 10, 2021.. The dropout in Group B, the group which did not partake in jump rope as an exercise, was 32%, (112 students), meaning that 238 were active in their PE classes as of March 10, 2021. The research study began on July 13, 2020, and ended on March 10, 2021, and the participants' dropout figures from the study are shown in Table 1 in the appendix.

The quantitative results show that the level of dropout from PE classes was lower with students who attended the jump rope classes during confinement compared to those who attended classes without the jump rope exercise. This therefore suggests that jump rope, as a form of physical activity, is both a viable and low-cost option to keep students active during lockdown and confinement.

APPENDIX

Table 1: Comparative results of participation rates of Sample Group A and Sample Group B of the research study



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THE EFFECT OF COVID-19 CONFINEMENT ON FUNDAMENTAL MOTOR SKILLS AMONG MALAYSIAN RURAL PRIMARY SCHOOL CHILDREN

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ABSTRACT

INTRODUCTION: The purpose of this study was to evaluate the level of fundamental motor skills among Malaysian rural primary school children aged 10 to 12 using the Canadian norms during the COVID-19 confinement period. **METHODS:** Participants were Year Four, Five and Six students (*N* = 336; male = 168; female = 168) from a rural primary school in Kapit, Sarawak. The Canadian Agility and Movement Skill Assessment (CAMSA) was used to measure the level of fundamental motor skills. Data were analysed by means of descriptive statistics. **RESULTS:** Overall, 99.7% of the children who participated in the assessment were unable to achieve the recommended level of the total CAMSA score, based on the Canadian norms of the total CAMSA score. As a result, it is recommended that the Institute of Teacher Education (ITE) develops, facilitates, and equips the trainee teachers in mastering the FMS teaching and learning methodologies to address this problem critically.

Keywords: fundamental motor skills, CAMSA, children, Malaysian, rural

INTRODUCTION

Physical inactivity is alarmingly high among Malaysian children, raising a public health concern as the risk of contracting non-communicable diseases (NCDs) is directly related to physical inactivity. Specifically, physical inactivity has been recognised as one of the major risk factors contributing to NCDs (Noor et al., 2014). Indeed, there is evidence that shows physical inactivity among Malaysian children population that has been conducted in recent years. According to Baharudin et al. (2014), 57.3 percent of 10- to 17-year-old students was physically inactive. In another study conducted by Wong et al. (2016) on physical activity among Malaysian children aged 7 to 12, it was found that girls are less active compared to boys, and children tend to be less active as they get older. Furthermore, data from the 2016 Malaysia Active Healthy Kids Report Card indicated that the majority of Malaysian students aged 13 to 17 received D grades, with only 22.8% of them being physically active (Sharif et al., 2016).

Stodden et al. (2008) explained that this low-level of physical activity among children may be due to a deficiency of fundamental motor skills (FMS) competency. In this regard, children who have a lower level of FMS competency are prone to engage in less physical activity compared to their peers (Malina et al., 2004). In contrast, children with higher levels of FMS competency can participate in a wide range of physical activities, games, and sports (Cohen et al., 2014). Therefore, it is crucial for children to develop their motor skills accordingly in order to engage in various forms of physical activities and lead an active lifestyle. According to Castelli and Valley (2007), they defined motor skill competence as the proficiency in physical skills and movement patterns that enable delightful engagement in physical activities. FMS are classified as locomotor skills, object-manipulation skills, and stability skills (Gallahue et al., 2011). As previously mentioned, children's mastery of FMS is imperative for sustaining children's engagement in physical activity. Nonetheless, several studies have shown that children worldwide have poor mastery in FMS. In a recent study by Lawson et al. (2021), it was discovered that British primary school children have poor FMS mastery in the following areas: running, jumping, hopping, skipping, catching, overarm throwing, and stability skills. Moreover, Hardy et al. (2010) reported that Australian preschool children possessed low mastery in seven motor skills tested (kick = 35%; gallop = 31%; hop = 25%; jump = 22%; catch = 20%; throw = 16%; strike = 14%), with the exception of running, which was mastered by 75% of children.

In Malaysia, the closure of schools during the COVID-19 lockdowns on 20 March 2020 has resulted in an increase in physical inactivity and sedentary behaviours, which has negative consequences on children's motor competence. Furthermore, there is no empirical assessment and limited studies on primary school children's motor performance (Baharom et al., 2014). Baharom et al. (2014) found that the 9-year-old school children have a low level of gross motor development, which was expected to increase parallel with their age.

Therefore, given the consistent pattern of poor mastery in FMS among children in Malaysia, this study aimed to examine the fundamental motor skills performance among the Malaysian primary school children aged 10 to 12 using the Canadian Agility and Movement Skill Assessment (CAMSA) during the COVID-19 lockdown period in 2020. It is hypothesised that the majority of the children would be unable to meet the recommended level of the total CAMSA scores.

METHODS

Participants

A total of 336 primary school children in Year Four, Five and Six, aged 10 to 12 were recruited from a rural primary school in Kapit, Sarawak. The participants consisted of 168 males and 168 females. In terms of age, most participants were 12-year-olds with 118 participants (35.1%), followed by 11-year-olds with 111 participants (33%), and 10-year-olds with 107 participants (31.8%). The motor competence test was administered in the school during Physical Education (PE) class, with the consent of the children, teachers, and parents. The Institutional Ethics Committee approval and consent were obtained, ensuring the children's voluntary participation, and assured of their confidentiality. The test was conducted in accordance with the Standard Operating Procedures (SOP) guidelines in August and September 2020, following the reopening of schools in July 2020 under the Conditional Movement Control Order (CMCO) after the nationwide lockdown for several months, since March 2020. The independent variables of gender and race were utilised to assess the differences according to their fundamental motor skills. The variable race was included as Malaysia has a multi-racial and ethnic population with diverse cultural and socioeconomic backgrounds in which stereotyping of physical competence of racial groups can undermine one's participation and performance in fundamental motor skills.

Table 1. Demographic characteristics of the participants

Characteristics	Frequency (F)	Percentage (%)
Gender		
Male	168	50.0
Female	168	50.0
Age		
10	107	31.8
11	111	33.0
12	118	35.1
Race		
Dayak	302	89.9
Malay	28	8.3
Chinese	6	1.8

The participants were 336 primary school students aged 10 to 12 from a rural primary school in Kapit, Sarawak. The participants included an equal number of males and females with 168 (50%) participants, respectively. In terms of age, 107 (31.8%) children were 10 years old, 111 (33%) children were 11 years old, and 118 (35.1%) children were 12 years old. The majority of the participants were Dayak with 302 (89.9%) participants, followed by Malay and Chinese with 28 (8.3%) and 6 (1.8%) participants, respectively.

Methods

The Canadian Agility and Movement Skill Assessment (CAMSA) was utilised to measure children's motor competence. CAMSA is a product and process assessment developed by the Canadian Assessment of Physical Literacy (CAPL) to measure motor competency level among children aged eight to twelve. The CAMSA's inter-rater reliability was substantial ranged from ICC = 0.70, 95% CI (0.59, 0.79) and ICC = 0.62, 95% CI (0.48, 0.72) on primary Chinese children (Cao et al., 2020) and ICC = 0.73 (0.44, 0.88) on primary British children (Grainger et al., 2020).

In this regard, each child completed seven CAMSA skills in succession. Prior to the testing, a test administrator demonstrated twice how to complete the CAMSA circuit. For the first demonstration, the test administrator completed the circuit while heavily emphasising verbal description and cue word for each skill. As for the second demonstration, the test administrator completed the circuit at full speed while executing each skill perfectly to emphasise the significance of executing each skill properly while moving as fast as possible.

It is recommended by the CAPL for the children to have two practice trials followed by two timed and scored trials. However, due to limited time provided, practice trials were not conducted, and the children were only able to attempt one timed and scored trial. In this study, two test administrators who also act as data collectors were involved whereby the first test administrator timed, gave the verbal cue, and provided balls for catching and kicking skills (throw the ball for catching skill and set the ball for kicking skill). The second test administrator evaluated participants' skill performance based on the skill criteria as shown in Table 2.

Table 2. CAMSA skill criteria

Skill	Criteria
2-foot Jumping 1	3 consecutive jumps on 2-feet
2-foot Jumping 1	Both feet land together in each hoop and do not touch hoops
Sliding 1	Body and feet aligned sideways when sliding in one direction
Sliding 2	Body and feet aligned sideways when sliding in the opposite direction
Sliding 3	Touches cone with low centre of gravity and athletic position
Catch	Catches ball without trapping against the body
Throw 1	Uses overhand throw to hit target
Throw 2	Transfer weight and rotates body to assist throw
Skip 1	Correct foot pattern of hop-step-hop-step
Skip 2	Uses arms appropriately
1-Foot Hop 1	Lands on only 1-foot in each hoop
1-Foot Hop 2	Hops only once in each hoop and does not touch hoops
Kick 1	Smooth approach to kick the ball between the cones
Kick 2	Elongated stride on last stride before impact

Participants' time to complete the circuit then converted to a predefined point score ranging from one to fourteen. As such, the faster the time the participants took to complete the circuit, the higher the time score will be. Further, for the criteria score, the skill performance is evaluated objectively whereby participants obtained 1 point for correctly performed skill and 0 points for incorrectly performed skill based on 14 evaluation criteria. The time score and criteria score are then totalled to generate a total CAMSA score ranging from one to 28.

Statistical Analysis

The data were analysed using Statistical Package for the Social Science (SPSS) 23.0. Descriptive analyses were conducted to determine the frequency and percentage of points obtained by children in each of the CAMSA skills, children's CAMSA time and criteria score, children's total CAMSA scores and interpretation of the total CAMSA scores based on the Canadian norms.

RESULTS

Table 3. Number (and percentage) of points obtained by children in CAMSA skill

CAMSA Skill	Frequency (N)	Percentage (%)
2-Foot Jumping 1		
0	72	21.4
1	264	78.6
2-Foot Jumping 2		
0	80	23.8
1	256	76.2
Sliding 1		
0	196	58.3
1	140	41.7
Sliding 2		
0	199	59.2
1	137	40.8
Sliding 3		
0	159	47.3
1	177	52.7
Catch		
0	85	25.3
1	251	74.7
Throw 1		
0	237	70.5
1	99	29.5
Throw 2		
0	149	44.3
1	187	55.7
Skip 1		
0	186	55.4
1	150	44.6
Skip 2		
0	303	90.2
1	33	9.8
1-Foot Hop 1		
0	92	27.4
1	244	72.6
1-Foot Hop 2		
0	199	59.2
1	137	40.8
Kick 1		
0	110	32.7
1	226	67.3
Kick 2		
0	145	43.2
1	191	56.8

Table 3 shows that most of the children (78.6%) obtained a point for 2-Foot Jumping 1 skill, followed by 2-Foot Jumping 2 (76.2%), Catch (74.7%), 1-Foot Hop 1 (72.6%), Kick 1 (67.3%), Kick 2 (56.8%), Throw 2 (55.7%), Sliding 3 (52.7%), Skip 1 (44.6%), Sliding 1 (41.7%), Sliding 2 and 1-Foot Hop 2 (40.8%), Throw 1 (29.5%) and Skip 2 (9.8%). Meanwhile, 90.2% of the children obtained 0 point for Skip 2 skill, followed by Throw 1 (70.5%), 1-Foot Hop 2 and Sliding 2 (59.2%), Sliding 1 (58.3%), Skip 1 (55.4%), Sliding 3 (47.3%), Throw 2 (44.3%), Kick 2 (43.2%), Kick 1 (32.7%), 1-Foot Hop 1(27.4%), Catch (25.3%), 2-Foot Jumping 2 (23.8%) and 2-Foot Jumping 1 (21.4%).

Table 4. CAMSA time score

Time Score	Frequency (N)	Percentage (%)
1	119	35.4
2	38	11.3
3	44	13.1
4	52	15.5
5	42	12.5
6	19	5.7
7	8	2.4
8	7	2.1
9	4	1.2
10	3	0.9
11	0	0
12	0	0
13	0	0
14	0	0

Table 4 shows most of the children (35.4%) obtained a time score of 1, followed by 4 (15.5%), 3 (13.1%), 5 (12.5%), 2 (11.3%), 6 (5.7%), 7 (2.4%), 8 (2.1%), 9 (1.2%), and 10 (0.9%). However, none of the children gained a time score of 11, 12, 13 and 14.

Table 5 shows 16.1% of the children scored 8 for criteria score, followed by 7 (12.8%), 9 (11.6%), 5 and 6 (10.4%), 10 (10.1%), 4 (7.4%), 11 (6.5%), 12 (4.8%), 3 (3.3%), 2 (2.7%), 1 and 13 (1.8%) and 14 (0.3%).

Table 6 shows 10.1% of the children scored 7 for total CAMSA score, followed by 9 (9.8%), 12 (9.2%), 11 (8.6%), 8, 10 and 13 (8.0%), 14 (7.7%), 6 (6.5%), 15 (5.1%), 5 and 16 (4.5%), 20 (1.8%), 3, 4 and 17 (1.5%), 2 and 18 (1.2%), 19 (0.9%) and 21 (0.3%). However, none of the children gained a total CAMSA score of 0, 22, 23, 24, 25, 26, 27 and 28.

Table 5. CAMSA criteria score

Criteria Score	Frequency (N)	Percentage (%)
1	6	1.8
2	9	2.7
3	11	3.3
4	25	7.4
5	35	10.4
6	35	10.4
7	43	12.8
8	54	16.1
9	39	11.6
10	34	10.1
11	22	6.5
12	16	4.8
13	6	1.8
14	1	0.3

Table 6. Total CAMSA score

Total CAMSA Score	Frequency (N)	Percentage (%)
1	0	0
2	4	1.2
3	5	1.5
4	5	1.5
5	15	4.5
6	22	6.5
7	34	10.1
8	27	8.0
9	33	9.8
10	27	8.0
11	29	8.6
12	31	9.2
13	27	8.0
14	26	7.7
15	17	5.1
16	15	4.5
17	5	1.5
18	4	1.2
19	3	0.9
20	6	1.8
21	1	0.3
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0

Table 7. Number (and percentage) of children assigned to each interpretation of CAMSA scores according to Canadian norms

Level	Frequency (N)	Percentage (%)
Beginning	324	96.4
Progressing	11	3.3
Achieving	1	0.3
Excelling	0	0

Table 7 shows the majority of the children (96.4%) were ranked as "Beginning", 33 children (3.3%) as "Progressing" and only 1 child (0.3%) was ranked as "Achieving". However, none of the children was considered "Excelling".

DISCUSSION

The aim of this study was to assess the fundamental movement skills of rural primary school children in the division of Kapit, Sarawaak, Malaysia. The participants comprised mainly of the indigenous people of Dayak and other indigenous communities since they are highly concentrated in the central region of Sarawak, followed by Malay and Chinese which are the minority in these areas. The results showed that children aged 10, 11 and 12 years were unable to achieve the recommended level of the CAMSA norm scores. Therefore, the study's hypothesis was confirmed through the findings that the confinement period adversely impacted children's motor skills. These findings are supported by Dunton et al. (2020) that stated that parents perceived a decrease in their children's physical activity (PA) and an increase in their sedentary behaviour between pre-COVID-19 and early-COVID-19 period. Prior to the CMCO period, the country was in lockdown, which is also termed as Movement Control Order (MCO), from March to July 2020 whereby citizens' movement outdoors was prohibited unless necessary. Subsequently, this implementation affected not only adults, but also children's engagement in PA. As such, Pombo et al. (2021) reported that the lockdown in Portugal has resulted in the deterioration of Portuguese children's motor skills development.

However, this could be due to cross-cultural differences between Malaysian and Canadian children resulting in the Malaysian children to perform poorer than the Canadian children. Specifically, Luz et al. (2019) reported differences in motor competence development among Portuguese and American children which may be due to cultural differences in physical education curricula and sports participation. These cultural differences can also be seen in another CAMSA study among Chinese children by Cao et al. (2020) whereby the number of children that were able to reach the recommended level of the total CAMSA score is less than half. Subsequently, the researchers proposed a Chinese version of the CAMSA norm to be built. In that sense, a Malaysian based CAMSA norms should also be constructed in a future study to establish an authentic FMS test among the Malaysian children.

Furthermore, based on the National Physical Education Curriculum, students of Year Three, Four, Five and Six should have mastered locomotor skills as students had learned these fundamental skills in Year One and Two. In this regard, students should be proficient in FMS by the age of 8 in order to be able to learn sport-specific skills as stated in the PE Scheme of Work for Year 3, 4, 5 and 6. Moreover, children aged 7, 8 and 9 would have acquired the basic locomotor skills and their level should be ranked as adequate (Gallahue, 2006; Ulrich, 2000). However, the results revealed poor FMS mastery among the Malaysian children in accordance with the Canadian evaluation criterion. In addition, adequate intervention strategies should be provided to improve the children's motor skills. It is recommended that the Institute of Teacher Education (ITE) campuses across the country develop, facilitate, and equip the trainee teachers in mastering the FMS teaching and learning methodologies to address this problem critically.

CONCLUSION

In conclusion, the confinement period has an adverse consequence on children's motor skills in which the skills need to be taught and trained in order to enhance the quality of the movements which are vital for further improvement in sports performance. The findings suggested that more studies on the fundamental motor skills utilising the CAMSA in rural students and urban students need to be conducted to establish the Malaysian version of the CAMSA norms. Therefore, there is a need for an early FMS interventions in young children, especially during the PE class, whereby teachers provide sustainable approaches that enable children to learn and practice their motor skills to transit to more specific sports and movement skills.

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HEALTH-RELATED PHYSICAL FITNESS OF MALAYSIAN SECONDARY SCHOOL STUDENTS AFTER COVID-19 CONFINEMENT

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ABSTRACT

The current COVID-19 pandemic has observed a substantial decline in physical activity (PA) level among school students leading to detrimental sedentary behaviour globally. The study examined the health-related physical fitness of Malaysian secondary school students aged from 13 to 17 years after the COVID-19 confinement. The Malaysian National Physical Fitness Standard Test (SEGAK) was used to assess the body mass index, muscle strength, muscle endurance, flexibility, and cardiovascular endurance. Descriptive statistics were used to analyse the data. Results revealed that females were more overweight than males, while males were slightly more obese than females. The prevalence of overweight and obese students declined from the age of 13 to 17 years. However, the younger age groups had a normal BMI as compared to the older age groups. The SEGAK test revealed that females perform better than males under the superior, excellent, and fit level.

However, there were more females than males under the poor and below average level. The students' fitness level gradually declines under the superior, excellent, and fit level as they age. The results reveal that the confinement has hampered PA among students which require collaboration between educational stakeholders and parents to strategize sustainable PA implementations that can facilitate and leverage sustainability of PA in order to decrease the detrimental effects of sedentary behaviour of the students.

Keywords: COVID-19, secondary school students, physical fitness standard test, Malaysia

INTRODUCTION

The Malaysian Ministry of Education implemented the National Physical Fitness Standard Test (SEGAK) for pupils in primary school from year 4 to year 6 and students in high school aged from 13 to 17 years. SEGAK is a physical fitness test designed to guide students to identify and evaluate their fitness level and monitor their Body Mass Index (BMI) value (Bahagian Pembangunan Kurikulum Kementerian Pendidikan Malaysia, 2016). SEGAK has been regulated to the Physical Education syllabus for primary and secondary schools in Malaysia to help students improve their level of physical fitness.

A lack of physical activity or exercise could acutely affect an individual's health as Salamudin and Harun (2013) also stated that the Malaysians' lifestyle has become more sedentary. The present generations are prone to be immersed in the technological world and could be prone to being sedentary as they spend the majority of their time on their gadgets scrolling through the Internet (Cilliers, 2017). A standard level of physical fitness activity is needed in order to perform daily tasks without feeling tired. Therefore, there is a need for a well-planned fitness activity that can be introduced and implemented in line with the procedures for each test item to measure different aspects of physical fitness. In addition, the items assessment needs to be measured based on standard evaluation procedures rather than having different procedures for different schools. Thus, there is the need for SEGAK to make available with an assessment of physical activity which is more standardised, comprehensive, and precise. The results obtained from the test will be distributed to students in the form of a certificate of recognition based on a centralised examination for Malaysian students as supported by Kolackova and Sikolova (2017) that assessment is an integral part in students' lives and the outcomes of the assessments have an impact on the students, regardless of the fact if the outcomes are favourable or not.

Childhood obesity has always been a strong predictor of adult obesity against a backdrop where adulthood obesity in developed and developing nations has shown a steady increase. Childhood obesity is also recognised as a vital public health issue worldwide (Zalilah et al., 2006). Physical fitness is considered as one of the main factors contributing to a healthy body which form the base of dynamicity and intellectual creativity (Health Fitness Revolution, 2013). Therefore, activities in relation to physical and mental health are inseparable (Dwyer et al., 2001). Moreover, these unhealthy behaviours tend to transit to late adolescence and young adulthood which have shown high levels of sedentary behaviour that can increase their risk of detrimental health outcomes (Castro et al., 2020).

The National Physical Fitness Standard Test also highlights that the state of fitness also relates to physiological and psychological aspects. Both perspectives of fitness have been perceived to protect students from non-communicable diseases in relation to a lack of movement or mobility. This results in negative effects on health, for example, facing cardiovascular diseases, obesity, hypertension, diabetes mellitus, among others. The term ‘fitness’ in terms of performance refers to an individual’s ability to compete in sports activities having sufficient energy, good endurance level and skills that can function effectively as a human being. The minimum requirement of fitness level helps students to carry out their daily tasks efficiently and effectively without any exhaustion. Therefore, students should give serious thoughts and reconsider their level of fitness and agility (Veloo & Ali, 2016).

Therefore, obesity is an issue which cannot be ignored as more Malaysian children and adolescents are becoming overweight and obese leading to sedentary behaviours, which affects their health and physical well-being. The current COVID-19 pandemic shutdown-related school closures across Malaysia have escalated obesity diverse severity which has affected the health and well-being of children and adolescents negatively.

Thus, this study aims to examine the health-related physical fitness level and BMI of secondary school students during the COVID-19 confinement which can address any PA issues that might have arisen due to their sedentary behaviour during the confinement. A better understanding of the overall fitness of the students and the challenges they face can provide better approaches and guidelines for stakeholders to reduce the sedentary behaviour of the students at the current uncertainties of this pandemic.

However, there is no doubt that it is also important to seek the views of teachers and students on the implementation of SEGAK test to create an understanding of the challenges that they face. Thus, a better understanding will provide the guidance and help to the policymakers and other stakeholders to make more informed decisions on ways to improve the implementation of SEGAK.

METHODS

Participants

The participants were 2081 students from one secondary school in Malaysia. The participants were Form 1 to Form 5 students, comprising 1039 males and 1042 females aged from 13 to 17 years (14.86 ± 1.42). The ethical approval was approved by the Institutional Ethics Committee. Informal consent was obtained from the participants and the teachers prior to the study. The SEGAK test was conducted when the schools were reopened under the recovery movement control order after July 2020. The test was administrated by the school Physical Education teachers in accordance with the guidelines and standard operating procedures as set by the Education Ministry, Health Ministry and National Security Council.

Measures

The National Physical Fitness Standard Test (SEGAK) battery was used to test the health-related fitness factors, which are body composition, muscle strength, muscle endurance, flexibility, and cardiovascular endurance. The test is compulsory for all students in Malaysia unless they have some health issues.

The Body Mass Index test was used to measure the body composition. The Body Mass Index (BMI) (weight (kg) × height $(m)^2$) measurement was taken for all the participants. The BMI followed the World Health Organization (WHO) norms (World Health Organization [WHO], 2004). BMI ≤ 18.5 is considered as underweight, 18.5 – 24.9 as normal weight, 25 – 29.9 as overweight, 30 – 34.9 as obese and BMI ≥ 35 as extremely obese.

The SEGAK test battery comprised of 4 tests, which are step up, push-ups, curl-ups, and sit and reach test. Step up test was used to assess cardiovascular endurance and push-ups test was used to test the muscle strength. In addition, curl-ups test was used to assess muscle endurance. Conversely, sit and reach test was used to assess the level of flexibility.

RESULTS

Table 1. Demographic characteristics of participants (N = 2081)

Characteristics	Frequency (F)	Percentage (%)
Gender		
Male	1039	49.93
Female	1042	50.07
Age Group		
13	490	23.55
14	429	20.62
15	413	19.85
16	380	18.26
17	369	17.73
BMI Test		
Obese	289	13.89
Overweight	313	15.04
Normal weight	1055	50.70
Underweight	90	4.32
Did not Participate	323	15.52
Exempted	11	0.53
SEGAK Test		
Below Average	66	3.17
Poor	582	27.97
Fit	710	34.12
Excellent	335	16.10
Superior	32	1.54
Did not Participate	345	16.58
Exempted	11	0.53

Table 1 shows the participants' demographic characteristics. There were 2081 participants involved in the study, with a total of 1039 (49.93%) males and 1042 (50.07%) females. The age groups categories showed that 490 (23.55%) of them were 13-year-olds, 429 (20.62%) were 14-year-olds, 413 (19.85%) were 15-year-olds, 380 (18.26%) were 16-year-olds, and 369 (17.73%) were 17-year-olds. Based on the Body Mass Index (BMI), 289 (13.89%) were in the obese level, 313 (15.04%) were in the overweight level, 1055 (50.70%) were in the normal weight level, and 90 (4.32%) were in the underweight level. However, 323 (15.52%) did not participate and 11 (0.53%) were exempted from the BMI test. In terms of SEGAK test, 66 (3.17%) performed below the average level of fitness and 582 (27.97%) were in the poor level of fitness. Conversely, 710 (34.12%) were in the fit level of fitness, 335 (16.10%) were in the excellent level of fitness, and 32 (1.54%) were in the superior level of fitness. However, 345 (16.58%) students did not participate and 11 (0.52%) were exempted from the SEGAK test.

Table 2. BMI based on gender

Gender	Level												Σn
	Obese 30 – 34.9		Overweight 25 – 29.9		Normal 18.5 – 24.9		Underweight ≤ 18.5		Did not Participate		Exempted		
	n	%	n	%	n	%	n	%	n	%	n	%	
Male	160	15.40	132	12.70	502	48.32	47	4.52	190	18.29	8	0.77	1039
Female	129	12.38	181	17.37	553	53.07	43	4.13	133	12.76	3	0.29	1042
Total	289	13.89	313	15.04	1055	50.70	90	4.32	323	15.52	11	0.53	2081

Table 2 shows the BMI test based on gender. Results revealed that there were slightly more males (15.40%) than females (12.38%) in the obese level. However, there were more females (17.37%) than males (12.70%) in the overweight level. In addition, more females (53.07%) were in the normal weight level as compared to males (48.32%). Moreover, there were more males (4.52%) than females (4.13%) in the underweight level. However, 190 (18.29%) males and 133 (12.76%) females did not participate in the BMI test. In addition, 8 (0.77%) males and 3 (0.29%) females were exempted from the BMI test.

Table 3. BMI test based on age groups

Age	Level												Σn
	Obese 30 – 34.9		Overweight 25 – 29.9		Normal 18.5 – 24.9		Underweight ≤ 18.5		Did not Participate		Exempted		
	n	%	n	%	n	%	n	%	n	%	n	%	
13	69	14.08	76	15.51	265	54.08	13	2.65	64	13.06	3	0.61	490
14	69	16.08	68	15.85	234	54.55	17	3.96	38	8.86	3	0.70	429
15	71	17.19	68	16.46	198	47.94	24	5.81	50	12.11	2	0.48	413
16	42	11.05	51	13.42	180	47.37	13	3.42	91	23.76	3	0.79	380
17	38	10.30	50	13.55	178	48.24	23	6.23	80	21.68	0	0.00	369
Total	289	13.89	313	15.04	1055	50.70	90	4.32	323	15.52	11	0.53	2081

Table 3 shows the Body Mass Index (BMI) test based on age groups. Results revealed that 15-year-old students (17.19%) showed higher percentage than 13-year-olds (14.08%), 14-year-olds (16.08%), 16-year-olds (11.05%) and 17-year-olds (10.30%) in the obese level. Besides, 15-year-olds showed higher percentage as compared to the 13-year-olds (15.51%), 14-year-olds (15.85%), 16-year-olds (13.42%) and 17-year-olds (13.55%) in the overweight level. On the other hand, 14-year-olds (54.55%) revealed a higher percentage as compared to the 13-year-olds (54.08%), 15-year-olds (47.94%), 16-year-olds (47.37%) and 17-year-olds (48.24%) in the normal weight level. Apart from that, 17-year-olds (6.23%) showed higher percentage than the 13-year-olds (2.65%), 14-year-olds (3.96%), 15-year-olds (5.81%) and 16-year-olds (3.42%) in the underweight level. However, 323 (15.52%) students did not participate, and 11 (0.53%) students were exempted from the BMI test.

Table 4. SEGAK test based on gender

Gender	Level														Σn
	Below Average		Poor		Fit		Excellent		Superior		Did not Participate		Exempted		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Male	30	2.89	276	26.56	349	33.59	164	15.78	12	1.15	200	19.25	8	0.77	1039
Female	36	3.45	306	29.37	361	34.64	171	16.41	20	1.92	145	13.92	3	0.29	1042
Total	66	3.17	582	27.97	709	34.07	335	16.10	32	1.54	345	16.58	11	0.53	2081

Table 4 shows the SEGAK test based on gender. Results revealed that there were more females (3.45%) than males (2.89%) in the below average level of fitness. Besides, there were also more females (29.37%) than males (26.56%) in the poor level of fitness. Furthermore, there were more females (34.64%) compared to males (33.59%) in the fit level of fitness. Similarly, there were more females (16.41%) than males (15.78%) in the excellent level of fitness. Moreover, more females (1.92%) as compared to males (1.15%) were in the superior level of fitness. However, 200 (19.25%) males and 145 (13.92%) females did not participate as well as 8 (0.77%) males and 3 (0.29%) females were exempted from the SEGAK test.

Table 5. SEGAK test based on age groups

Age	Level														Σn
	Below Average		Poor		Fit		Excellent		Superior		Did not Participate		Exempted		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
13	7	1.43	122	24.90	164	33.45	119	24.28	18	3.67	57	11.63	3	0.61	490
14	22	5.13	127	29.60	171	39.86	59	13.75	5	1.17	42	9.79	3	0.70	429
15	11	2.66	111	6.88	140	33.90	68	6.46	6	1.45	75	18.16	2	0.48	413
16	16	4.21	111	29.21	113	29.74	45	11.84	1	0.26	91	23.95	3	0.79	380
17	10	2.71	111	30.08	122	33.06	44	11.92	2	0.54	80	21.68	0	0.00	369
Total	66	3.17	582	27.97	709	34.07	335	16.10	32	1.54	345	16.58	11	0.53	2081

Table 5 shows the SEGAK test based on age groups. Results revealed that 14-year-old students (5.13%) showed higher percentage than the 13-year-olds (1.43%), 15-year-olds (2.66%), 16-year-olds (4.21%) and 17-year-olds (2.71%) in the below average level of fitness. Besides, 17-year-olds (30.08%) revealed higher percentage than the 13-year-olds (24.90%), 14-year-olds (29.60%), 15-year-olds (6.88%) and 16-year-olds (29.21%) in the poor level of fitness. In contrast, 14-year-olds (39.86%) performed higher percentage than the 13-year-olds (33.45%), 15-year-olds (33.90%), 16-year-olds (29.74%) and 17-year-olds (33.06%) in the fit level of fitness. Moreover, 13-year-olds (24.28%) showed higher percentage as compared to the 14-year-olds (13.75%), 15-year-olds (6.46%), 16-year-olds (11.84%) and 17-year-olds (11.92%) in the excellent level of fitness. Furthermore, 13-year-olds (3.67%) demonstrated higher percentage than the 14-year-olds (1.17%), 15-year-olds (1.45%), 16-year-olds (0.26%) and 17-year-olds (0.54%) in the superior level of fitness. However, 345 (16.58%) students did not participate, and 11 (0.53%) students were exempted from the SEGAK test.

DISCUSSION

The study aims to examine the health-related physical fitness levels of Malaysian secondary school students based on gender and age groups after the COVID-19 confinement. In terms of gender, females were more overweight than males. However, males were slightly more obese than females. Conversely, more females showed that they had normal weight compared to the males. The increase in substantial weight gain for both genders was attributed to the increase in their food consumption in the form of unhealthy and less nutritious food which was associated with sedentary behaviours. The males could have been spending substantial amount of time engaging in video and online gaming compared to the females, alongside their normal on-line learning throughout the duration of the confinement. The prevalence of overweight in females could be due to greater screen time on computer and tablet use and snacking that arose from added anxiety for adolescents leading to an increase in eating disorders.

In terms of age groups, the prevalence of overweight and obese level decreased from 13-year-olds to 17-year-olds. Conversely, the younger age groups of 13-, 14- and 15-year-olds were in the normal level as compared to the older age group of 16- and 17-year-olds in the BMI. The younger age groups were exercising less, snacking more, and spending more screen time engaging in online gaming and streaming which provide tempting means to socialize with friends who share similar interests in gaming.

The SEGAK test showed that just slightly over 50% of the students were under the superior, excellent, and fit level, whereas the remaining percentage of the students were under the poor, below average and did not participate level. These showed that COVID-19 confinement had decreased students' daily PA which does not meet recommended daily PA guidelines of 60 minutes of moderate-to-vigorous PA, which has reduced their fitness level (Zenic et al., 2020). The results supported Sekulic et al. (2020) study which showed a higher decrease of PA level in boys compared to girls. The females performed slightly better than males in the superior, excellent, and fit level which did not support the prevalence of insufficient physical activities for girls at 85% between 2001 and 2016 (Guthold et al., 2018). The females could have participated in PA through on-line workout and exercise with the support of their peers and friends' network through social media. This is because adolescent females, as compared to males, are more dependable to interpersonal reasons from the social and community support in engaging in PA as they transit from childhood to adolescence.

The SEGAK test also showed that the students' fitness level declined gradually in the superior, excellent, and fit level based on the age groups. Furthermore, the results also revealed that a higher percentage of the older age groups of 16- and 17-year-olds were in the poor and below average level compared to the younger age groups of 13-, 14- and 15-year-olds. The COVID-19 confinement has not led to any effective forms of interventions from the stakeholders in term of adapting and sustaining creative pedagogical supported technology to provide an online platform such as digital instructional videos for the students to participate in PA and exercise, as Physical Education has not been prioritized and which has lessened PA for the students. The results also supported Ng et al. (2020) study that showed environmental changes had led to significant decline of moderate-to-vigorous PA with age. The burden of increase in schoolwork, subjects, homework, and studying have decreased the PA time for the older students as the older Form 5 students are facing challenges through online learning to prepare for their Malaysian Certificate of Education.

CONCLUSION

The COVID-19 confinement has impacted PA participation severely, which resulted in detrimental effects on the fitness, mental and physical health of the students globally. The study recommends the strengthening of parents and schools' engagement to guide the parents on effective approaches to improve, promote and motivate the students to participate in PA to harness a good balance of healthy activities among the students.

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THE EFFECTS OF THE COVID-19 PANDEMIC ON DIFFERENT HEALTH OUTCOMES AMONG UNIVERSITY STUDENTS IN CROATIA

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ABSTRACT

The aim of this study is to assess the level of physical activity in students at the beginning of the COVID-19 pandemic outbreak and to establish the differences between physically active and physically inactive students in terms of body fat percentage, the BMI, heart rate and blood pressure. In this cross-sectional study, the respondents were 129 university students (mean age: 19.58, mean height: 170.87 cm, mean weight: 71.63 kg, mean body mass index: 24.40 kg/m^2). Physical activity was assessed with a validated International Physical Activity Questionnaire (IPAQ-short version). As a measure of physical activity, we considered students' total physical activity in the last 7 days. We grouped the respondents into two categories: (1) physically inactive and (2) minimally active. Body composition parameters were assessed by using bioelectric impedance analysis. The differences between the two groups were analyzed by using the Student t-test and Man-Whitney U-test. The significance level was set up at $p<0.05$. Approximately 45% of the respondents did not meet the minimum recommended requirements laid down by the World Health Organization (WHO). The physically inactive had a higher body fat percentage ($p < 0.000$), a higher viscelar fat percentage ($p < 0.000$), a higher heart rate ($p < 0.000$) and a higher BMI ($p < 0.000$). The physically active had a higher muscle mass percentage ($p < 0{,}000$) and a lower heart rate (systolic pressure: $p < 0{,}000$ and diastolic pressure: $p < 0{,}024$). The results of the study indicate that the students who do not meet the minimum physical activity recommendations have body composition and cardiovascular parameters that are not within the recommended ones in comparison to the students who are minimally to extremely active. Physical activity should become a regular part of our daily life, especially during pandemics, so as to make our organism stronger, thereby reducing the chances of developing various diseases.

Keywords: students, COVID-19, body composition, physical activity, differences, cardiovascular system

INTRODUCTION

Globally, physical inactivity and bad mental health are among the main risk factors for chronic diseases (Hallal et al., 2012). With the outbreak of the COVID-19 pandemic, sports activities, school, and recreational ones, have been either partially or completely restricted, which led to the increase in sedentary lifestyle. Moving, which helps maintain the quality of life, is a vital need of every living being (Malina et al., 2004; Abernethy et al.,2005). Today physical inactivity is the main public health problem, causing chronic diseases at any age (WHO, 2009). Physical activity plays an important role in the individual's health status. There are many positive effects of a regular physical activity and some of them are: normalization of blood pressure, bone density increase, lower blood cholesterol, prevention of depression, reduced number of injuries and decrease in obesity rates (Blair & Morris, 2009; Strong et al., 2005; Janssen & Leblanc, 2010; Miles, 2007). Physical inactivity is a serious health risk factor and one of the main health problems of the population of the 21st century (Blair, 2009). Global prevalence of the sedentary lifestyle is very high (WHO, 2009). More and more young people are obese, especially university students (Lowry et al., 2000). Changes in lifestyle, such as leaving home and going to university can account for an increased BMI among this specific population (Butler et al., 2004). Monitoring children's and young people's lifestyles is essential for making an adequate contribution to programmes of global obesity reduction. From the public health perspective, promotion of healthy diet and encouraging children and young people to be physically active and to exercise are equally important for the maintenance of the optimal body mass and the reduction of the risk of chronic diseases (Ding & Hu, 2009).

The aim of this study is to assess the level of physical activity in students at the beginning of the COVID-19 pandemic outbreak and to establish the differences between physically active and physically inactive students in terms of body fat percentage, the BMI, heart rate and blood pressure.

METHODS

Respondents

In this cross-sectional study, 129 university students were randomly selected at the Faculty of Economics and Business, University of Zagreb, Croatia, and were aged 19.58 on average (91 female and 38 male students). The assessment was carried out a week before the lockdown in March 2020. Also, they were told that the study was voluntary and they could withdraw at any time. The data collected in the study were anonymous and in accordance with the Declaration of Helsinki. The respondents were randomly chosen during physical education classes.

Variables

Physical activity was assessed with validated International Physical Activity Questionnaire (IPAQ-short version) (Craig et al., 2003). As a measure of physical activity, we considered students' total physical activity in the last 7 days, which was expressed as metabolic equivalent-hours per week. Body composition characteristics: percentage of body fat - FM%, percentage of muscle mass - MM%, visceral fat - VF, were gathered using the bioelectric impedance method (Model TBF-310, Tanita Corporation of America, Inc., Arlington Heights, IL, USA; Tanita-BIA) according to Duerenberg et al. (1991). The Body Mass Index – the BMI – was calculated according to the formula: body mass in kilograms divided by body height in m^2. Body height – BH – was measured using the SECA stadiometer in centimeters, and the body mass – BM – using a calibrated SECA electronic scales in kilograms. Blood pressure (diastolic – DBP – and systolic – SBP), as well as the heart rate – HR – were measured using the OMRON digital sphygmomanometer, on the left hand, after a 5-minute rest period, while sitting down.

Data analysis

Basic descriptive parameters were calculated. Using the Student t-test and Man-Whitney U-test, the differences in the above variables between the two groups were categorized based on the physical activity variables ((1) physically inactive and (2) minimally active), at the significance level of $p<0.05$. The data were processed using the Statistica 13.0 software.

RESULTS

Table 1 contains the descriptive parameters of the respondents, measured in the above variables. It is evident that the arithmetic mean of the respondents in the BMI variable is 24.40, which places the students in the desirable body mass category. According to the World Health Organization (2000) classification, indexes lower than 18.5 indicate malnutrition, between 18.5 and 24.9 designate ideal weight, from 25.0 to 29.9 point to being overweight, and higher than 30 signal obesity. The range of values measured is from 16.95 to 34.67. Considering the fact that the BMI is not an adequate and reliable measure, definitely a more precise indicator is the percentage of body fat, which is 29.18, and the percentage of muscle mass, which amounts to 29.69 on average. For a student population, these values are not satisfactory, as the percentage of body fat is too high, and the percentage of muscle mass is low.

Table 1. Basic descriptive statistics of the study respondents.

Variable / N= 129	Mean	Min	Max	SD	Skew	Kurt
DOB	19.58	19	22	0.71	1.08	0.76
BH	170.87	155.00	193.00	10.33	0.38	-0.90
BM	71.63	46.90	111.90	15.93	0.43	-0.48
BMI	24.40	16.95	34.67	4.33	0.45	-0.80
FM%	29.18	13.60	41.20	6.88	-0.45	-0.57
MM%	4.60	1	10	2.23	0,.1	0.14
VF	29.69	21.30	43.50	5.68	0.74	-0.22
HR	123.21	92	149	13.73	-0.31	-0.66
SBP	77.14	55	92	9.14	-0.18	-0.85
DBP	86.74	63	133	13.43	0.73	0.65
MET/week	1528.26	0.00	11466.00	1676.05	2.36	9.00

Legend: DOB-age, BH-body height, BM-body mass, BMI-body mass index, FM%-percentage of body fat, MM%-percentage of muscle mass, VF-visceral fat, HR-heart rate, SBP-systolic blood pressure, DBP-diastolic blood pressure, MET/week- metabolic equivalent of task.

Table 2 contains the results of the analysis of the two groups, categorized according to physical activity in the last 7 days (physical activity variables). Out of 129 students, 58 reported not to have had any physical activity in the last 7 days which would meet the requirement of the minimum of 600 MET/week and were categorized as physically inactive and 71 of them have met the criterion for the minimally active. Using the Student t-test and the Man-Whitney U-test, statistically significant differences were found between the groups in all seven variables: the BMI, the HR, the SBP, the DBP, %FM, %MM, and the VF, at the significance level of $p<0.05$. Students who failed to meet the minimum physical activity criterion had a higher percentage of body fat, as well as a lower percentage of muscle mass. Naturally, both the BMI and the percentage of visceral fat are also higher in these students. On the other hand, those students who have met the minimum physical activity criterion had a lower systolic and diastolic blood pressure, as well as a lower heart rate.

Table 2. Differences between the groups by using the Student t-test and Mann-Whitney U-test

Study variables	Physically inactive (N=58)	Minimally active (N=71)	p-value
	mean±s.d.	mean±s.d.	
BMI	26.50±4.86	22.69±2.89	<0.000
FM%	32.46±5.67	26.51±6.66	<0.000
MM%	26.97±4.61	31.91±5.52	<0.000
VF*	5.38±2.43	3.97±1.84	<0.000
SBP	127.84±14.11	119.42±12.25	<0.000
DBP	79.14±9.36	75.51±8.68	<0.024
HR*	91.41±13.68	82.93±12.04	<0.000
*denotes using Mann-Whitney U test			

DISCUSSION

The aim of this study is to assess the level of physical activity in students at the beginning of the COVID-19 pandemic outbreak and to establish the differences between physically active and physically inactive students in terms of body fat percentage, muscle mass percentage, visceral fat percentage, the BMI, heart rate and blood pressure. The results of this study have shown that insufficient physical activity leads to a large extent to a higher BMI, a higher heart rate, a higher systolic and diastolic blood pressure, a higher fat mass percentage, a higher visceral fat percentage and a lower muscle mass percentage. Health experts consider obesity a serious health threat and an ever-expanding epidemic. At the age of 19, being overweight and having a high percentage of body fat will not have severe consequences for students but their harmful effects will undoubtedly have a negative impact on their overall health status in the future. This has been confirmed by the differences between physically active and inactive students in all the assessed variables. This study has proven physical activity is proportional to a higher muscle mass percentage and inversely proportional to weight, the BMI, fat mass percentage, a higher heart rate and a higher systolic and diastolic blood pressure. The results of the study are similar to those of some previous studies (Zaccagni et al., 2014; Štefan et al., 2017). To be precise, in 2014 Zaccagni et al. reported that physically active women had a higher muscle mass percentage compared to less active individuals, while physically active men had a lower fat mass percentage and the BMI. Also, the results of the study by Štefan et al. from 2017 indicated physical activity was proportional to muscle mass percentage and inversely proportional to weight, the BMI and fat mass percentage in both men and women, while physical activity resulted in a lower blood pressure in women, and a lower heart rate in men. In children and young people physical activity is closely related to school activities, active transport, and participation in sports activities (Hoffmann et al., 2019). Since educational institutions have been closed during the COVID-19 pandemic, physical activity has decreased consequently, which increases the risk of a long-term sedentary behaviour. The results of several studies show that the current anti-COVID-19 measures could dramatically influence lifestyle activities globally, including participation in sports activities and doing physical activity in general (Ammar et al., 2020; Oliveira Neto et al., 2020). Promotion of physical activity during the time of the COVID-19 restrictions and advice on a healthy diet can have a positive effect on the whole-body composition. In addition, indirect effects on other determinants of health, such as satisfaction with physical appearance, better self-assessed general health and thereby the improved overall quality of life and health of not only young people, but also of the wider population can be expected.

There are several limiting factors in this cross-sectional study. The sample of respondents is not sufficient for any general conclusions about the whole population of students at the university where the study was carried out.

CONCLUSION

The aim of this study is to assess the level of physical activity in students at the beginning of the COVID-19 pandemic outbreak and to establish the differences between physically active and physically inactive students in terms of body fat percentage, muscle mass percentage, visceral fat percentage, the BMI, heart rate and blood pressure. Based on the results of this study, which are indicated in this paper, it can be concluded that students who have body composition and cardiovascular parameters that are not within the recommended ones will report a lower level of physical activity compared to students who are reported to have the recommended values. In conclusion, the problem of obesity and the whole range of diseases generated by this condition should be considered a national priority. Health workers, teachers, parents, and others should put in extra effort to change this negative trend and the way of life of children and adults likewise. Physical activity should become a regular part of our daily life, especially during pandemics, so as to make our organism stronger, thereby reducing the chances of developing various diseases.

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CHANGES IN MOTOR, MORPHOLOGICAL AND FUNCTIONAL STATUS AFTER PARTICIPATION IN NORDIC WALKING TRAINING DURING THE COVID-19 PANDEMIC

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ABSTRACT

It has been proven that physical activity is associated with maintaining functional abilities, but also with independence in performing daily activities, which is especially important in the elderly population. Given the multiple effects of COVID-19 virus on the human body, it is reasonable to conclude that the virus, among other things, reduces muscle ability and cardiorespiratory fitness. The implementation of various forms of physical activity programs could be crucial in combating imbalances in antiviral immunity, protecting a person from inflammatory processes caused by the COVID-19 virus. Strict lockdown is causing radical changes in the daily routines and lifestyles of individuals as well as their habits related to participation in sports and recreational activities. Nordic walking is one of the activities that is useful for adapted motor re-education in COVID-19 patients who have developed respiratory, metabolic, cardiovascular, and walking problems. The Nordic walking program adapted to the working population between the ages of 35 and 65 has been implemented with the citizens of the city of Zagreb (Croatia) lasting three months. The sample consisted of 116 previously physically inactive persons (M-40, F-76, average age 52.64 ± 8.05 years; average height 168.29 ± 8.62 cm; average body mass 90.02 ± 16.08 kg). Each respondent underwent initial and final testing that included morphological status determination, motor tests, and a functional test. Each group of respondents conducted the same prescribed exercise program for 12 weeks. At the end of the final testing, participants were observed as three separate groups: participants who were not infected with the coronavirus and were not in self-isolation during the program (group 1), participants who recovered from the coronavirus during the program (group 2), and participants who were in self-isolation for a certain period of time during the program (group 3). A group of respondents who did not get infected with the coronavirus and were not in self-isolation achieved significant improvements in all observed tests for assessing motor skills. However, it is important to note that no significant decline in fitness was observed in those respondents who had recovered from the coronavirus or were in self-isolation during the program. There is a positive trend in these groups, especially in motor tests. Based on the data of this study, it can be concluded that in this case, continuous physical activity contributed to accelerated recovery and elimination of the consequences of recovering from the coronavirus.

Keywords: physical activity, fitness testing, lockdown, coronavirus pandemic, recovery process

PHYSICAL ACTIVITY AND HEALTH

There is ample evidence of the impact of physical inactivity on increasing the risk of developing non-communicable chronic diseases such as, for example, coronary heart disease and metabolic disorders. The World Health Organization has classified physical inactivity as the fourth leading risk factor for mortality globally, accounting for 6% of deaths, while 13% is related to hypertension, 9% to smoking. Diabetes is also considered to be the cause of 6% of deaths globally (Ricci et al., 2020). Certain projections indicate that in 2008, 5.8 million deaths globally were directly related to lack of physical activity (Lee et al., 2012). As already mentioned, physical inactivity is highly positioned on the scale of mortality risk factors, which led to the decision of the World Health Organization members to achieve a global solution related to the reduction of physical inactivity by 10% by 2025 (WHO, 2009).

On the other hand, regular physical activity has positive effects, among other things, on blood pressure, metabolism, and body weight. Furthermore, moderate physical activity is thought to have numerous positive effects on health of individuals already suffering from certain chronic diseases or disorders (Nieman & Wentz, 2019; Sharman et al., 2019). It has been proven that physical activity is associated with maintaining functional abilities, but also with independence in performing daily activities, which is especially important in the elderly population (Roberts et al., 2017).

In addition to the aforementioned positive impact on reducing the risk of diseases, there is ample evidence of the psychological, social, environmental, and economic benefits of physical activity (Anderson & Shivakumar, 2013; Sharma et al., 2006). Habits acquired through systematic physical exercise have a positive transfer to a person's daily life, and this is mostly manifested through long-term improvement of the overall health status.

There are various guidelines on the required level of physical activity on daily and weekly basis. Thus, for example, the World Health Organization recommends 150 minutes of moderate-intensity physical activity or 75 minutes of high-intensity activity per week, or a combination of these activities. Furthermore, a large study was conducted based on the observation of the beneficial effects of moderate physical activity in leisure time on health status. Light physical activity for 15 min daily, 6 times a week has been shown to reduce all causes of mortality by 14%, the one caused by cancer by 10%, and cardiovascular disease mortality by 20%, compared to the inactive population group (Wen et al., 2011).

Exercise programs should include a combination of strength, balance, and aerobic exercise. In addition to the above, fast walking is also recommended as a cheap and easily accessible form of outdoor physical activity. Optimally, each exercise program should be individualized, that is, adapted to each person with respect to their level of functional and motor abilities (Said et al., 2020).

CORONAVIRUS AND PHYSICAL ACTIVITY

At the end of February 2021, the World Health Organization announced on its website that the total number of people infected with COVID-19 virus globally was 113,467,303, the number of deaths was 2,520,550 and the virus was detected in a total of 223 countries and territories.

However, while the figures shown suggest that the virus has spread en masse globally, the coronavirus pandemic has not affected all population groups equally. The World Health Organization, in a compilation of multiple studies, concluded that there is an increased risk of acute symptoms and mortality caused by the COVID-19 virus in people who have certain health problems. This applies, for example, to hypertension, cardiopathy, pneumonia and cancer. Age is also an important factor, i.e., the elderly population has an increased risk of disease. On the other hand, there is less possibility of developing acute clinical conditions in children (WHO, 2020a; WHO, 2020b; Violant-Holz et al., 2020).

Given the multiple effects of COVID-19 virus on the human body, it is reasonable to conclude that the virus, among other things, reduces muscle ability and cardiorespiratory fitness, which is particularly pronounced in more severe clinical conditions. This can remain as a long-term consequence in those people who have recovered from the coronavirus. However, to date, there is insufficient data on the impact of coronavirus on the above-mentioned abilities after recovery. It is therefore difficult and unjustified to draw concrete conclusions and fully understand the background of the impact of the virus on sports performance after recovery (Frazão et al., 2021). Furthermore, a general two-week reduction in activity (75% reduction in daily number of steps) has been shown to reduce muscle strength by approximately 8%. Although a seemingly small percentage, rehabilitation (re-strengthening) in a period of 2 weeks proved ineffective in restoring muscle function to its initial state, emphasizing the impact of a sharp decrease in activity in an already vulnerable population. In addition to the effect on muscle mass, it has been shown that reducing steps from 1500 a day to 1000 a day negatively affects the use of glucose in the body (skeletal muscles are the main place of glucose storage) which is associated with increased inflammatory processes and decreased protein synthesis (Roschel et al., 2020).

The implementation of various forms of physical activity programs could be crucial in combating imbalances in antiviral immunity, protecting a person from inflammatory processes caused by the COVID-19 virus. Also, new data point to the fact that continuous physical exercise may reduce the risk of developing acute respiratory distress syndrome, which is one of the leading causes of death in patients with coronavirus. After recovery from the coronavirus, it is extremely important that individuals gradually return to some form of physical activity and begin to apply individualized and appropriate exercises programmed by a professional kinesiologist. In this way, a positive effect will be made on maintaining a person's good mental and physical condition (Maugeri & Musumeci, 2021).

According to certain guidelines, when a person is asymptomatic for at least 7 days, a phased approach is used to gradually increase the level of physical activity (Barker-Davies et al., 2020). In case a person has not been physically active before being infected by the virus, the period after the recovery is important for changing habits and starting to engage in controlled physical activity. The development or recurrence of some symptoms, including coughing, shortness of breath, rapid heartbeat, fever, and loss of sense of smell are indications for stopping the activities and medical advice is required, followed by resumption of activity provided the symptoms have disappeared (Elliott et al., 2020).

INFLUENCE OF LOCKDOWN PERIOD ON PHYSICAL (IN)ACTIVITY

Although the lockdown has prevented the explosive spread of the virus in many countries, certain counter-effects have also occurred. Certain authors warn that the sudden introduction of a strict lockdown is causing radical changes in the daily routines and lifestyles of individuals as well as their habits related to participation in sports and recreational activities (Begović, 2020; Hammami et al., 2020). It is important to note that during the pandemic caused by the COVID-19 virus, 4 billion people were in some form of lockdown which may result in an increase in sedentary time on a daily basis, especially in a population that is extremely sensitive due to health status and the inability to move (Jesus et al., 2021).

Given the prolonged stay at home, there is a high probability that the above will affect the increase in time spent inactive – sitting and lying down; in addition to playing video games, watching television, and using cell phones. In this way, the time spent in regular physical activity is reduced, which consequently leads to reduced energy consumption and unwanted changes in morphological status (Chen et al., 2020; Owen et al., 2010).

Official restrictive measures that limit people's movement due to the current situation related to the coronavirus do not necessarily include a restriction of physical activity, i.e., not all forms of physical activity are automatically completely eliminated. Physical exercise has direct positive effects on overall health status, both in healthy individuals and in patients with various diseases or chronic health problems (U.S. Department of Health and Human Services, 2018; Luan et al., 2019). For example, Nieman and Wentz (Nieman & Wentz, 2019) point to the positive role of physical activity in disease prevention. Specifically, according to their conclusions, physical activity is an aid in combating the negative consequences of chronic diseases due to its protective role of the immune system whose optimal status is crucial for an adequate response to the negative effects of coronavirus. Physical inactivity that accumulates over weeks and months can lead to immune system dysfunction which can later be a factor in increasing the risk of infection, which can especially affect the elderly and people suffering from cardiovascular disease, cancer, or inflammatory disorders (Flynn et al., 2019; Damiot et al., 2020). Although the immune system already responds positively to individual training units, it is more likely that the positive effects will accumulate over time and that long-term and continuous physical exercise will achieve adaptation of the immune system (Simpson et al., 2015).

Furthermore, although self-exercise and exercise planning are challenging and require a certain level of self-motivation, some authors suggest that regular physical activity plays a significant role in reducing anxiety and improving mental health and general self-esteem (Anderson & Shivakumar, 2013; Sharma et al., 2006).

However, it is important to mention that there is no consensus regarding the decline or increase in the habit of continuous physical exercise during the lockdown period.

For example, according to an international study involving more than 13,000 participants from 18 countries around the world, 31.9% of participants reported that they started to exercise more regularly during the lockdown, 44.2% indicated no change in their physical exercise habits, and only 23.7% reported a decrease in the frequency of their physical exercise (Brand et al., 2020).

BENEFITS OF NORDIC WALKING

Currently available data suggest that jogging and hiking in nature allow the prescribed physical distance to be maintained and as such represent activities of low risk of injury and infection or spread of disease (Frühauf et al., 2020).

In addition to these activities, the above mentioned certainly applies to other activities carried out outdoors which represent activities of minimal risk of spreading the infection, such as Nordic walking.

Nordic walking is also mentioned as one of the activities that can help in the complete recovery of individuals from the coronavirus. This type of activity is carried out in the so-called "healthy" environment, such as the mountain environment, the coast and parks and is suitable for people of all ages. Also, Nordic walking is useful for adapted motor re-education in COVID-19 patients who have developed respiratory, metabolic, cardiovascular, and walking problems. The use of specific poles during walking enables the activation of the upper body muscles and the total energy consumption is increased compared to normal walking (Pellegrini et al., 2015). Energy consumption at a particular speed is about 20% higher during walking with poles, with certain differences present depending on the walking technique and equipment used (Church et al., 2002; Schiffer et al., 2006). Greater differences in energy expenditure between normal walking and Nordic walking are particularly noticeable when a person adopts and perfects advanced (vigorous) Nordic walking technique (Hansen & Smith, 2009; Pellegrini et al., 2015).

Furthermore, since the poles are held in both hands, there is less stress on the knees and joints in general, and Nordic walking is therefore recommended for degenerative conditions such as osteoarthritis due to the positive impact on motor function and muscle strength (Musumeci et al., 2012; Bieler et al., 2017). It is important to emphasize the psychological benefits of Nordic walking. For example, according to the available data from one study, significant psychological improvements have been proven related to alleviating depressive states and reducing sleep problems (Park & Yu, 2015).

NORDIC WALKING PROGRAM WITHIN THE *GETFIT4FREE* PROJECT

The Nordic walking program adapted to the working population between the ages of 35 and 65 has been implemented with the citizens of the city of Zagreb (Croatia) continuously since 2019. The program continued during the coronavirus pandemic (except during the period when outdoor training was banned due to the epidemiological situation). At the beginning of each new cycle of exercising, lasting three months, citizens attended an initial testing to determine their preliminary condition. In accordance with the results of the initial testing, the training intensity was individually adjusted. Each citizen was able to monitor their own exercise intensity using a heart rate monitor. Also, after three months of the program, a final testing was conducted to determine the individual progress of each citizen. The following is a presentation of previously unpublished data on the impact of Nordic walking programs on the functional, motor, and morphological status of citizens who participated in the program. The analysis included three groups of citizens: 1. the ones who recovered from the coronavirus, 2. the ones who had to be in self-isolation and 3. the ones who were not infected with the coronavirus nor were in self-isolation during the program.

METHODS

Respondents

The sample consisted of 116 previously physically inactive persons (M-40, F-76, average age 52.64 ± 8.05 years; average height 168.29 ± 8.62 cm; average body mass 90.02 ± 16.08 kg). Physical inactivity was determined by a questionnaire on general health, referring to the last 5 years during which it is considered that the respondents were not actively involved in any form of recreational activities. The survey was conducted in late 2020 and early 2021. Before conducting the research, the participants were informed about the purpose of the research and their written consent was obtained to participate in the entire research. At the end of the testing, participants were observed as three separate groups: participants who were not infected with the coronavirus and were not in self-isolation during the program (group 1), participants who recovered from the coronavirus during the program (group 2), and participants who were in self-isolation for a certain period of time during the program (group 3).

Variables

All respondents underwent initial and final testing that included morphological status determination, motor tests, and a functional test.

1. Morphological status: body height, body mass, body mass index (BMI; expressed in kg/m2), body fat percentage, muscle mass (expressed in kg).

Body height was measured with an anthropometer; body mass, body fat percentage, muscle mass and body mass index were determined using a Tanita scale that allows the measurement of the required parameters.

2. Motor tests: alternating lunges with left and right leg (number of repetitions in 30 seconds), modified squats (number of repetitions in 60 seconds), modified push-ups (number of repetitions in 60 seconds), plank (measured in seconds), wall sit (measured in seconds).
3. Functional test: modified Beep test (15 meters distance of sections).

The following section comprises goal, description, and protocol for conducting basic motor tests and functional test.

ALTERNATING LUNGES WITH LEFT AND RIGHT LEG

Aim of the test: to assess the relative repetitive power of the leg muscles.

Test description: the respondents are in the upright position, with their palms on their hips and they perform the maximum number of correct lunges with the left and right foot in 30 seconds.

Testing protocol: a measurer defines the length of the respondent's two feet and marks the distance with two markers. The respondent performs lunges alternately with the left and right foot in line with the marked length. The body must be in the upright position; the knee of the stepping leg must be at least 5 cm off the ground. The result is expressed in the total number of lunges made with the left and right foot.

PLANK

Aim of the test: to assess the stability of static body strength

Test description: The respondent takes the position of the front hold with support on the elbows and toes, fully extended body, head in the extension of the spine.

Test protocol: The test begins when the respondent is placed in the correct position. The test lasts as long as the subject maintains the correct position. The result is expressed by the time the respondent managed to maintain the correct position.

MODIFIED PUSH-UPS

Aim of the test: to estimate the relative repetitive power of the arm and shoulder girdle muscles

Test description: The respondent performs the maximum number of correct push-ups in 60 seconds; leaning his arms on a bench 80 cm high. The palms are shoulder-width apart; seen from the lateral (sagittal) plane, the respondent's upper arms and torso form an angle of 90 degrees; the body is fully stretched.

Testing protocol: Correct performance involves keeping the body fully extended during the push-up, fully extending the arms at the elbow in the upper position, touching the bench with the chest in the lower push-up position. The result is expressed in the number of correctly performed push-ups.

MODIFIED SQUATS

Aim of the test: to assess the relative repetitive power of the leg muscles.

Test description: The respondents are in an upright stride position with feet shoulder-width apart in front of a bench 40 cm high and perform the maximum number of correct squats in 60 seconds. The palms of the respondents are on their hips.

Testing protocol: From the initial position, the respondent performs a squat by touching the bench with the gluteus muscle, keeping the torso as upright as possible, and returning to the initial position. The result is expressed in the number of correctly performed squats.

WALL SIT

Aim of the test: to estimate the relative static strength of the leg muscles

Test description: The respondents perform maximum wall sit; in a semi-squat position, with their feet hip-width apart, their whole back leaning against the wall; with angle at ankle, knee and hip is 90 degrees, and arms crossed at chest with palms on opposite shoulders.

Test protocol: The test begins when the respondent is placed in the correct position. The test lasts as long as the respondent maintains the correct position. The result is expressed by the time the respondent managed to maintain the correct position.

BEEP TEST (15 m)

Test goal: Assessment of aerobic capacity, measurement of maximal heart rate.

Test description: Requirements to perform this test are the Beep test mobile application (Ruval Enterprises), two cones that are placed at a distance of 15 meters from each other and a form for recording the intervals passed. The beep test consists of twenty-one levels of 7 or more 15-meter intervals. Each level lasts approximately 60 seconds, with the 'speed' od the respondents (duration of each interval) dictated by the interval of the audio signals on the audio device. Thus, at each of the intervals the respondent crosses a section of 15 m at a given pace.

Testing protocol: The task is for the respondent to be close to the marker at the time of the beep. The initial respondent's speed is 6 km/h, and the speed of transition is increased by reducing the interval between the sound signals. In case the respondent reaches the mark too early (crossing the 15 m section too fast), he should trot in place until the signal. The test ends when the respondent, within the same interval, does not arrive (comes late) twice to reach the given marker at the time of the signal. The test can be performed with or without Nordic walking poles. The result is expressed numerically depending on the number of levels passed and the intervals on the form.

Research protocol

Each respondent underwent initial testing that included morphological status determination, motor tests, and a functional test that were previously described in detail. After the testing, the respondents were randomly divided into smaller groups (10-15 persons) and were included in the Nordic walking program, which was conducted under the supervision of a kinesiologist and a project coordinator. Each group of respondents conducted the same prescribed exercise program for 12 weeks. The Nordic walking program was significantly adjusted in intensity to the respondents, with regard to the initial state of morphological characteristics and motor abilities and the health status determined by the questionnaire. During the training, the respondents used a heart rate monitor in order to individualize the training, i.e., each respondent was assigned 4 load zones, which were determined based on their individual result of the Beep test. After the expiration of 12 weeks, the respondents participated in the final testing, which was conducted according to the same protocol as the initial testing.

NORDIC WALKING PROGRAM

The Nordic walking program is designed with the aim of improving the overall health status, developing aerobic capacity, and developing a positive attitude towards physical activity. Nordic walking training activated various muscle groups of the upper and lower body. The use of poles made it possible to increase the intensity of exercise, without having a negative impact on the musculoskeletal system of previously physically inactive people. The initial one-week training phase included learning the correct walking technique using poles and getting used to continuous work. The intensity and extent of the training load progressively increased, and the goal of each training was to exercise in the aerobic-extensive zone. Load monitoring during training was performed via a heart rate monitor.

Data processing methods

The collected data were processed using the software package STATISTICA, version 13.4 for Windows. Kolmogor's Smirnov test was used for the purpose of testing the normality of distributions in all observed variables. Basic descriptive statistical indicators of variables (mean, standard deviation, minimum and maximum) were calculated. In order to gain insight into the significance of the difference between the results achieved at the two time points of the measurement, ANOVA was used for repeated measurements for all three groups of respondents. The obtained results were considered statistically significant at the error level $p < 0.05$.

RESULTS

Table 1. Descriptive statistical parameters of results in individual tests of initial and final measurement for group 1 respondents (respondents who were not infected with the coronavirus and were not in self-isolation).

Variables	N	Mean	Minimum	Maximum	St.Dev.
Lunge_IN	82	11,66	0,00	20,00	3,94
Lunge_FIN	82	13,54	0,00	22,00	3,43
Wall sit_IN	82	45,15	0,00	180,00	25,65
Wall sit_FIN	82	51,80	5,00	169,00	25,52
Squats_IN	82	33,32	0,00	58,00	8,70
Squats_FIN	82	39,48	15,00	59,00	7,91
Push-ups_IN	82	22,05	3,00	40,00	7,64
Push-ups_FIN	82	25,94	6,00	46,00	7,65
Plank_IN	82	44,91	2,50	150,00	26,72
Plank_FIN	82	53,53	6,00	151,00	27,69
Beep test_IN	82	4,28	2,02	11,00	1,71
Beep test_FIN	82	4,74	0,00	11,03	1,82
HRmax_IN	82	165,00	122,00	203,00	14,74
HRmax_FIN	82	162,67	0,00	200,00	23,93
Body mass_IN	82	89,66	62,20	137,60	15,81
Body mass_FIN	82	89,67	61,60	140,20	15,61
BMI_IN	82	31,93	23,90	50,30	4,40
BMI_FIN	82	31,92	24,50	45,40	4,20
% body mass_IN	82	43,51	20,10	62,50	7,20
% body mass_FIN	82	43,63	22,90	58,90	6,87
Muscle mass_IN	82	47,21	36,00	80,60	8,91
Muscle mass_FIN	82	47,16	36,60	80,00	8,86

* IN- Initial testing; FIN- Final testing.

Table 1 shows the average values of the initial and final testing results in the observed variables, standard deviations, and minimum and maximum values of the group 1respondents. Based on the presented results, it is evident that positive changes were achieved in all motor tests, morphological status, and test to assess functional abilities.

Table 2. Descriptive statistical parameters of results in individual tests of initial and final measurement for group 2 participants (respondents who recovered from the coronavirus).

Variables	N	Mean	Minimum	Maximum	St.Dev.
Lunge_IN	24	12,83	0,00	16,00	4,34
Lunge_FIN	24	14,92	8,00	20,00	3,50
Wall sit_IN	24	51,55	10,00	130,00	36,80
Wall sit_FIN	24	44,57	10,00	92,00	25,04
Squats_IN	24	40,33	20,00	62,00	12,02
Squats_FIN	24	48,33	35,00	65,00	9,03
Push-ups_IN	24	27,08	2,00	44,00	13,18
Push-ups_FIN	24	28,83	0,00	48,00	13,77
Plank_IN	24	52,83	10,00	120,00	37,32
Plank_FIN	24	58,69	11,00	134,19	40,19
Beep test_IN	24	5,12	2,03	10,01	2,63
Beep test_FIN	24	5,53	2,04	10,03	2,46
HRmax_IN	24	165,17	137,00	191,00	18,34
HRmax_FIN	24	165,92	132,00	187,00	15,47
Body mass_IN	24	97,80	74,60	146,40	19,34
Body mass_FIN	24	96,58	75,50	143,70	18,82
BMI_IN	24	34,14	24,80	49,50	6,46
BMI_FIN	24	33,70	24,60	48,60	6,23
% body mass_IN	24	41,70	16,60	63,20	12,62
% body mass_FIN	24	41,33	17,20	62,20	12,40
Muscle mass_IN	24	52,80	37,60	71,90	11,28
Muscle mass_FIN	24	52,49	37,80	71,80	10,92
* IN- Initial testing; FIN- Final testing.					

Table 2 shows the basic descriptive statistical indicators of the initial and final testing in the observed variables of group 2 (respondents who recovered from the coronavirus). A slight positive change in motor tests is noticeable. There are no significant changes in the observed body composition variables.

Table 3. Descriptive statistical parameters of results in individual tests of initial and final measurement for group 3 respondents (respondents who were in self-isolation for a certain period of time).

Variables	N	Mean	Minimum	Maximum	St.Dev.
Lunge_IN	10	15,20	9,00	22,00	4,97
Lunge_FIN	10	18,00	15,00	24,00	3,94
Wall sit_IN	10	39,86	19,30	70,00	18,74
Wall sit_FIN	10	38,30	21,00	47,00	10,95
Squats_IN	10	38,20	22,00	51,00	11,17
Squats_FIN	10	42,40	31,00	53,00	9,94
Push-ups_IN	10	23,00	15,00	41,00	10,39
Push-ups_FIN	10	29,40	17,00	44,00	10,83
Plank_IN	10	45,16	14,00	65,00	23,89
Plank_FIN	10	56,39	35,00	73,46	19,17
Beep test_IN	10	5,02	3,03	7,01	1,86
Beep test_FIN	10	5,65	4,02	8,01	1,81
HRmax_IN	10	175,60	168,00	187,00	7,27
HRmax_FIN	10	177,20	170,00	184,00	5,72
Body mass_IN	10	85,26	72,40	107,10	16,31
Body mass_FIN	10	85,90	72,10	109,30	16,38
BMI_IN	10	30,14	27,20	35,40	3,55
BMI_FIN	10	30,34	27,10	36,10	3,62
% body mass_IN	10	39,94	28,90	49,60	7,40
% body mass_FIN	10	40,20	28,00	50,50	8,09
Muscle mass_IN	10	48,08	40,50	66,50	11,07
Muscle mass_FIN	10	48,14	40,30	66,20	10,88
* IN- Initial testing; FIN- Final testing.					

Table 3 shows the basic descriptive statistical indicators of initial and final testing in the observed variables of group 3 (respondents who were in self-isolation for a certain period of time). In the observed motor tests, there is a slight positive change compared to the initial testing, while in the observed variables of body composition there are no significant changes.

Table 4. Results of ANOVA for repeated measurements for group 1.

	Test	Lambda value	F	P
criterium	Wilks	0,819	3,049	0,001*
* significance level p<0.05				

The results indicate a statistically significant difference between the initial and final testing of group 1 (respondents who were not infected with the coronavirus and were not in self-isolation) (F = 3.049; p = 0.001).

Table 5. ANOVA results for all observed variables in group 1.

Variables	F	p
Lunge	10,577	0,001*
Wall sit	2,766	0,098
Squats	22,508	0,000*
Push-ups	10,614	0,001*
Plank	4,113	0,044*
Beep test	2,726	0,101
HRmax	0,563	0,454
Body mass	0,000	0,997
BMI	0,000	0,986
% body mass	0,012	0,913
Muscle mass	0,001	0,973
* significance level p<0.05		

The results analysis shows that the final testing results differ from the initial ones in several observed variables from the motor space. Group 1 respondents made statistically significant progress in the final testing in the number of performed lunges in 30 seconds (p = 0.001). Also, a statistically significant change is visible in the number of performed squats (p = 0.000), in the number of performed push-ups (p = 0.001) and in plank duration (p = 0.044). Furthermore, it can be observed that no statistically significant change was achieved in the observed morphological status variables, nor in the result achieved in the functional ability assessment test. It is expected that in this group of respondents there is a statistically significant change in at least one tested segment with respect to continuous training without interruption.

Table 6. Results of ANOVA for repeated measurements for group 2.

	Test	Lambda value	F	P
criterium	Wilks	0,209	2,431	0,092
* significance level p<0.05				

The results indicate that there is no statistically significant difference between the initial and final testing of group 2 (respondents who recovered from the coronavirus) (F = 2,431; p = 0,092). Considering the results presented in Table 2 and Table 6, it can be noticed that there were no statistically significant differences in the level of observed abilities. However, although the changes are not statistically significant, it is possible to determine a positive trend in the results achieved in almost all motor tests, and mild positive changes are visible in the variables of body composition and the test to assess functional abilities. It is important to point out that in respondents who recovered from the coronavirus, no decline in ability was found, but despite the disease, it can be established that the exercise program had a positive effect on maintaining and improving the observed abilities and morphological components. This is very important in the context of observing the speed and the consequences of recovering from the coronavirus. Given the trend of the results, it is possible to expect a statistically significant shift in all observed variables with the continuation of the training loads application in the next quarterly cycle. With additional research that would support the results of this research, it can be concluded that continuous physical exercise can reduce the negative effects of coronavirus and accelerate the body's recovery. Consequently, it is easier to get involved in the activities of everyday life, and thus in exercise programs.

Table 7. Results of ANOVA for repeated measurements for group 3.

	Test	Lambda value	F	P
criterium	Wilks	0,196	0,511	0,801
* significance level p<0.05				

The results indicate that there is no statistically significant difference between the initial and final testing of group 3 (respondents who were in self-isolation for a certain period of time) (F = 0.511; p = 0.801). Based on the results shown in Table 3 and Table 7, it can be concluded that there was no significant decline, but also no statistically significant increase in the level of tested abilities. It can be observed that the respondents progressed in almost all motor tests, while a slightly negative trend is visible in the morphological components. The period of self-isolation caused a slight stagnation in the development of the observed abilities, compared to the group of respondents who were not in self-isolation, nor they recovered from the coronavirus. However, it is important to mention that the respondents who were in self-isolation for a certain period of time, after returning to the exercise program, did not have a problem with monitoring the increase in the intensity of training activities.

CONCLUSION

The pandemic caused by the COVID-19 virus has become a global problem and has affected various spheres of human life. This refers to health status, mental state, social component, employment status and many others. In addition, given the various restrictive measures limiting movement and closing fitness centres and gyms, the problem of physical inactivity has deepened even more. It is important to point out that at this time, physical activity is extremely important due to its various health and psychological benefits. Physical activity is one of the most effective preventive methods to fight various viruses and infections. Systematic physical exercise reduces the sedentary lifestyle, but also the adaptation of the immune system, which in turn can reduce the risk of infection. In this period of the pandemic, special emphasis is placed on outdoor activities, such as Nordic walking.

This study looked at the impact of Nordic walking programs on changes in the morphological status, motor, and functional abilities of previously physically inactive individuals during the COVID-19 pandemic. A group of respondents who did not get infected with the coronavirus and were not in self-isolation achieved significant improvements in all observed tests for assessing motor skills. However, it is important to note that no significant decline in fitness was observed in those respondents who had recovered from the coronavirus or were in self-isolation during the program. Furthermore, there is a positive trend in these groups, especially in motor tests. Thus, based on the data of this study, it can be concluded that in this case, continuous physical activity contributed to accelerated recovery and elimination of the consequences of recovering from the coronavirus. It is important to note that the population that participated in this study was physically inactive prior to enrolment in the exercise program and a longer period of time is required for the body to respond to the effects of targeted physical activity. Given the above results, it is possible to conclude that statistically significant changes in the measured variables would be recorded in the next quarterly cycle. Also, it is expected that the negative consequences of coronavirus will be completely annulled. Further research with a similar goal would contribute to a better understanding of the specific impact of physical activity on prevention and recovery from the coronavirus, which could provide guidelines for planning and programming activities during a pandemic, but also after a pandemic in individual cases of coronavirus.

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CHAPTER 3

THE INFLUENCE OF PHYSICAL INACTIVITY ON OVERALL WELL-BEING DURING COVID-19 PANDEMIC

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A long period of social isolation at home or quarantine has strong psychosocial consequences, especially for the well-being of the general and more vulnerable populations. Studies suggest there is a negative impact on overall well-being from time spent under quarantine measures. Emotions and feelings play a central role in response to the COVID-19 outcomes and re-structure our understanding about how to cope with the negative impacts of different situations we are all dealing with. Apart from the fact that physical activity is a natural human need, nowadays emphasizing its importance is one of the most responsible obligations of all health professionals. The main goal of promoting physical activity is ultimately a longer life expectancy and better life quality of individuals and society as a whole. In order to prevent the development of the most numerous non-communicable diseases, the promotion of physical activity must be carried out in a planned and interdisciplinary approach. Available data on the causes of premature death show a significant impact of the environment (20%) and genetics (18%), while most of them (56%) depend on lifestyle, where physical activity is necessary to maintain personal hygiene and prevent premature death worldwide. It seems the social connectedness within the family and social environment during the COVID-19 pandemic appear to be important factors influencing well-being within the population. Analysing the influence of COVID-19 pandemic on overall well-being is extremely important for predicting the social and economic development of any country. Additional studies are needed to identify interventions that can increase social capital to engender healthy habits with the ultimate goal of achieving healthier people. This chapter provides the latest evidence on the influence of the COVID-19 pandemic on overall well-being.

OUT OF THE DARKNESS, A NEW COMMUNITY EMERGES

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ABSTRACT

This autoethnographic case study explored how I, as a professor teaching about exercise, fitness, and physical activities, experienced and developed exercise programs for my physical education and exercise science students. My purpose was to explore the sense of community that was created in teaching physical activities in online community college courses during the COVID-19 pandemic. The transition from face-to-face classes to online learning was studied in order to learn and develop new approaches from this recent experience. This reflective autoethnographic case study describes the process of building a better pedagogical foundation of practice.

Keywords: online instruction, autoethnographic, exercise and fitness, creating community

INTRODUCTION

Issues of COVID-19 and Health and Lifestyle Consequence

The World Health Organization (2020) declared coronavirus disease 2019 (COVID-19) to be a global pandemic on March 11, 2020. Due to the health risks involved in the pandemic, public health measures were taken, such as having people quarantine, practice physical distancing, and the wearing of personal protective equipment (PPE). These measures were followed by the United States as well as by countries across the world (Nussbaumer-Streit et al., 2020). The impact of COVID-19 had a devasting effect on our public health, our economy, and our lifestyles (Ikenberry, 2020). The consequences of this pandemic have resulted in loneliness, increased anxiety levels, and sedentary behaviour. The absence of social connections, psychological emotions and mental health factors, and physical inactivity can lead to serious health consequences to the cardiovascular system, immune system, respiratory system, and musculoskeletal system (Woods et al., 2020).

The emotional responses from social distancing and staying at home has resulted in fear, anxiety, distress, and depression. The possibility of contracting viral infections creates fear, and that combined with feeling lonely because of self-imposed isolation, can lead to the heightening of negative emotions that go so far as increasing the risk of suicide in pandemics (Leaune et al., 2020; Smith & Lim, 2020). The psychosocial conditions of loneliness and an absence of social connections, particularly face-to-face connections, have been found to predict unhealthy behaviours (i.e., smoking, long hours of watching television) (Constandt et al., 2020; Wang et al., 2020). Loneliness can also cause increases in cognitive decline and cardiovascular disease (Hawkley & Cacioppo, 2010). Behaviours such as prolonged sleeping time have been associated with the COVID-19 outbreak (Zheng et al., 2020). Physical well-being (Uchino, 2006) and overall longevity (Shor et al., 2013) are significantly influenced by having social connections. It was found that social isolation, living alone, and loneliness contribute to an increased earlier mortality risk (about 29%). That risk percentage is equal to a comparable degree to previously established risk factors of health conditions, such as obesity and substance abuse (Holt-Lunstad et al., 2015).

The health care crisis has been feeding the economic crisis and has affected the world economy. Unemployment has increased, economies have decreased by 25% or more, and COVID-19 recessions have begun (Cutler, 2020). Since the outbreak, the impact of the virus, on global and national levels, has affected productivity levels, people's livelihoods, and resources; this resulted in an economic downward spiral (Baldwin & Tomiura, 2020; McKibbin & Fernando, 2020). Workers began to work from home, allowing business owners to save on operating costs as revenues decreased. Panic buying increased, and people stocked up on essential food items and service items (i.e., toilet paper, sanitizers), despite there not being a shortage (Ozili, 2020). Though the hoarding of such items has made them hard to find.

The strict social distancing measures that have been enacted by countries and cities were being enforced in order to minimize the chances of transmitting the COVID-19 virus (Ali & Kunugi, 2020). These social distancing measures included home confinement as schools closed for home learning, working remotely from home, and poor sleep quality (Stanton et al., 2020; Wang et al., 2020). Sleep was affected as being home disrupted the structure of sleep; there were long sleep times, staying up late, short sleep times, long naps during the day – all related to an increased risk of weight gain, cardiometabolic health, and cardiovascular disease (Huang et al., 2020). More than a third of people increased their internet browsing to more than six hours per day (Islam et al., 2020); more than 20% reported high sedentary behaviour, more than eight hours a day, during the COVID-19 pandemic (Rahman et al., 2020). All this resulted in a large increase in overall sedentary behaviour.

Furthermore, working at home and no longer commuting to work decreased the physical activity that many people used to get on a daily basis. Gymnasiums and outdoor recreation facilities and activities were no longer accessible, which also decreased the physical activity levels of populations (Stanton et al., 2020). The decrease in muscular strength due to the lockdown measures of the COVID-19 pandemic imposed by most countries would result in decreases in physical fitness (Cheval et al., 2020; Smith & Lim, 2020; Woods et al., 2020). This lack of physical activity associated with staying at home may alter body immunity and increase the risk for contracting viruses, such as COVID-19. Immunity, the first defence to fight the COVID-19 virus, can decline due to lack of activity (Warburton & Bredin, 2017). Daily exercise and physical activity boost our immune system (Siordia, 2020), and yet more than 55% of people did not participate in physical exercise while in home confinement (Islam et al., 2020). Almost 38% of participants in a study were physically inactive during the COVID-19 pandemic (Rahman et al., 2020). Tison et al. (2020) found that there was a decrease of 27.3% in the daily step count of people in 187 countries for the first 30 days of confinement; Italian people had a 48.7% decrease in their daily step count over the same time period probably due to their much higher infection rates.

However, it was students who were found to be the least physically active (46%) as compared to other groups. Universities and colleges were closed, and students were learning online. Many had to spend more hours on their studies and work as they were not as adept to doing schoolwork on computers. Their screen exposure increased, and then students were more prone to play games and engage on social media and be inactive. Those living in urban areas also participated in less physical activity (Rahman et al., 2020).

METHOD

Autoethnography is a form of qualitative research that may be described as an attempt by an individual to use informed analysis to explore and understand one's personal experience to illustrate facets of a cultural experience and to gain insight into the culture you are a part of (Patton, 2014). The primary data source for autoethnography is the description and awareness of one's experience and self-examination. This type of research allows for a deeper exploration of the impact of instruction on students' abilities to learn and grow.

Autoethnography was the method used to uncover the reflective insights of my teaching during the cultural changes of the COVID-19 pandemic. The culture of in-person teaching was drastically changed, and I was faced with remote instruction. This was a challenge for both me as an instructor and for my students as the fabric of traditional in-person fitness instruction was changed to online teaching. Autoethnography guided my reflections on these changes. Lesson plans and journaling helped me to reflect on the changes that I was going through in this period.

THEORETICAL FRAMEWORK

To frame my experience with online teaching, I was guided by the Fragmentation Theory (Ulusoy & Firat, 2011). This theory, stemming from sociology, suggests that during uncertain times, there is an increase of subcultures that are formed on the basis of the collective choices that the individuals have to make. This theory can be applied to a wide range of topics including art, religion, and economic trends. For the purpose of my autoethnographic reflection, I examined exercise fitness throughout the lens of fragmentation. Specifically, I scrutinized how my instructional choices of exercise that I taught to my classes were directly influenced by the online environment and was a by-product of the pandemic. I also assessed how my instructional process brought this fragmentation back to a more stable process.

PURPOSE OF STUDY

The purpose of my exploration was to examine my experience as an instructor of fitness courses amidst the COVID-19 pandemic. The intent was to explore how I transitioned from in-person to fully online teaching to develop approaches to effective instruction while experiencing these significant changes and modifications.

RESEARCH QUESTIONS

As I reviewed and analysed my journal entries, a set of questions emerged. The two major questions became:

1. How am I developing and learning as an instructor due to this transition?
2. How can this exploration help to provide insight to other instructors experiencing a transition to teaching fitness online?

CONTEXT

This transition from in-person to online instruction took place at a community college. Community colleges have emerged in the last 40 years as an increasingly vibrant and significant part of the higher education system in the United States. These colleges traditionally have appealed to student populations, who have been characterized as low-income, first-generation, minority, or working adults, who want a lower-cost, close-to-home into post-secondary education (Shaffer, 2008). Students of colour compose a larger share of the student body at community colleges compared to four-year public and four-year private colleges (Juszkiewicz, 2015; St. Rose & Hill, 2013). Over one third of students, who attend community colleges, have parents who did not graduate from college (Ma & Baum, 2016). They attract students from all backgrounds and educational levels. The courses that students take at community colleges are extremely important as they lay a foundation to a future course of study in four-year colleges (Hultin, 2014).

THE FRAGMENTATION BEGINS: JOURNEY TO NEW TEACHING METHODS

Spring 2020-Pandemic Shut Down

On March 11, 2020, I abruptly stopped teaching in the classroom and was told that I would be teaching online. I was given five days to transition from my in-class teaching to online instruction because of the COVID-19 pandemic. I had little training but had to make some quick decisions about how to adjust my courses for online instruction. I was told that I had five days off from teaching, which included a weekend, to adjust my teaching to being online. My strategy was to use my existing course and maintain the same teaching objectives, activities, and strategies that I used in in-person classes. The amount of work that had to be done to record all of my courses onto a PowerPoint format, or redo PowerPoints that I already had, was tremendous.

I have a lot of energy, so I would work all day, very often all night, and collapse on the weekends to sleep 10 hours. But all day during the week, and all day during the weekends, was spent adjusting my courses and lectures, so that students would be able to get the most out of my courses. Every exam would take eight hours to develop and type on to Blackboard, my electronic teaching platform, specifically in the test assessment section. Recording two-hour lectures would often take four or five hours. Developing the PowerPoints to go with them another four or five hours. It would take all day, every day. I would sit, I would barely move, and when my legs would swell edema-like from my knees down, I would stand. I would sit and stand in various parts of my home, so that I could change my surroundings and to stay awake. I drank coffee by the gallon. However, what kept me awake was the fact that my students were waiting for their lectures and that those lectures had to be available for them.

In that spring semester of 2020, I was teaching asynchronously. My only communication with students was through emails, and sometimes an occasional phone call, if it was warranted. At the beginning of the semester, I had my students confirm their email addresses that were connected to Blackboard. Blackboard was used to send emails to my students. Those that did not confirm their emails did not receive updates about the start of our online teaching. Some did not find out that we started class again until over a month later. Many of them had to do a lot of catching up, getting poor grades, unfortunately, during this time, and many of the students dropped out completely.

The college where I work has an amazing sense of community. That wonderful sense of community that my college worked so diligently to maintain with the students, and that we as faculty members work so hard on, was very quickly dissipating. I was exhausted. I could barely keep up with the work that my students were turning in for me to grade, check, and correct. Not knowing all the features of Blackboard, I had students take pictures of their labs, assignments related to their academic work, and email them to me. Modifications were made in how I corrected those labs. In the in-person class I would grade labs, and then, if necessary, work with students on equations, discuss their answers, and pose questions for them in the margins. The labs could be given back to me for regrading. When classes went online, I barely had time to read through and grade labs one time. I could not grade them a second time.

During in-person classes, we would work out in the gym and on weight machines. But now that classes were online, I had to modify these instructional methods. For the actual fitness and exercise sections of all of my classes, I had to adapt new workouts, which could be done at home, that corresponded to the various lessons in the lectures and classes. Although it would have been easy to revise in-person lectures, to redo, and explain, and describe, and write out instructions for lectures in this online format, was difficult. Due to the shortness of time, my focus was on creating the physical activities and exercises for the students, rather than on building community in our class settings. Student experience was not shared when doing these workouts at home alone. I could sense that there was a lot of connection missing in my classes. I was trying to bond with students but was not doing it very well. My students were absolutely not connecting with each other, as we had no solid structure for that because of the online format. After grades were finally posted, I recouped and kept my feet up in the air. Edema, be gone!

Summer 2020-Reflecting on the Fragmentation that Had Occurred

I was so ecstatic when the final grades went in. I remember going outside on my terrace, sitting down on my Adirondack chair, and staring out onto the park in front of me with a glass of seltzer in my hand. I was actually able to say that I had nothing to do at that moment. Nothing was due tomorrow. I had completed the spring term, and my students had completed the spring term. And I believed and hoped that every student who made it to the end with me learned not only the subject matter, but about life, about themselves, and about enduring a challenging semester. However, upon reflection, I felt that the course, while completed, could have been improved.

The students had to adjust to the new structure of the courses, and I had to become more familiar with the new types of concerns, situations, and questions that the students had. Students suddenly had encountered new barriers; these included faulty internet connections, the lack of computers, finding personal space, childcare, work responsibilities, and juggling classes that were suddenly approached and taught very differently by instructors like me - all of which sometimes meant that getting their schoolwork done was more arduous. The transition to online learning and facing these barriers was a disproportionate risk for many of my students. My job was to balance the possible unequal learning outcomes.

I had given them a little bit of a foundation for the summer of 2020, with some knowledge of how they could exercise in their own home without having to worry about going outside due to the pandemic, or going into any kind of gym, where they may not feel comfortable. They were given aerobic and calisthenic exercises that they could use to work out throughout the summer and keep in shape until the fall when, hopefully, our world would open up a little bit more.

Sitting on my terrace, I had envisioned that I had the whole summer to work on my 14-week semester teaching schedule. I had taught the last seven weeks of the semester online. It had not been easy, but I had laid out the groundwork for all of my courses. Those last seven weeks needed a lot of fine-tuning, and also some major changes, but I felt secure that I had ‘substance’ to work with. It was the first seven weeks of the semester that I was concerned about.

I knew how much work it took for me to get each week of classes ready, and how many hours I would have to put into each lecture and exercise fitness workout, if I were to really get it right. Getting it right meant to reach my students, to give them something that they can feel better about, and the something that I could do for them was to make them feel healthier. I could literally help them to learn about their health and bodies, and then show them how to physically feel better and help them improve their fitness. I had 12 weeks to do this. Twelve weeks to organize seven classes, so I figured I could work on one lecture every week. I could work diligently, slowly, feel energetic, and still get some sleep during that period of revamping the lectures. It also gave me five weeks to update and correct the last seven lectures, which I had rushed to develop from mid-semester, when we went to online teaching.

However, later that week, and at the last minute I was required to undertake a four-week online teaching essentials workshop to become certified in teaching on the Blackboard platform. I was not too worried about it when I was first told of it, because I believed I would get better with the Blackboard platform to teach my courses. However, those four weeks, as helpful as they were in learning about Blackboard, required my working every day at the computer for hours on end. I was a student, I had homework, I had to write essays, papers, and to research and work on all aspects of Blackboard. I learned a lot that I was going to use in the fall semester, but I had lost time to do the work that I had planned to do for my classes. And I was exhausted. I was still working, and I was working on the computer. I did not want to see my computer anymore. I wanted to shut my computer down. I knew that this meant that I had to once again rush to complete the lectures for the fall within the last eight weeks that I had left of my summer.

However, that is what I did. I worked for hours on my lectures, and I relished the fact that my workload in the fall would not be as extreme as it had been in the past spring semester. While preparing for the fall lectures, I wanted to figure out some ways that I could bring the students in my classes together, to have them feel a sense of the community that they had lost when they left their campus life during that previous spring semester. I made the decision that I was now going to teach synchronously; I would see their faces. I would get to know them personally. I also worked on improving the exercises that I was going to use with each course. To do this, my College Lab Technician and I put together an exercise video for the students to follow for one workout. I wrote up workouts and supplemented the instructions on how to do them with YouTube videos, which would exactly replicate my instructions. I wanted my students to understand precisely how to do the exercises correctly. In my synchronous class, after I explained the exercises, I could demonstrate them, or they could follow the YouTube video examples I provided for them. I gave them as many options as possible.

It ended up being a demanding summer with the work that I had to do, but I did get more sleep, and I entered the fall semester much more confident in my ability to use Blackboard, more energized to meet and engage my students, and looking forward to my first all online semester, something I never imagined myself teaching.

Fall 2020-A Start to Building Community

I was so excited when the semester started because I felt that I had done so much work on my courses all summer long. I anticipated seeing students' faces, having engaging discussions, and with the clarity that everything was written out in, I thought my classes would run very smoothly. But this did not happen as I envisioned.

Instead of seeing faces, I stared at black boxes on the screen. We were not allowed to require the students to open up their videos. Many students did not even open up their audio, but instead chose only to chat. If I was screen sharing, I could not even see the chats and had to rely on other students to read them to me. Many students never even read the syllabus, even though I went through it the first day of class, and it was posted as the first item on Blackboard. I constantly got emails that could be simply answered with "check your syllabus," but I was trying to be understanding of the stresses that the students were also undergoing in their daily lives.

Students did not always know the difference between where on Blackboard to post their own daily exercises, assigned weekly workouts, or their labs. I thought the tabs on Blackboard that stated Daily Exercises, Assigned Weekly Workouts, and Labs were clearly indicated, but students were still posting the assignments in the wrong areas. All three of the assignments would end up in not necessarily the correct tab. For example, labs took time to grade, save on my computer, and to upload the corrections. This had to be done separately for every lab for each student. In addition, I required a Word document, so I could do track changes, but students often posted pdfs, so I could not correct the assignments. With the opportunity for the students to redo a lab for a higher grade, I counted that I recorrected 427 labs in two of my classes. It tires me when I remember recorrecting and rereading all those assignments.

My classes were more organized. The lectures, the workouts, and the assignments were all better than the semester before. But the semester still felt very transitional. My own personal workouts had become sporadic. After initially running three virtual marathons in the fall, my semester ended with fewer runs, and inconsistent calisthenics for strength training. I felt separated from my physical body. I knew that I had lost muscle mass, so it was most likely that my students did also. I worked hard to encourage my students about exercising every day, but at the same time I was not being consistent myself. Exercise, a stabling factor in my life was dissipating. If I felt separated from my physical routine, how did my students feel? They were doing their assigned workouts, but the unknown future, and the higher online workload, was not motivational. COVID-19 had not gone away as we had hoped, and in fact, was having a resurgence all over the world. Both the students and I were tired.

And, sadly, I did not succeed in developing my goal of a community setting for my classes. I felt that if I could engage them in the spring, even a little more in the course, much would fall into place. I had the winter intersession to do some thinking and to connect the dots.

Spring 2021-Putting the Pieces Together

I came to the spring 2021 semester with the goal of connecting with my students and creating a sense of community between the students within the class. Having a clearly organized Blackboard site with consistency in the weekly assignments, and building, sustaining, and supporting connections would help facilitate this goal. I had time to prepare during the winter break, and I was going to be the perfect teacher - convincing them to keep their cameras on, starting every lesson with the sharing of their weekly assigned workouts, allowing make-up exams only when told of a conflict in advance, keeping deadlines for weekly assignments and discussion board posts, and recording more personal workout videos that featured my CLT and me, so students could watch us and work out with us. I would create structure, even during this difficult time, while teaching in an online environment.

Due to these changes, I saw improvement. My classes were going well. Many students did keep their videos on, and that encouraged conversation and questions. Our weekly breakout rooms, which were on the topic of the lecture, had different variations of students every class and were encouraging the students to participate in small projects, assignments, and learning games.

But by mid-semester, I started to notice that I was not the only one with darker circles under my eyes, slightly messy hair, and sometimes disheveled clothing. I was having a hard time teaching and working non-stop for 15 months straight. Just as they did, I was going through some personal issues myself. It was demanding to appear to be so perfect. As more students became ill or had family members who became ill with COVID-19, conversations amongst the students had begun that focused on the pandemic. I let them discuss this, but never joined the conversation. I had early on decided not to discuss the pandemic, as students were dealing with this in many ways. I would just focus on the content of the course. I felt sharing anything else, but content was not what the students had signed up for. If I went off topic, the students would feel I was not teaching. I thought it would undermine my instruction, and I was afraid to let the world enter the safety of my online teaching world that I had created.

But then I lost a parent, and for the first time, I joined in, and shared my loss with my students. The support I received brought me to tears. I became more involved in their lives and listened to their struggles. When my college would broadcast some available funds, in the past I ignored them, but now I was trying to match up students from my classes for all of them. I had been doing a very good job of taking care of my students' fitness levels, but now I was concerned about their emotional levels, also.

CONCLUSION AND MOVING FORWARD

From fragmentation to building community, I realized how truly important community is, and how quickly it can become fragmented. During this time, I became closer with my students. Students became more open with me and with each other. Sometimes in the middle of a class, a comment would send us to share personal thoughts, stories, and experiences, at the expense of the lecture. I learned, however, to tie these experiences back into a conversation of fitness and exercise, as we shared our lives and shared how new exercise routines helped us through this incredible time. I had the students trying African dance, yoga, and even belly dancing, where entire families from home would take part. Exercise brought families together. I was so inspired that I once again signed up for two marathons in the fall. My students and I learned and grew together from this experience. Teaching became more about sharing, and I became more open to the importance of flexible deadlines and relaxation of penalty points for late work. These were unprecedented times, and we all needed each other. I supported and guided my students, but they supported and guided me also. We learned together about fitness, our bodies, and about each other. And because of them, I have become a better teacher, albeit an imperfect one.

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THE EFFECTS OF QUARANTINE ON HEALTHY LIFESTYLE HABITS IN MEXICO

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ABSTRACT

INTRODUCTION: The confinement that keeps families in their homes to combat the pandemic caused by COVID-19 has caused children and adolescents to have considerably reduced the time that, in normal situations, they spent walking, running, enjoying a sport, playing in the schoolyard, on the street or in the park. A quarantine that affects more than 125.9 million inhabitants in Mexico. On the other hand, prolonged periods of confinement can also have effects and consequences for mental and emotional health. The main **OBJECTIVE** of this research is to identify the state of health with respect to physical, nutritional, and psychological activity of the Mexican population during quarantines that originate as a consequence of the COVID-19 virus epidemic. **METHODOLOGY:** Type of descriptive and cross-sectional investigation; 300 subjects (178 men and 122 women between the age of 20 and 50 years old) from different parts of the Mexican Republic participated in the research, a survey was conducted during the month of June 2020.

Taking as main **RESULTS** that 75% of subjects consider the importance of establishing a new routine, which refers to different contexts, the physical space, the tasks to be performed and the organization of people they live with. **CONCLUSIONS** are that the permanent practice of physical activity as long as possible, together with a healthy diet, is essential to maintain good health, physical and emotional well-being. In addition to prevent the development of non-communicable diseases, it is a fundamental element factor for better managing the effect of quarantine and helping to form healthy lifestyle habits.

Keywords: health, quarantine, physical activity, technology, COVID-19

INTRODUCTION

Social isolation or quarantine helps us prevent or limit the transmission of an infectious agent, a biological toxin, or a released chemical in order to protect the health, safety, and public welfare (Villalobos & Gloria, 2004). Therefore, isolation is for people with a contagious disease who are separated from other people until they are considered to be out of the contagion stage. This is used in hospitals where patients can infect others with their diseases, so, in some cases, care can be offered to people in hospitals, designated facilities, or at home. On the other hand, quarantine is for people who have been exposed to a contagious disease, but who are not sick. They are separated from others to see if they will show signs of disease and contagion. For this reason, people can be asked to stay at home to avoid the possible spread of disease to other people.

Heymann et al. (2015) examine recent experiences such as SARS, Ebola, H1N1 flu, Middle East respiratory syndrome, and equine flu in ten different countries. According to the study, isolation and quarantine have a psychological impact on people with consequences such as anxiety, detachment, stress, irritability, insomnia. Furthermore, these effects also cause long-term mental problems, even post-traumatic stress. Therefore, the following research aims to evaluate constructs of physical, nutritional, psychological, and technological activity experienced during quarantine caused by COVID-19 and its effects on healthy lifestyles. Thus, it will contribute to suggest a series of activities that will help in this stage of quarantine or to a better prevention in case of going through the same thing again for the benefit of health.

Global health problems derived from the appearance of COVID-19 have led to an economic crisis in Mexico, which has forced temporary closures of activities. This has caused a decrease in the growth of the economy, causing increases in unemployment levels and underemployment in the Mexican labor market. Unlike other crises, the current one has its genesis in a health problem and not an economic one. Its duration and depth, rather than economic measures, is subject to the validity of the pandemic. In Mexico, in the current situation of confinement, and given the reduction in economic activity, people have been laid off from the formal sector. However, they could not find employment in the informal sector. As a result, the labor market has been negatively impacted in both sectors and this leads to a negative influence on the economic and employment situation and health, with emphasis on food and physical activity, as well as psychological risk factors.

PROBLEM STATEMENT

The confinement that keeps families in their homes in order to combat the pandemic caused by COVID-19 has caused children, adolescents, and young people to have drastically reduced the time that, in a normal situation, they spend walking, running, enjoying a sport, playing in the playground of their school, on their street or in a park. A confinement that affects more than 125.9 million inhabitants in Mexico, out of which 9,552,000 are students (8,217,000 elementary, highschool and university students attending remote on-line classes, and 1,335,000 face-to-face university students), as mentioned in the National survey on the availability and use of information technologies in Mexican households (INEGI, n.d.).

For this reason, it is necessary to implement, through the use of technological tools, the development of physical, psychological and coexistence activities that allow to reduce the effects caused by the pandemic and, thereby, improve the health status of the Mexican population.

HYPOTHESIS

The implementation of the technology will help to promote the exchange of information on physical activity, nutrition and psychology that originate in the quarantine as a result of the COVID-19 virus epidemic.

OBJECTIVE

General

To identify the state of health with respect to physical, nutritional, and psychological activity of the Mexican population during quarantine that originate as a result of the COVID-19 virus epidemic.

Specific

1. Compare physical activity levels before and during quarantine.
2. Analyze the psychological effects that arise during quarantine.
3. Analyze changes of eating habits during quarantine.
4. Assess the different factors, such as the use of mobile devices and internet, duration of use and the use of different platforms that influence the modification of healthy lifestyle habits.

METHODOLOGY

The present research work has a scientific basis whose approach is **mixed**, as stated by Hernández-Sampieri and Torres (2018). It will be a process that collects, analyzes and links quantitative and qualitative data in the same study. On the other hand, it will recognize the study subjects as individuals who develop in a certain context, but at the same time it will offer quantitative data that allow the research to be validated. For example, it will allow discovering important data on the effects on physical activity, food quality and the psychological aspects that influence people in quarantine.

The research has a scientific basis whose **type** of documentary or bibliographic research is one that seeks to obtain, select, compile, organize, interpret and analyze information about an object of study from documentary sources, such as books, archival documents, hemerography and audiovisual records, among others (Hernández-Sampieri & Torres, 2018). It is descriptive in a way that allows to give validity to the research, describing the results obtained from the variables to be investigated analytically and not correlationally.

This research will be **descriptive** (Hernández-Sampieri & Torres, 2018), since it aims to measure the degree of relationship that exists between two or more concepts or variables. In a particular context, this allows information on the effects of physical, nutritional, and psychological activity that arise as a consequence of the quarantine.

The research design is of the **transversal type** (Hernández-Sampieri & Torres, 2018), because it will be applied during a specific period without allowing to see the evolution of the characteristics and variables observed by performing an analysis in a random group of subjects.

The sample is made up of 300 subjects, belonging to different states of the country where the type of sampling was intended for convenience.

Independent Variable: Quarantine.

Dependent Variables: Effects of Physical, Food and Psychological Activity and their application.

Strange Variables: Strange variables are all kinds of variables that are not controlled by the researcher and that threaten the internal and external validity of the study. An example is experimental death, which is the subjects' dropout of the selected sample of the study for any reason (illness, economic causes, family problems, etc.).

TECHNIQUES AND INSTRUMENTS

For the qualitative approach, as for the quantitative one, data collection is essential, except that its purpose is not to measure variables to carry out inferences and statistical analysis. What is sought in a qualitative study is to obtain data that will become information about people, living beings, communities, situations, or in-depth processes.

Data collection occurs in the natural and everyday environments of the analyzed participants. Specifically, regarding their daily life: how they speak, what they believe, what they feel, how they think, how they interact, and so on. For this research, the COVID-19 Quarantine Effects Evaluation Test was applied through 5 Likert scale questions, which consists of evaluating different physical, nutritional, psychological, and technological constructs triggered by the quarantine caused by COVID-19 virus. See annex 1.

RESULTS

The results obtained from the surveys applied to the participants are presented below. To carry out an analysis in a clearer way, a file was created and analyzed in the SPSS program, where all the data obtained were recorded and subsequently analyzed in tables and graphs with the Microsoft Excel program.

Next, the sample size of 300 subjects of the investigation that lasted from May to July 2020 will be analyzed, out of which 178 were men and 122 women, as can be seen in figure 1.

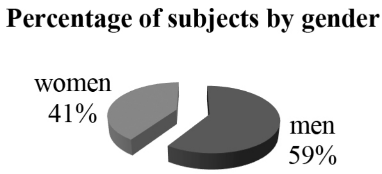

Figure 1. Percentage of subjects by gender.

Source. Self elaboration with survey results.

The main activity of the subjects is in the educational environment, being teachers of different levels of elementary school, high school, university, and higher education. However, there is also a percentage of professionals from the health sector that were integrated, as shown in figure 2.

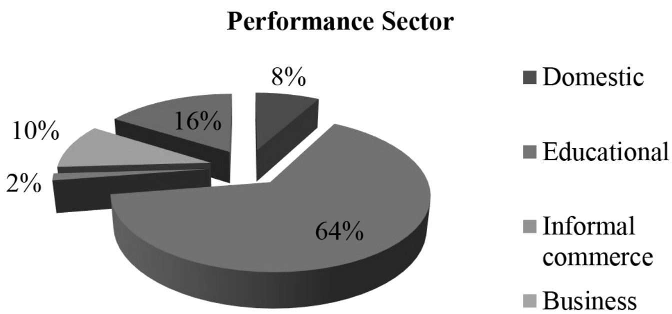

Figure 2. Performance sector

Source. Self elaboration with survey results.

Healthy lifestyle habits allow us to know, in a general way, lifestyle and its relationship between the practice of physical activity, eating and mental health issues. More than 40% of the participants consider that, before the pandemic, their healthy lifestyle habits were regular, referring to physical activity and eating habits. Additionally, almost 20% mention that their physical activity habits were bad, while almost 15% consider their resting habits as bad. Regarding communication, 98% consider the relationship with other people to be fair to good, as shown in table 1.

Table 1. Healthy living habits before the pandemic

	Physical Act	Act Food	Emotions	Rest	Communication with the people around you
Bad	54	22	7	40	2
Regular	135	142	144	161	105
Good	111	136	149	99	193
TOTAL	300	300	300	300	300

Physical activity is any body movement produced by skeletal muscles that requires energy expenditure. During the quarantine, only 60% of the population could perform physical activity in the place where they live and only 35% engaged in it for 30 to 60 minutes daily. On the other hand, 65% consider that the activities they carried out helped them stay healthy, while 38% positively modified the permanent practice of physical activity, as shown in figure 3.

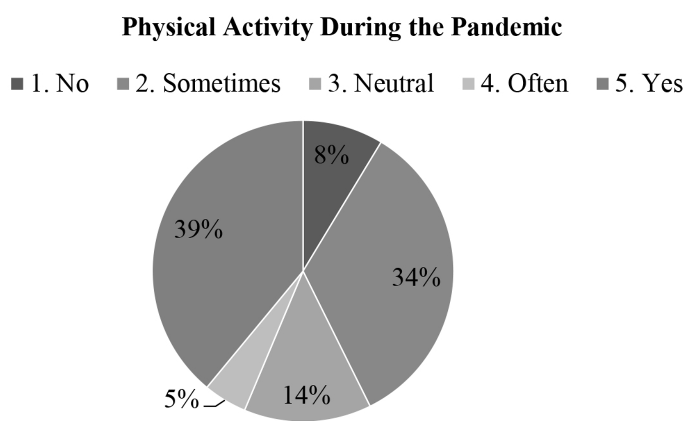

Figure 3. Physical activity during the pandemic

Eating habits are mainly related to the social, economic, and cultural characteristics of a certain population or region. In this regard, during quarantine, 58%

of participants consider that their diet was modified both in portions and in the amount of junk food and 85% increased fat intake, maintaining the consumption of fruit, as shown in figure 4.

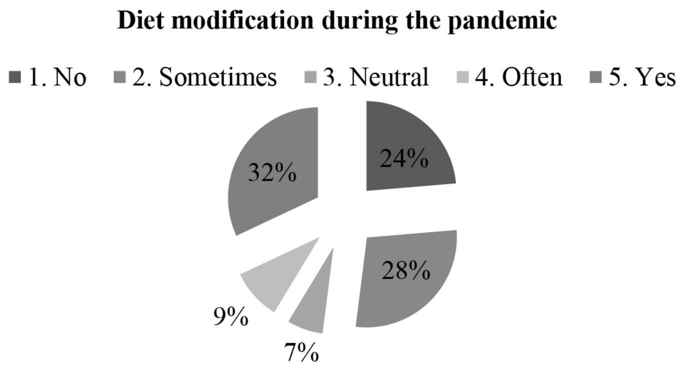

Figure 4. Diet modification during the pandemic

Regarding the psychological part, only 15% of the subjects mention that they do not suffer from anxiety or stress. However, 75% feel confusion about the information in different media, while only 50% fear being infected and 58% worry about their health and control of emotions (figure 5).

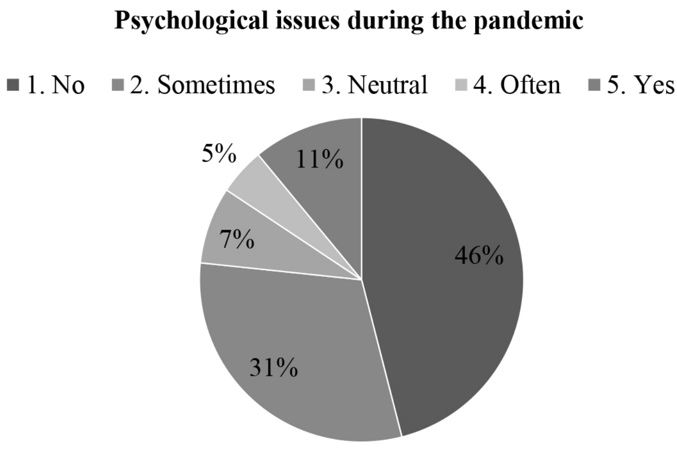

Figure 5. Psychological issues during the pandemic.

The use of technology during the pandemic increased considerably, given that 60% of participants consider that they spend more time than usual watching television or using mobile device and 40% use the time to search for information that generates knowledge (figure 6).

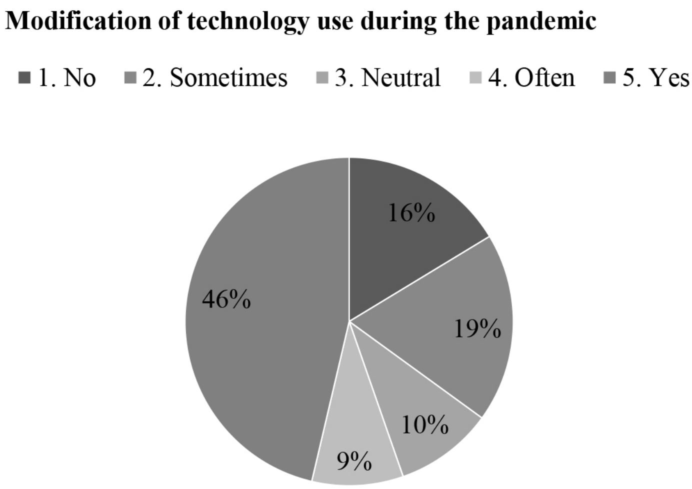

Figure 6. Modification of technology use during the pandemic.

Regarding the economic impact, the subjects revealed, based on their own experience, that only 53% were occasionally or permanently affected at different times of the pandemic and 37% continued with economic stability (figure 7).

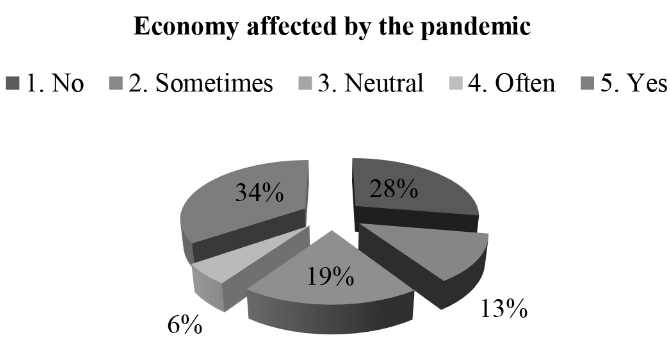

Figure 7. Affected economy.

DISCUSSION

The anomalous situation we live in today has radically changed the way in which we have treated recommendations to improve health so far, and thus reduce the percentage of children and young people who are overweight or obese, which places us in the first position in the world. The period of confinement spent at home has reduced exercise time in different places, which has contributed to having a significant impact on health.

Movement is more reduced in terms of space in a way that the period of confinement supposes a significant reduction in daily physical activity. This reduction has negative effects on the musculoskeletal system, since it increases sedentary lifestyle, which is a risk factor for obesity, and a loss of the individual's aerobic capacities, which is expressed in terms of fatigue or decay. The lack of physical exercise impact on children and adolescents confined at home depends on all the above-mentioned factors.

López et al. (2017) concluded that longer television viewing and more frequent use of mobile devices were associated with poorer body composition, cardiovascular risk, poorer prosocial behavior, poorer fitness and self-esteem. A person who is in quarantine, but usually performs physical activity on a regular basis (having good habits), may consequently suffer from a decrease in performance. However, once a period of isolation or quarantine has elapsed, they can probably recover their training and not be significantly affected. On the contrary, with sedentary people, these prolonged periods of inactivity can have a significant impact, both in terms of health and recovery of great or little habit acquired before the quarantine. Therefore, it is essential, especially in these cases, to encourage exercise at home during quarantine.

On the other hand, prolonged periods of confinement can also have effects and consequences for mental and emotional health, according to Rábago et al. (2010). Among the most noteworthy, they mention "increased insomnia and sleep problems, increased irritability and nervousness, and increased sadness and apathy." However, regular physical activity has been shown to have benefits for children and adolescents at all levels, physical, psychological, and social. Based on this, we are faced with a worrying situation, with a population that in itself is not very active. This presents problems that derive from the aforementioned inactivity, together with a long period of confinement at home. However, this circumstance opens a window of opportunity to introduce physical activity into people's daily routine, helping them to benefit from these modifications and healthy lifestyle habits, not only on a physical level, but also on a psychological and emotional one.

Therefore, this is an ideal time to practice physical activity as a family. In addition, it is key that parents serve as an example. Consequently, this quarantine can be seen as an opportunity to start taking care of oneself through physical exercise, and also to help strengthening one's immunity, by trying to make an effort to continue practicing physical exercise on a daily basis. From now on, it is more than evident that the levels of anxiety and the fear of uncertainty due to not knowing what may happen in the next few days may be stronger.

CONCLUSION

Brooks et al. (2020) explain the stressors of quarantine that are associated with negative psychological effects. These include a longer duration of the quarantine period, a real fear of getting sick, frustration due to a change in the planning of tasks and events, boredom due to a change in routine, inadequate information supplies, loss of financial control and, of course, the stigma of a disease.

The inevitable result of all of the above is the creation of a new daily routine in accordance with the rules of quarantine, isolation and maintaining social distance. Certain questions arise and concerns appear: *How am I going to do things in this particular situation? How am I going to organize my daily routine? How am I going to do the activities that require me to be in motion? Ambivalence arises, on the one hand I have to stay active, connected, alert, functional, and on the other hand, tremendously limited in space.*

The foregoing questions, added to the uncertainty and being hyper-alert to everything that is happening, makes adapting to this new situation a challenge. Although we rationally know that the situation is temporary, the uncertainty triggers warning signals that can be configured from an adaptive disorder to post traumatic stress. Some of the symptoms that have been described are irritability, nervousness and feelings of anguish and insomnia, which can evolve to panic attacks, panic, anxiety disorders and, in extreme cases, it is possible to find post-traumatic stress disorders with marked avoidance behaviors, which impact people differently.

Therefore, the first thing that is recommended is to use reliable sources of information, more specifically, information channels as official websites being the best resource. Another strategy is to maintain fluid communication with work teams or colleagues to facilitate official information and group contention. Remote work inevitably implies being more connected and being available to propose virtual meetings to coordinate tasks. In case of students, connecting virtually with teachers and classmates will help reduce uncertainty and will still generate an experience of contention.

For activating support networks, friends, and family, social networks, virtual meeting platforms, and even cell phones can be excellent allies, since they allow to stay connected if used for that purpose and in a planned way. This ability arises from our social nature. On the other hand, it is necessary to establish a new routine that adapts to the context, the physical space, the tasks that must be carried out and the organization of the people who one lives with. This is essential to mitigate the feeling of boredom, which is often present in these situations. Therefore, planning daily tasks, work and family will help build a sense of control from day to day.

The permanent practice of physical activity as long as possible, along with a healthy diet, is essential to maintain good health, physical and emotional well-being. In addition to preventing the development of non-communicable diseases, it should be taken as a fundamental factor to overcome and to better deal with the effect of quarantine by helping to form healthy lifestyle habits.

Finally, it is necessary to keep in mind what general responsibilities are as human beings. Therefore, it is vital to connect with the deep sense of complying with the measures of self-care and care for the others, this being the central value that sustains living in community. Connecting with the meaning and purpose of the measures, from this perspective, it is necessary to reinforce that care depends on everyone and that by being responsible for one's care, one benefits others who, due to their conditions, are more vulnerable.

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AN ASSESSMENT ON THE MOTOR ACTIVITIES AND HEALTH OF PEOPLE OVER THE AGE OF 65 DURING THE PANDEMIC: A STRATEGY ADOPTED IN SOUTHERN ITALY

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ABSTRACT

A lack of physical activity (PA) during the COVID-19 pandemic is a well-documented and underlying risk factor for senior citizens and as a result has seen the development of multiple chronic diseases and adaptations to their habits and lifestyles. The pandemic has had a negative impact on the opportunity for senior citizens to walk outside, even in relation to carrying out basic everyday activities. During this period, training and exercising at home with appropriate explanation, infographics and video guidance through social media platforms has proved a to be a generally safe and healthy environment for individuals to exercise in at home.

Keywords: senior, pandemic COVID-19, exercise prescription, home training, lifestyle

The recent restrictions imposed to reduce the spread of the virus have changed the habits and lifestyles of people on a global scale, with particular reference to those over the age of 65 years due to the higher risk factors they face if they contract the virus. The infectious agent responsible for this highly contagious respiratory disease is SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) and on the 11 March 2020, the World Health Organization (WHO) declared COVID-19 a pandemic. This was based on the fact that there were over 118,000 confirmed cases across 110 countries and territories worldwide, with the risk of it spreading if not contained (Cucinotta & Vanelli, 2020). On 23 January 2021, Johns Hopkins University Coronavirus tracking centre reported more than 98 million cases worldwide and a total number of global deaths that exceeded 2 million (Johns Hopkins University Coronavirus Resource Centre, 2021).

The benefits of an active lifestyle upon health and well-being have been identified for all age groups (European Heart Network, 2019; Higueras-Fresnillo et al., 2017; Lewis et al., 2018; Wahid et al., 2016; Saint-Maurice et al., 2019). However, the advantages derived from active lifestyles and from increased levels of PA are particularly important within the elderly population due to evidence showing that PA can slow or oppose the effects of ageing. Ageing is commonly associated with a decline in cardiorespiratory fitness, muscle strength, agility and balance, and cognitive performance, which together can lead to reduced physical abilities and independence (Gallè et al., 2020). Indeed, the effects of aging involve all bodily systems and processes, something that adopting an active lifestyle can help counteract (European Heart Network, 2019; Higueras-Fresnillo et al., 2017; Marston et al., 2019; Gillette et al., 2019). PA improves health and functional mobility in adults, including those with chronic conditions (U.S. Department of Health and Human Service, 2018). PA also improves strength, cardiopulmonary function, postural stability, cognitive health, functional strength and walking speed (Chodzko-Zajko et al., 2009; Liu & Latham, 2009; Sannicandro et al., 2008; Granacher et al., 2010; Marston et al., 2019). Moreover, physical exercise is a well-known antidote to many age-related and cognitive diseases (Yu et al., 2019; Formenti et al., 2020; Koh et al., 2020). The positive association between physical exercise and cognitive function in middle-aged and elderly individuals has been clearly established (Koh et al., 2020). Furthermore, specific fitness programs, as well as general or recreational PA, increases stability and balance which in-turn reduces the risk of falls among the elderly (Dunsky, 2019; Granacher et al., 2011; Granacher et al., 2012; Grabiner et al., 2014; Giboin et al., 2015).

Recent studies investigating the levels and types of PA in individuals over the age of 65 highlight both the relationship between a sedentary lifestyle and pathological conditions, such as increased body fat and systemic inflammation (Loprinzi, 2015; Gebel et al., 2015; Golubic et al., 2015; Hupin et al., 2015; Gillette et al., 2019). Recent research shows that reductions in mobility, or the cease of all forms of PA, exert significant consequences on the muscular system, especially over the age of 65 (Campbell et al., 2019).

The restrictions imposed by the Italian Government related to the outdoor activity of individuals during the ongoing pandemic as well as the recommendations provided regarding the maintenance of social distancing to help stop the spread of COVID-19 have severely reduced the opportunity for the elderly population to engage in PA. These restrictions have extended to the closure of training facilities, including both private and public gyms and present a fundamental problem for the health of the general population, as well as amateur and elite sporting professionals (Latella & Haff, 2020; Mon-López et al., 2020).

Since 11 March 2020, progressive measures have been put in place to limit the spread, thus modifying and limiting both individual and collective behaviours in relation to activity. The subsequent closure of parks, gardens and green areas has prevented the use of these spaces for recreational motor activity or walking. The restrictions have also had a negative impact on the opportunity for senior citizens in terms of walking outside in open spaces and even in relation to carrying out everyday activities.

Although the restrictions have been imposed in a progressive manner, people had to respond immediately, making it difficult for individuals to identify alternative strategies to engage in PA. This is particularly relevant in urban contexts and has meant that the levels of PA in the elderly population have significantly decreased.

In advanced adulthood, the effects of a reduction of motor activities result in deterioration. A reduction in performance in walking speed, cognitive performance, and upper and lower limb strength (Esain et al., 2019; Oliveira et al., 2017; Correa et al., 2016; Lobo et al., 2010) predisposes subjects to a greater risk of cardiovascular pathologies such as higher blood pressure (Oliveira et al., 2017). A recent survey conducted on a sample of adults over 70 years old in a metropolitan area showed that in this geographical area more than 45% of subjects were overweight, weekly PA levels were below 500 min/week (with women at around 330 min/week), and time spent performing sedentary activities was strongly correlated with age: the older the age, the greater the time spent in a sedentary state (Gallè et al., 2020).

Home exercise or home training are forms of motor activity widely used as strategies for increasing PA levels when accessing facilities outside the home were restricted and recent literature shows an increase in studies focused on the analysis of motor activities carried out within the home. This form of activity is usually adopted by subjects with pathologies (Scott et al., 2020; Madruga et al., 2020; Vidal-Almela et al., 2020; Onerup et al., 2020; Wittwer et al., 2020), transplants or prostheses (Wood et al., 2020; Trudelle-Jackson et al., 2020), subjects who have undergone amputations (Tao et al., 2020), or subjects that follow specific prevention programs (Müller et al., 2019a, b).

Exercising at home by implementing a variety of safe, simple, and easy-to-do exercises provides a practical solution to maintaining fitness levels while avoiding contact with the airborne virus. The types of exercises suited to this form of training may include strengthening exercises, balance and control motor tasks, stretching, or a combination of all of these. Examples of some home exercises could include walking within and around the house and to local shops, lifting and carrying groceries, alternating leg lunges, stair climbing, stand-to-sit and sit-to-stand transitions using a chair, and chair squats (Chen et al., 2020).

In Italy, due to the cultural characteristics of the adult and elderly population, this type of activity had not, until now, been used. Moreover, some recent literature has identified some limitations in relation to home training within the elderly population, it has emerged that elderly subjects with different levels of motor skills tend to benefit in different ways from this training modality (Scronce et al., 2020; Martin et al., 2013).

The strategies adopted in Southern Italy

Due to the COVID-19 pandemic, the Italian government published recommendations promoting home training regimes, considering them to be truly advantageous and effective for most of the population. The government's decision to promote exercise in the home anticipated the recommendations provided by the WHO in relation to the need to comply with nutritional regimes to stay healthy as well as exercising for at least 30 minutes per day (WHO, 2020).

Recent surveys in Southern Italy show the urgent need for effective interventions to counter the potential risks associated with sedentary lifestyles within the elderly population (Gallè et al., 2020). Such intervention should also take into consideration all the emotional implications relating to a reduction in mobility (Tully et al., 2019). In response to this need, an intervention was initiated in the form of a pilot experiment by Sannicandro et al. (2020), which was implemented and then expanded thanks to the positive feedback received from the participants involved. The pilot study, which was carried out during the first lockdown period in the spring of 2020, led to motor tasks being modified in order to enhance participation and assess whether there was a positive reaction from the participants and a beneficial outcome.

The intervention was primarily directed towards individuals over the age of 65 who had led active lifestyles prior to the pandemic (e.g., going out to buy the daily newspaper, daily shopping, social activities) and whose activity had been significantly reduced due to the pandemic-related restrictions. Social media platforms such as WhatsApp and Instagram were used to implement the programs and the recommendations given were aimed at increasing PA through two key modalities: i) by modifying behaviours linked to the performance of every-day tasks (daily shopping, avoiding the use of elevators etc); ii) the daily practice of exercises at home to stimulate joint mobility, strength, balance and flexibility. With regard to the latter, subjects received exercise cards and videos which described the exercises to help them remain physically active.

The goal of the intervention was to a) to increase the motor activities related to domestic life and b) to increase the levels of PA by stimulating the motor skills through given exercises.

The purpose of this study was to implement strategies aimed at opposing sedentary lifestyles in over 65's caused by the prolonged period of restrictions linked to the pandemic.

Type of motor tasks given

The motor skills given met two criteria i) they must relate to the daily life activities and promote the physical independence of the senior citizens; ii) they must compensate for the loss of motor skills resulting from sedentary lifestyles caused by the forced suspension of activities normally performed.

Thus, the motor tasks should increase muscular strength in the upper and lower limbs as well as the trunk, increase aerobic capacity, and improve balance and joint mobility.

A key feature in the programs was the fact that the participants did not need any tools or equipment to perform the exercises. This was implemented because the requirement of simple, everyday tools or equipment would run the risk of reducing adherence or participation in the program.

A second condition was that each task should be executed in safe environment to limit the risk of a fall. The main extrinsic risk factors to this program are factors that are present in people's homes. Interior aspects such as carpets, vases, slippery floors, and stairs increase the risks of individuals falling, also as senior citizens often live alone the risk level is increased even more.

The methods through which the activities were proposed were designed to encourage adhesion through personal needs and preferences and to follow the suggestions of previous literature in relation to stopping long periods of sedentary activity (Owen et al., 2010; Climie et al., 2018).

The activities were formed of:

a) traditional exercise sessions, with a number of sets and repetitions.

b) a maximum of 3 different tasks lasting a total of 5 to 6 minutes, taking active intervals or active breaks, repeated usually every two hours.

c) daily activities related to social interactions (e.g. going for a walk with a friend).

Table 1. Summarizes the motor tasks that were sent to participants. They are classified by type of motor ability and skills related to daily living activities.

Motor abilities	Motor tasks
Balance	• Flexion and extension of a lower limb while holding onto a chair for support. • Abductions of a lower limb while holding onto a chair for support. • Hip extensions alternating between legs. • One-legged stance, flexions, and extensions of the upper limbs on the frontal / sagittal plane (close eyes to increase the degree of difficulty). • From a one-leg stance, slowly swing the free lower limb in a circular motion keeping the hips and upper body stable. • Alternate hip flexions, holding the position for 2 seconds (close eyes to increase the degree of difficulty). • From a seated position, perform a sit-to-stand, flexing one thigh towards the pelvis, and repeat on the other leg. • From a seated position, transition to a standing position, lifting both heels off the ground. • Tandem walking.
Aerobic ability (intermittent exercise)	• Walking on the spot for 10 seconds, recovery: 30 seconds. • Taking 1 step forward and 1 step backward for 10 seconds, recovery: 30 seconds. • Side-stepping left and right for 10 seconds, recovery: 30 seconds. • Walking on the spot and performing upper limb circles for 10 seconds, recovery: 30 seconds In the hallway at home: • Walking 5 steps forwards, then walking on the spot for 15 seconds, recovery: 45 seconds • Walking sideways for 5 steps, then 5 steps on the spot for 15 seconds, recovery :45 seconds, repeat on both sides. • Walking with hip flexion for 5 steps, then with leg flexion for 5 steps, recovery: 45 seconds. • Walking with foot dorsum flexion for 10 seconds, recovery: 40 seconds. For those with stairs in the vicinity of their homes: • Walking up a flight of stairs, recovery: 45 seconds, then back down again, recovery: 30 seconds. • Walking up a flight of stairs, walking on the spot for 10 seconds, recovery: 45 seconds, then walking back down again, recovery: 30 seconds. • Climbing the flight of stairs sideways – first with one lower limb leading, recovery: 45 seconds, repeat on both sides.

Joint mobility and flexibility	• Cervical spine mobility with head flexions and extensions and inclinations and rotations. • Stretching and mobility of the neck muscles. • Lower limb circles. • Thoracic spine flexion and extension combined with inhalation and expiration. • Thrusts of the upper limbs associated with a trunk engagement. • Standing in front of the wall raising the arms laterally by bending the elbows whilst inhaling. • Torso lateral flexions, with the lower limbs spread in front or in a tandem position. • Lower limb flexions and extensions. • Foot circles, engaging the ankle joint, in a chair or in a standing position. • Walking forwards and performing a stationary foot circle at each step.
Strength	• Sitting on a chair or sofa, maintaining an isometric leg flexion for 5 seconds, then flexing and extending the leg. • Sit-to-stand transitions with body weight only. • Sit-to-stand transitions while holding two water bottles (the weight of which can be freely chosen according to capability). • Stand-to-sit transitions. Performing a slow squat movement until reaching the chair (perform the movement over 3 seconds and build up to 5 seconds). • Side steps with knees slightly bent. • Trunk twisting while holding two bottles (the weight of which can be freely chosen according to capability). • From the split step position, lower limb half-squats with the upper limbs free or hands on hips. • From the split step position, abducting the arms whilst holding two half-litre bottles (the weight of which can be freely chosen according to capability). • Backwards lunges, holding the position for 3 seconds, then returning to the starting position. • From a one-legged stance at the top of a flight of stairs, slowly lower the free leg down towards the next step, breaking on the descent as much as possible to engage eccentric contraction, until the foot touches the next step. • Descending the stairs very slowing (eccentric phase of each step lasting 3-4 seconds). • Walking up the stairs very slowly, raising the heels and putting the weight the front of the foot on each step.
Daily living activities (suggestions)	• Instead of using public transport, travel by foot as often as possible. • Go up and down the stairs of your building at least once a day, avoid using the elevator. • Walk to shops which are further than the regular ones used. • Wash the floor and use the vacuum cleaner several times pre week. • Dust one room per day and start by moving all small items of furniture (lamps, boxes, chairs, stools, cushions) from one room to the farthest one. Once done, bring every back to where it belongs. • Work in the garden; if you only have trees in the garden, exercise by moving pots, pruning the branches, and collecting up fallen leaves. • Hand wash and iron clothes. • If you own a dog, take it out for a walk several times per day. • If you own a car, bicycle, or small motorcycle, wash it once every two weeks. • If allowed, take a walk around the block at least once a day. • Offer to accompany your grandchildren to school at least once a day, or to run errands (to the newsstand, bookstore, dentist).

Exercise loads

Each participant varied in terms of exercise loads, reps, and sets. The amount they did was suggested in line with the amount of PA and exercise they would usually do on a regular basis. Indeed, each participant was able to freely decide how often and how much load was used in the suggested exercises throughout the study.

The instructions provided essentially concerned the task type, meaning each person was free to choose the appropriate load. The only exceptions regarded the tasks were related to balance, where the technique required some positions to be maintained and controlled, and those related to aerobic capacity that required a minimum load to be effective. In addition, instructions were provided regarding the order in which the exercises should be carried out, as communicated in the instruction videos provided. The suggested order was mobility and flexibility exercises in the initial phase, followed by strength, balance or aerobic exercises in the second phase. With reference to aerobic exercise, it was suggested that it should always be performed in the final phase rather than in the initial one in order not to tire the participant out before the mobility and flexibility exercises had been completed.

CONCLUSIONS

The elderly population cannot afford prolonged periods of physical inactivity as the effects of inactivity and aging are sudden and visible, something that PA can effectively slow (Rodríguez-Gómez et al., 2020). When the pandemic restrictions were imposed, the PA in the weakest and most frail segments of the population took a back seat.

The striking contrast between the restrictions introduced to reduce the spread of COVID-19 and what has been suggested by the WHO regarding the minimum levels of PA for the protection of health has proved the need to provide more elderly populations with useful information for counteracting the effects of aging and sedentary lifestyles through PA at this point in their life.

Unlike the first lockdown, in which the restrictions were more rigid, the ongoing second phase has seen individuals be able to combine home training with other recommendations for maintaining a more active lifestyle, even taking advantage of pedestrian areas within urban centres.

Finally, the exercise videos that were sent out to the participants through WhatsApp and Instagram also helped alleviate the sense of loneliness and social isolation caused by the pandemic.

This type of home training strategy is perhaps the only one that can be pursued at a time when travel is prohibited. A physical training program cannot be solely executed in this manner as the presence of a teacher is fundamental and irreplaceable for the correction of errors. This is particularly true regarding motor learning in citizens over the age of 65.

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SPORT AND PHYSICAL ACTIVITY ARISING FROM COVID-19: A DESK STUDY AND CONCEPT-CENTRIC MATRIX

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ABSTRACT

A number of measures and policies have been implemented globally since March 2020 to combat the spread of COVID-19, including restrictions on movement, activities, and sport. This desk study explores published research investigating the impact of COVID-19 on physical activity and sports participation, as well as published recommendations and national and international policies and campaigns to promote physical activity during periods of restriction. Research indicated that overall activity levels have decreased as a result of the COVID-19 pandemic, with some demographics seeing no change, or an increase, in levels. These differences may be explained by a number of factors including age, gender, access to technology and adequate space (both indoor and outdoor), socio-economic status, prior physical activity levels, and rural or urban living. Promotion of physical activity and sports participation should take into consideration demographic and socio-economic differences when identifying recommendations.

Keywords: coronavirus, pandemic, sports, physical activity, sedentary behaviour, wellbeing, policy

INTRODUCTION

As a result of the COVID-19 pandemic countries worldwide have introduced social distancing, quarantine, and lockdown policies with the aims of reducing the spread of infection. These policies have fostered an environment that leads to a reduction in physical activity and sports participation due to fewer opportunities to remain active and a fear of infection (Pinto et al., 2020). The lasting effects of this change on physical activity and sporting behaviours post-pandemic remain unclear (Hall et al., 2020), however research exploring physical activity levels after natural disaster indicates a long-term reduction in activity levels (Okazaki et al., 2015). Therefore, it is essential that effective strategies are designed and implemented to tackle this increase in sedentary behaviour and reduction in physical activity, and sports participation. According to Denay et al. (2020), the pandemic should be viewed as an opportunity to explore and expand our current approaches to physical activity.

A recent systematic review, exploring physical activity and sedentary behaviour in COVID-19 related lockdown, indicates an overall decrease in physical activity among healthy adults, healthy children, and adolescents, and those with medical conditions (Stockwell et al., 2021). Several studies found that those with higher levels of physical activity pre-lockdown were more likely to have larger decreases in physical activity during COVID-19 restrictions (Stockwell et al., 2021). These findings should be viewed with caution, however, due to the subjective design of most included studies and the inclusion of measures and tools which lack prior validation (Stockwell et al., 2021). It is clear from the literature that COVID-19 has had a negative impact on physical activity and sports globally, with deleterious outcomes associated with this reduction including wellbeing, mental health, and COVID-19 recovery (e.g., Nienhuis & Lesser, 2020; Puccinelli et al., 2021). A systematic review examining the impact of COVID-19 on university students' physical activity also found a reduction in physical activity, however this review observed that those who met minimum physical activity recommendations pre-lockdown generally still met the recommendations during lockdown restrictions (Lopez-Valenciano et al., 2021).

This desk study examines published research on the impact of the COVID-19 pandemic on physical activity and sport in Ireland and globally, and also examines national and international policy surrounding this topic. The findings are summarised below and are presented in concept-centric matrices. Table 1 presents empirical studies on the impact of COVID-19 on sports and physical activity, while Table 2 presents papers providing advice and recommendations for maintaining and increasing activity levels during the pandemic. Several hypotheses are proposed for sport and physical activity in Ireland, the EU, and the world post-pandemic.

POLICY AND CAMPAIGNS

A number of recommendations, policies, and campaigns have been launched globally to promote physical activity, both in the context of the COVID-19 pandemic and in more stable times. Ireland launched the Keep Well campaign in October 2020, which aims to support individuals and communities to mind their wellbeing and mental and physical health. The Keeping Active initiative is part of this campaign and comprises a range of projects and initiatives to ensure people remain active during restrictions devised by Sport Ireland in partnership with their funded bodies, Local Authorities, Local Sports Partnerships, and National Governing Bodies (Department of Health, 2020).

The European Union have published their Work Plan for Sport (Official Journal of the European Union, 2020) which includes objectives to:

- Strengthen the recovery and the crisis resilience of the sport sector during and in the aftermath of the COVID-19 pandemic;
- Increase participation in sport and health-enhancing physical activity in order to promote an active and environment-friendly lifestyle, social cohesion and active citizenship;
- Ensure, through cross-sectional cooperation, the awareness of other EU policy domains of the important contribution that sport can make to Europe's socially and environmentally sustainable growth, digitization as well as recovery from the COVID-19 pandemic and future resilience, as well as to achieve the SDGs.

In 2021 UNESCO published a policy brief presenting the importance of investing in inclusive, quality, physical education policy development which incorporates inter-sectoral partnerships, low-cost programming to accelerate post COVID-19 recovery (UNESCO, 2021). Policy development should contain these key components: local ownership, participation, inclusiveness, gender sensitivity, and empowerment (UNESCO, 2021), and should aim to advance international physical activity and sport development agendas e.g., UN Sustainable Development Goals, WHO's Global Action Plan on Physical Activity, UNESCO's Kazan Action Plan, and Beijing Platform for Action (UNESCO, 2021). This policy brief also emphasizes the importance of digitization but highlights the intersectional nature of the digital divide and the necessity of providing low-tech alternatives (UNESCO, 2021).

UNESCO has also launched a number of initiatives in conjunction with their Almaty Office as part of their Any Time is Sports Time campaign, and to encourage people to remain active during the pandemic (UNESCO, 2020). The UNESCO Almaty Cluster Office and the National Olympic Committee of the Republic of Kazakhstan launched an interactive online campaign to support wellbeing and activity, which included online interactive games (UNESCO, 2020). The #BeActive campaign invited people to make videos displaying their creativity in participating in physical activity (UNESCO, 2020). The WHO have also developed a campaign to promote wellbeing and physical activity during the pandemic, the #HealthyAtHome campaign (WHO, 2021). This campaign provides information on staying active, healthy eating, and looking after our mental wellbeing (WHO, 2021). A recent position paper by TAFISA (2020) has outlined the impact COVID-19 has had on the sports sector and has identified a number of measures which could help to increase participation including:

- Stimulating innovation programmes (industrial modernization) for sport enterprises to address current societal change;
- Helping schools and physical education teachers to continue training pupils through digital means that are effective and safe (and stimulate innovation);
- Stimulating a healthy active lifestyle in the working population, both those working at home and at the office by introducing innovative solutions to stimulate physical activity.

According to Sallis et al. (2020), an international research agenda to inform global COVID-19 physical activity policies and practices is imperative. They state that this research is critical for the short-term but also to ensure better global public health responses for future crises (Sallis et al., 2020). Sallis et al. (2020) identify the need for cross-country collaboration and replication to explore context specific differences in findings to promote robust evidence-based recommendations (Official Journal of the European Union, 2020).

PUBLISHED RESEARCH ON PHYSICAL ACTIVITY AND SPORT

Overall, research exploring the impact of COVID-19 on physical activity and sport participation has found an overall decrease in levels of activity across the globe (Avram et al., 2020; Dunton et al., 2020; Lopez-Valenciano et al., 2021; Stockwell et al., 2021; Zhou et al., 2021). Avram et al. (2020) analysed daily steps of individuals from across the world and found a decrease in activity in each of the 187 included countries, though the percentage decreased, and timing of the decrease varied by country which can be explained by the varying strategies implemented across the globe to combat the spread of COVID-19.

Although most studies have found a reduction in physical activity and sports participation due to the COVID-19 pandemic, a number of studies have found no change or an increase (Cloosterman et al., 2021; Janssen et al., 2020; Sport Ireland, 2020) and other studies have found an increase or no change with specific groups within their sample, or with specific types of activities (Roe et al., 2021). Roe et al. (2021) found that among home-schooled Norwegian students during the pandemic, older students engaged with more physical activity and physical activity engagement correlated with effort in schoolwork in general. The study also found that schools differed greatly in the amounts of physical activity offered through online home-schooling. Cloosterman et al. (2021) conducted a study on Dutch runners and found 93.9% of participants continued running during lockdown, this research suggests that individuals already engaged in certain physical activities and sports are likely to continue to participate in them even during a lockdown. A study commissioned by Sport Ireland (2020) found that physical activity increased overall during a lockdown period, but sport participation decreased. This can be explained by the lack of access to facilities and the temporary closures of sports clubs.

Schmidt and Pawlowski (2021) explored Danes' participation in physical activity and found that teens had the highest decrease in activity levels and that individuals with low educational attainment and those living in rural areas had the largest reduction in physical activity. Nienhuis and Lesser (2020) explored physical activity and mental wellbeing in a Canadian sample, they found that women were significantly less active than men and reported more barriers and fewer facilitators for opportunities to participate in physical activity. It is clear from these studies that socio-demographic and socio-economic differences are playing a role in overall participation in physical activity and sports during the COVID-19 pandemic, and these differences should be explored when identifying campaigns and activity programmes to increase activity.

A number of papers suggest that a lack of physical activity can impede recovery of COVID-19, as well as leaving people vulnerable to infection (Brawner et al., 2020; Burtscher et al., 2021; Nieman, 2020), while some papers have hypothesised this based on information available for other respiratory disorders. Brawner et al. (2021) conducted a study exploring hospitalisations of patients with COVID-19 in relation to their maximal exercise capacity, the results of which indicate those with higher levels of physical activity are less likely to be hospitalised as a result of COVID-19. Tavakol et al. (2021) also found that patients with lower physical activity levels were affected by COVID-19 more severely. This indicates the importance of participating in physical activity, in general, but in particular during this current pandemic.

Studies have also found that the reduction in physical activity during the COVID-19 pandemic has led to increases in mental ill-health, including elevated instances of depressive symptoms and anxiety, and lower levels of wellbeing (Nienhuis & Lesser, 2020; Zach et al., 2021). Zach et al. (2021) found that physical activity was associated with higher resilience and fewer depressive symptoms in middle and older adults. The impact of physical activity on wellbeing and mental health has also been found to have gendered effects, with women and girls showing higher levels of anxiety, depressive symptoms, and lower wellbeing than males (McGuine et al., 2021; Nienhuis & Lesser, 2020). McGuine et al. (2021) also found differences in depressive symptoms between individuals who participate in team sports versus individual sports.

Since the start of the COVID-19 pandemic, there have been a large number of papers published providing recommendations and advice on remaining active during the crisis, and for sporting clubs and bodies to implement for the safe resumption of activities (see Table 2 below). A large number of these articles emphasise the need to curtail sedentary behaviour by promoting the importance and impact of shorter, less-rigorous bouts of activity throughout the day (e.g., Elmagd, 2020; Schwendinger & Pocecco, 2020).

A number of articles identify the need for the development and promotion of creative, and innovative, home-based programmes to increase physical activity (Chen et al., 2020; Denay et al., 2020; Schwendinger & Pocecco, 2020). As previously stated, access to safe, outdoor spaces to take part in physical activity can be limited depending on the restrictions imposed by national governments and the geographical locations of individuals which means that creating adaptable, home-based programmes can ensure those who have limited space to perform physical activities.

Creation of virtual events and online programmes have also been recommended in the literature, enabling people to safely participate in physical activity with some form of social interaction combined to attenuate social isolation, along with the provision for exercising with small groups (Denay et al., 2020; Elmagd, 2020; Ng, 2020; Webster et al., 2021; Woods et al., 2020). For example, there has been an increase in Virtual Run events worldwide, encouraging participants to run a certain distance within a certain amount of time, not only does this enable participants to take part in physical activity, but there is also an element of accountability and socialization involved in the process (Elmagd, 2020). Developing online programmes can be a useful and meaningful way of increasing sports and physical activity participation but as previously mentioned, an understanding and awareness of the digital divide is necessary to ensure low-technology alternatives are also provided (Webster et al., 2021). Ng (2020) has also highlighted the importance of adapting communication for online delivery of physical activity programmes to ensure participants are optimally motivated to participate. Articles have also highlighted the importance of cross-country collaboration in policy development and research in increasing participation in physical activity and sport as well as media campaigns to encourage participation (Bas et al., 2020; King et al., 2020; Ng, 2020).

Along with articles detailing recommendations for increasing physical activity and sport participation during the pandemic, a number of papers have explored frameworks for the safe resumption of sporting activities including competitive sports, team sports, and indoor activities. Recommendations include a phased approach, small groups, enhanced hygiene and cleaning practices, testing provisions, and in the case of indoor activities a thorough exploration of infrastructure and ventilation requirements (Blocken et al., 2020; CDC, 2020; HSE, 2020; Hughes et al., 2020; Woods et al., 2020).

Table 1. Concept-centric Matrix of Published Empirical Studies Examining the Impact of COVID-19 on Physical Activity and Sports

	Country	Sample	Age	General impact of low physical activity on health	Cross country Collaboration	Advice**	Mental Health	Wellbeing	Reduced Physical Activity*	Increased Physical Activity* /No change	Increased Sedentary Behaviours	Physical Activity Attenuates Risk Factors	COVID-19 Physical Activity Risk Factors	Competitive Athletes
Aguilar-Farias et al. (2020)	Chile	3157	1-5	-	X	X	-	-	X	-	-	-	-	-
Avram et al. (2020)	187 Countries	455404	-	-	-	-	-	-	X	-	-	-	-	-
Brawner et al. (2021)	USA	246	-	-	-	-	-	-	-	-	-	X	-	-
Cloosterman et al. (2021)	Netherlands	2586	-	-	-	-	-	-	-	X	-	-	-	-
Dunton et al. (2020)	USA	211	5-13	X	-	X	-	-	X	-	X	-	-	-
Jang et al. (2020)	South Korea	112	-	-	-	-	-	-	-	-		-	X	-
Janssen et al. (2020)	Scotland	3230	18+	-	-	-	-	-	X	X	X	-	-	-
McGuine et al. (2021)	USA	13002	13-19	-	-	-	X	-	-	-	-	-	-	X
Nienhuis & Lesser (2020)	Canada	1098	19+	X	-	X	X	X	X	-	-	-	-	-
Puccinelli et al. (2021)	Brazil	1853	18+	X	-	-	X	-	X	-	-	-	-	-
Roe et al. (2021)	Norway	5350	-	X	-	-	-	-	X	-	-	-	-	-
Schmidt & Pawlowski (2021)	Denmark	1802	15+	X	-	-	-	-	X	-	-	-	-	-
Sport Ireland (2020)	Ireland		-	-	-	-	-	-	X	X	-	-	-	-
Tavakol et al. (2021)	Iran	206	-	X	-	-	-	-	-	-	-	-	X	-
Zach et al. (2021)	Israel	1202	45-90	-	-	-	X	X	X	X	-	-	-	-
Zhou et al. (2021)	China	8115	15-33	X	-	-	-	-	X	-	X	-	-	-

* Includes sports, walking, steps taken.

** Includes types and duration of activities, home-based or online programmes, policy and provisions for creating safe spaces to exercise, following current health guidelines, small group activities and other measure to curtail isolation.

Table 2. Concept-centric Matrix of Published Studies Providing Recommendations or Commentary for Physical Activity and Sport Participation arising from COVID-19

	General impact of low physical activity on health	Cross-country Collab-oration	Advice*	Competitive Athletes	Sporting Events	Sports Centres	Reduced Physical Activity	Increased Sedentary Behaviours	Physical Activity At-tenuates Risk Factors	COVID-19 Physical Activity Risk Factors
Bas et al. (2020).	X	X	X	-	X	-	X	X	-	-
Blocken et al. (2020)	-	-	-	-	-	X	-	-	-	-
Burtscher et al. (2021)	X	-	-	-	-	-	-	-	X	X
CDC (2020)	-	-	X	-	-	X	-	-	-	-
Chen et al. (2020)	-	-	X	-	-	-	-	-	-	-
Denay et al. (2020)	X	-	X	-	-	-	-	-	-	-
Elmagd (2020)	-	-	X	-	-	-	-	-	-	-
HSE (2020)	-	-	X	-	-	-	-	-	-	-
Hughes et al. (2020)	X	-	X	X	-	-	-	-	-	-
King et al. (2020)	-	-	X	-	-	-	-	-	-	-
Ng (2020)	X	-	-	-	-	-	-	-	-	-
Nieman (2020)	-	-	X	-	-	-	-	-	X	X
Pinto et al. (2020)	X	-	X	-	-	-	-	-	-	-
Schwendinger & Pocecco (2020)	X	-	X	-	-	-	-	-	-	-
Webster et al. (2021)	-	-	X	-	-	-	-	-	-	-
Woods et al. (2020)	-	-	X	-	-	-	-	-	-	X

* Includes types and duration of activities, home-based or online programmes, policy and provisions for creating safe spaces to exercise, following current health guidelines, small group activities and other measure to curtail isolation.

CONCLUSION AND FUTURE RECOMMENDATIONS

A number of hypotheses to increase physical activity and sports participation during and post COVID-19 have been identified based on this published research:

1. Targeting individuals who had low levels of physical activity and sport engagement pre-lockdown will achieve greater participation; Individuals engaged in activities prior to lockdown continue their engagement;
2. Promotion of reducing sedentary behaviours will positively impact levels of physical activity;
3. Home-based, adaptable programmes will positively impact levels of physical activity;
4. Development of small group, online programmes will positively impact levels of physical activity;
5. A deeper understanding on the motivations and obstacles influencing individual's participation in physical activity and sport, in-particular in times of lockdown, will enhance physical activity and sport service provision;
6. Indoor sports arenas and sports centres must review current practices to ensure safe, effective service provision post-pandemic to continue to provide excellent service.

Sport and physical activity promotion are a key priority globally, with many governmental departments, and national and international organisations actively developing and implementing policies and frameworks to increase physical activity and sports participation which emphasises inclusivity, equality, and incorporates the United Nations Sustainable Development Goals. Most recently, these include provision to help support the sporting industry and the to negate the negative impact COVID-19 has had both on sports economy but also individuals' participation in physical activity and sports.

It is clear that the COVID-19 pandemic has had a significant impact on physical activity and sports participation globally. With the introduction of restrictions across the world access to recreational sites such as parks and sports centres have seen a decrease in physical activity, while home-based lockdowns have resulted in increased sedentary behaviour. Although the research exploring this impact has utilised varied methodologies and most have relied on self-report data, the clear impact of COVID-19 on physical activity cannot be denied. Research has suggested that exercise may attenuate symptoms of COVID-19, reduce the risk of mental ill-health, and increase wellbeing, especially among those struggling with social isolation of COVID-19 restrictions. Research has also identified differences among activity levels based on socio-economic factors such as income level, educational attainment, and geographical location (i.e., urban or rural living).

The COVID-19 pandemic has led to an increased availability of online sports and physical activity offerings, both live, synchronous classes with trained instructors, and pre-recorded fitness videos, many of which have been offered at low- to no-cost. Although this has allowed many to continue, or start, physical activity during lockdowns, it has also highlighted the discrepancy of access to technology and adequate connectivity infrastructure both within-countries (based on socio-economic disparities) and across the globe.

Moving forward, a creative and innovative approach to promoting and enhancing sport and physical activity is needed. Development of online, home-based, adaptable, and safe programmes of activity should be explored, with an emphasis on reducing sedentary behaviours throughout the day and promoting overall wellbeing. Recommendations should include small, intermittent periods of activity along with longer, moderate forms of exercise to underpin the importance of all forms of movement on our overall physical health. Future directions for sport and physical activity should focus on sustainability, inclusivity, and accessibility. Sports centres, gym facilities, and other indoor physical activity centres will need to consider the long-term implications of the COVID-19 pandemic on their practices and policies, including hygiene and cleaning, ventilation, and access to facilities.

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CZECH PHYSICAL EDUCATION TEACHERS DURING THE SPRING 2020 COVID-19 PANDEMIC: RESULTS OF AN ONLINE SURVEY

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ABSTRACT

Czech schools were closed due to pandemic situation in March 2020. This closure caused many troubles and we wanted to find out how physical education (PE) teachers dealt with the unexpected situation during the COVID-19 pandemic. We distributed a questionnaire with open and closed questions in June 2020 through the Czech society of PE teacher's webpage and Facebook. 86 teachers from all school levels participated in the survey. Only 22% of PE teachers did not miss their teaching in PE lessons but the rest (78%) were creative enough and used many different tools to motivate their students toward physical activity (PA). During that period distant teaching was not compulsory, and schools did not have many tools, such as software to use for teaching. Based on the findings, the Czech society of PE teachers felt the need to release an official statement to support and promote everyday PA as a part of healthy lifestyle.

Keywords: Czech society of PE teachers, questionnaire, physical education, physical activity, online teaching, methods

INTRODUCTION

The closure of schools from 11 March 2020 due to the COVID-19 disease pandemic (Ministerstvo zdravotnictví, 2020) greatly affected the teaching of PE and the associated general PA in the Czech Republic. PE and the associated general PA along with other education subjects took a back seat to science subjects. All the teachers were thrown into an unexpected and new situation for all, and it took some time to get their bearings and to start distance teaching. Teachers and schools were not prepared for this, and they started distant education through many various ways (sharing study material and other documents on a cloud, sending collective mails with instructions, some children without internet access had to go to school to collect homework and tasks etc.). Thus, teachers could continue to educate their students at least to a limited extent. At the same time, major subjects in school were given priority (like mathematics, Czech language, foreign languages, and science) and minor subject were neglected (like music, PE, art). Also teaching major subjects on-line was much easier than to organise and teach PE lessons.

METHODS

Czech society of PE teachers designed short online questionnaire with the help of Google forms. This tool was distributed through the society webpage, email addresses, and through society´s Facebook page in June 2020. We asked four compulsory questions where teachers could choose from given answers and two voluntary open questions where teachers could write their own opinions. We did not collect gender, age, location of schools etc., as we wanted to complete the survey as quicky as possible.

RESULTS

We collected answers from 86 respondents sorted by the type of school they teach at, and this is shown in Figure 1.

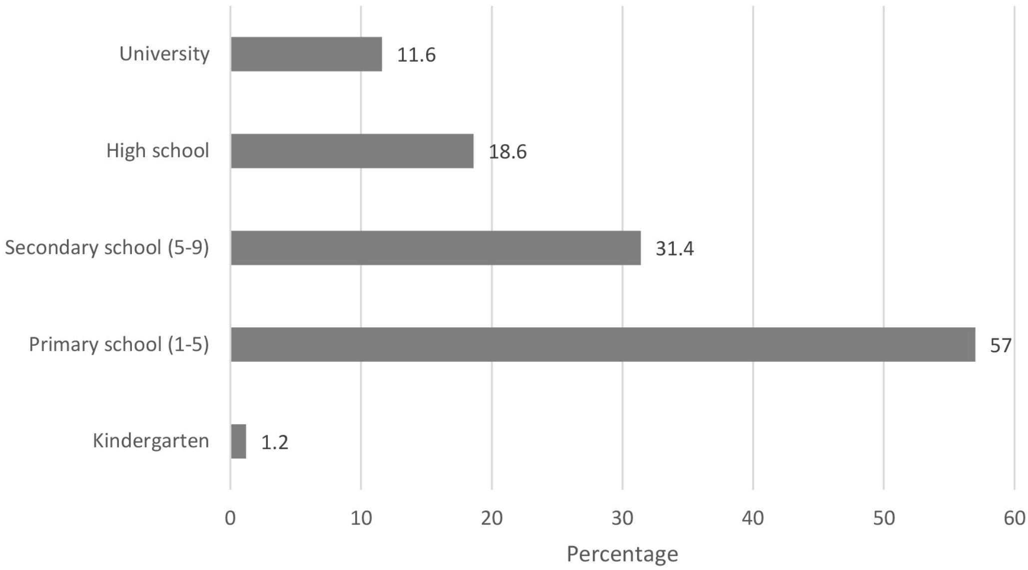

Figure 1. Percentage of PE teachers who participated in online survey

A) Opinions on the inability to teach face to face

The formulated questions were very simple. We wanted to know how teacher dealt with the situation when face to face teaching was limited. We were aware that teachers who taught only PE would answer differently than those who taught also other subjects. Czech PE teachers can be divided into three categories – one category are those who teach only PE, the second category are those who studied and teach PE with a second subject (e.g., biology or maths or geography) and the third category consist of those general teachers in primary schools who teach all subjects. According to teachers´ answers, three quarters of them missed PE very much. On the other hand, every tenth teacher did not miss PE lessons (Figure 2).

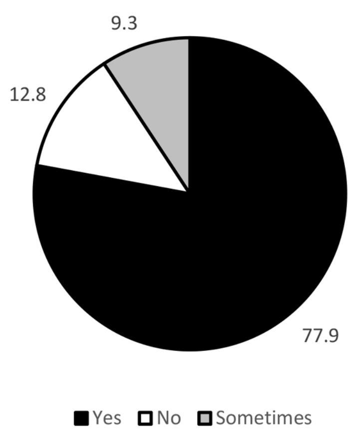

Figure 2. Percentage of answers to question: Did you miss face to face PE class?

B) Opinions of PE teachers whether their pupils miss PE lessons due to pandemic situation

On the other hand, we wanted to know from the PE teachers whether their pupils miss face to face PE lessons. We were not able to address pupils individually, so we relied on the teachers´ opinions. More than one third of teachers did not verify this information but 44% of teachers expressed that pupils missed PE. Detailed answers are presented in Figure 3.

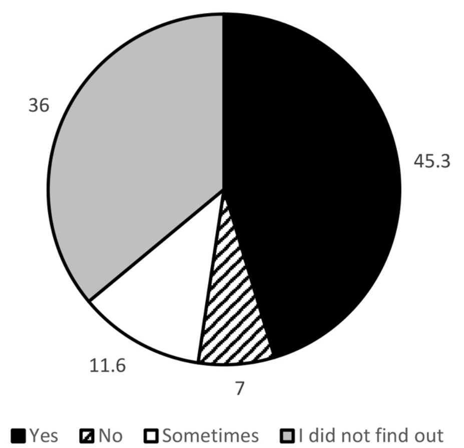

Figure 3. Percentage of answers to the question: Did your pupils miss face to face PE lesson?

C) Usage of modified PE lessons

Nevertheless, some PE teachers were able to find other ways how to teach PA in that new situation. A third of the respondents were able to conduct teaching regularly and in a modified way, while over 45% of respondents did not apply distant teaching. We could ask only hypothetical question searching for the reasons why most of the interviewed PE teachers did not organise distant or online form of teaching. Some reasons might be – the teachers were instructed by the school management to focus on major subjects, or the modified PE was not conducted mainly due to the little creativity of the teachers. The searching for the reasons could be the topic for future survey. In the spring 2020 it was absolutely new situation to all educational policymakers, so only a minority of schools were prepared for distant education due to the technical (enough laptops for teachers and for each students), IT reasons (stable internet connection in schools or in households) or other reasons (e.g., poor family support) (Česká školní inspekce, 2021). In addition, nobody expected that the situation would last for so long (second part of the school year 2019/2020). It must be also stated that the research sample was not representative, and it is possible that more teachers taught online but those did not participate in our survey.

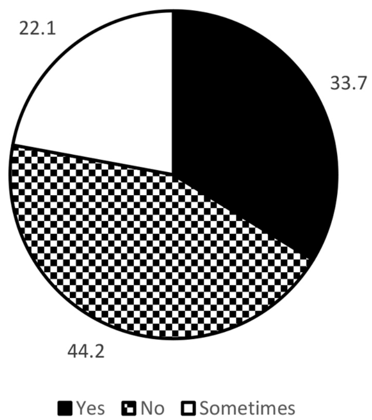

Figure 4. Percentage of answers to our question: Did you organise PE lessons in any way?

D) Variety of distant teaching used by the respondents

The voluntary open-ended question focused on the means that PE teachers used in the modified PE lessons. We collected 48 (55.8%) reactions from all the respondents who actively conducted such PE lessons. Some of the respondents gave more than one answer and therefore the percentage is not 100%.

They stated that the most frequently used method was an example of exercising pre-recorded on video and used from e.g., YouTube or newly made videos that were recorded by the teachers themselves (56.25%). Physical activity homework was mentioned three times. Teachers also referred to the live streaming their own physical activity as a way of "personal" contact with the students (via Google Meet, MS Teams, etc.) in 27.08 %. For keeping student's engagement in physical activities, personalisation is the most effective strategy in establishing a virtual relationship with students (Vilchez et al., 2021).

Some other various tasks were given to students such as "Sazka olympijský víceboj" – online notebook (Sazka Olympijský víceboj, 2020), physical activity challenges (challenge your teacher, 30day challenge, squatting challenge, etc.), thesis and methodical cards, testing and quizzing and personal development toolkits. The Czech public television also offered some physical activity programs, and some teachers "only" motivated the pupils to spend some time outdoors, using the bicycles, skipping ropes, etc.

E) PE teachers' opinions on the PE lessons restrictions

The second voluntary and open-ended question focused on teachers' own observations concerning of the restriction of PE due to pandemic situation. 43 respondents commented on this question. The statements have been translated into English. They have not been classified in any way.

- PE has become completely secluded. Only those pupils whose parents somehow got involved, practised, and exercised.
- In the primary schools, children still like to move without being forced.
- Children get lazy even more!
- Providing practical physical education online in a non-contact way is difficult. It is not possible to achieve a personal movement experience, interaction, etc.
- The need to move, relax, stretch after a day of sitting at a PC...
- I do not know how to evaluate them (giving marks at the end of school year).
- Some children missed the gym and physical education.
- Obesity, boredom, laziness, negativity.
- Various physical activities could be designed for domestic conditions. I tried to make the children see that PE does not have to be just making somersaults etc.
- Only those who wanted, exercised.
- I really missed movement and direct contact with children. I enriched teaching with various "jokes" that I can include into my teaching to make it more attractive.
- Parents provided sports activities as far as possible.
- Some children started cycling even more while some did not move at all.
- Some people were dampened by this period while others began to move actively much more. However, according to my information and experience, the teaching of PE was delayed at primary schools because the emphasis in distant education was on mathematics, Czech language, and English language and, in the interest of not overloading pupils, the offer of physical education was only marginally used. At university, teaching of PE was complicated and, in some cases, remotely impossible. In some cases, on the contrary, new possibilities and horizons have opened in online access, which could have its place in the future as well. This applies to all levels of schools.

- I think that exercising and movement is more important to children now than anything else. It can help them regenerate, clear their heads, and organize their thoughts, just a simple walk could be enough.
- Minimal feedback from children.
- Those pupils who like to practice in PE at school have accepted and fulfilled the challenges.
- Pupils engaged in physical activity far more, voluntarily, of their own free will than when they were „forced" to do so by school physical education.
- Athletes practised (searched for exercises on the internet), non-athletes did nothing.
- According to my information, students missed PE, especially in the team of classmates, friends.
- Pupils did not show much interest in PE lessons through video etc.
- PE is still disabled. It is an important subject but in times of fear of infection less...
- Nowadays, there is a great opportunity for professional videos. For many students it worked; I just showed them where to search and find.
- Whoever wanted, exercised.
- PE teaching has not been much addressed in distant education.
- PE was not a major subject, and it was not given priority in teaching.
- Motivation to exercise.
- I practiced online over the internet, and I paid for this.
- Whoever is used to sports, he/she practiced them also at home. Some children and their parents have downloaded the exercise application. The parents tried to take the children for walks, ride a bike with them, or play tennis and ball games.
- Pupils who have difficulty exercising or are not regularly participating in PE in school are worse off than before. Only those who were keen on physical activities performed tasks from PE.
- Many children used the gardens of their home to move, later bicycles with their parents, on the playground, playing football, tennis, and other ball games.

- General unpreparedness of the system, positive observation – the initiative of some teachers, their ability to improvise and respond to changed conditions.
- Exceptional situation...
- Since I am a class teacher of sport class at a primary school, I know that parents led their children to exercise during the quarantine – whether at home, when the whole family practiced or outside – running, cycling – the school was powerless in this respect (not counting exceptions as challenges in the form of assembly over jump rope or the number of push-ups, sit-ups, or other exercises...).
- Creativity of students in creating materials.
- Whoever likes movement, moved; whoever does not, did nothing – a big role for parents...
- It goes this way too, but it is more difficult! I am slightly tired after teaching 60 online hours.
- Significant decrease in physical activity (in and out of school).
- If he/she does not want to exercise, he/she will not do it anyway.
- The difficulty of distant teaching is higher in terms of time. In the future, distant teaching is possible, but only as a supplement. The absence of full-time PE is not realistic.
- Due to the voluntary nature of assignments to PE, only a few of my pupils responded. Out of a total of eight classes, only about 40 children worked in some way.
- The sooner we return to normal teaching, the better.
- Alternative solutions in PE will not replace contact teaching, it results in reduced physical fitness level of children and future adults.

CONCLUSION

The presented survey proves the statements of many other experts (Czech Society of PE teachers, 2020; EUPEA, 2020) – if COVID-19 disease (or other similar disease) emerges again, it will be necessary to pay more attention to PA in a modified way. Not only PE teachers, but also teacher staff play a crucial role in such extreme conditions as we experienced due to COVID-19 disease not only in schools in 2020 (Yao et al., 2020).

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APPENDIX

As the PE has stayed limited even after the schools reopening, the Czech Society of Physical Education Teachers (CSPET) feels the need to comment on the reduced physical activity caused by the COVID-19 disease measures. The statement of CSPET is presented below.

CSPET demands that PE should be managed and taught in a qualified way regarding the specific conditions of schools and in compliance with hygienic measures. This statement also applies to any possible crisis of a similar type.

Due to the coronavirus restrictions, the lifestyle of many adolescents has been affected by inactivity and high levels of media consumption, which can cause a number of physical and psychosocial problems. Never before has it been more important to participate in regular PA than today.

Professional school PE management is essential with regard to the overload and injuries prevention. To compensate the past less physically active period, meaningful and safe programmes are essential for physical activity promotion also during the summer break.

PE lessons should take place primarily outdoors, on the playgrounds, on a running track, in a park, in a schoolyard or in any other suitable location. Such lessons can include running, jumping, throwing, basics of track and field athletics, badminton, inline skating, cycling, contactless sports and games and many others. Even small physical activity tasks performed at home or outdoors in free time can help increase daily physical activity regimen. A suitable supplement to PE could also be some physical activity tracking tools or notebooks recording the most popular routes for running, walking, cycling, inline skating, longboarding, etc., to help stick to the exercise routine.

Relay races or any other physical activity relays could provide the space for shared experiences that many students have recently lacked. Cycling, inline skating, running with various tasks (e.g., using skipping ropes) or outdoor workout and park-our activities can open up new perspectives. Synchronous or rhythmic choreographies with different equipment (e.g., scooters, skateboards, etc.) can also help to share common physical activity experiences.

The total restriction of PE is being justified by the increased risk of infection when changing and showering. However, this argument is insufficient, as there are various solutions in this area.

The PE class can for example take place at the end of the school day so that students will be able to take a shower at home. Another possibility is to integrate physical activity with other subjects in the form of fieldwork.

It would be unjustifiable to take away the last opportunity to move, strengthen physical and psychosocial health, cognitive performance, regeneration, and relaxation especially from those children and youth whose families are less inspiring toward physical activity. Do not forget that ***„There is no Education without Physical Education IN PERSON”.***

QUALITY OF LIFE ASSESSMENT DURING THE COVID-19 PANDEMIC BY USING THE WHOQOL-BREF QUESTIONNAIRE BEFORE, DURING AND AFTER THE LOCKDOWN

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ABSTRACT

The introduction of restrictive measures and lockdown, i.e., movement restrictions, significantly affected the time of engaging in some type of activity. Given the introduced epidemiological measures, it is necessary to determine how the global pandemic has affected the quality of life of active individuals in the Republic of Croatia. The aim of this research is to determine the quality of life of participants in the Nordic walking program via the WHOQOL-BREF questionnaire through 3 time points (before, during and after the lockdown). The implementation of this study involved 72 respondents (83.3% women and 16.7% men). A total of 216 questionnaires were collected at 3 time points (G1 Before the lockdown, G2 During the lockdown, G3 After the lockdown). By restricting movement, daily active time was negatively affected. The presented results indicate a statistically significant change in quality of life during different time periods of the COVID-19 pandemic. In domains 1 (physical health), 2 (psychological status) and 4 (environment), a significant difference was found between the results before the lockdown and during the lockdown. Also, in the before mentioned domains, a statistically significant difference was found between the lockdown and after the lockdown. In domain 3 (social relationships) there is no statistically significant difference between the observed facets. The negative impact of lockdown can be avoided by providing accurate and quality information and by promoting a healthy lifestyle through online training and examples of exercises to do from one's own home.

Keywords: quarantine, global health status, inactivity, Nordic walking, survey

INTRODUCTION

Quality of life encompasses an individual's perception of many social, environmental, psychological, and physical values (Theofilou, 2013). With the onset of the global COVID-19 epidemic, changes in the quality of life emerged. Restrictions and the introduced epidemiological measures are considered to have a positive effect on health in terms of reducing the spread of coronavirus (Nussbaumer-Streit et al., 2020). In contrast, lack of activity, sedentary lifestyle, mental health, and social status have been compromised (Chen et al., 2020; Smith & Lim, 2020). Quarantine and isolation are two preventive measures aimed at reducing the spread of the virus. Quarantine refers to the separation of persons or communities that have been exposed to the virus. The term isolation is applied when a person is known to be infected and must be separated from others (Parmet & Sinha, 2020). The authors Matias et al. (2020) present a model that encompasses all the needs that an individual in isolation would have to meet in order to maintain mental and physical health. Separating individuals from society directly affects their psychological and social status. Previous research has identified a negative impact of an epidemic outbreak on people's quality of life (Nguyen et al., 2020; Chen et al., 2020; Sprang & Silman, 2013). Pieh et al. (2020) found that during the COVID-19 pandemic, respondents who have a quality relationship with a partner have a higher quality of life in the field of psychological health compared to those who do not have a quality relationship or do not have a partner. This highlights the importance of social status and socialization during restrictions and quarantine. Also, prolongation of time spent in quarantine is associated with poorer psychological outcomes. These negative effects can be reduced by obtaining as accurate information as possible about the current state of the epidemic and by increasing communication through social networks (Brooks et al., 2020). Furthermore, it has been previously proven that positive thinking, active coping with stress, and social support are positive predictors of psychological quality of life (Budimir et al., 2020).

Although people had more free time during the pandemic, there is a significant reduction in physical activity. Intense physical activity decreased by 16.8%, walking time by 58.2%, while sedentary time increased by 23.8% (Castaneda-Babarro et al., 2020).

INACTIVITY AND LOCKDOWN

The World Health Organization (2020) emphasizes that adults must perform 150-300 minutes of medium-intensity aerobic activity per week to meet their physical needs and maintain good health status. Inactivity can be defined as a condition during which the normal structure and function of organs, metabolic regulatory processes, building and maintaining lean body mass, and maintaining motor control are not preserved. In contrast, physical activity represents any increase in energy expenditure above that at rest and any movement that requires some form of muscle contraction (Duraković et al., 2018). The introduction of restrictive measures and lockdown, i.e., movement restrictions, significantly affected the time of engaging in some type of activity.

The term *lockdown*, also called "mass quarantine", is based on the principle of staying at home, which is determined by the authorities of each country individually (Lippi et al., 2020). The introduction of a lockdown aimed at reducing the spread of the virus poses a major societal challenge that is sure to have consequences on people's mental and physical health (Fuzeki et al., 2020). The Government of the Republic of Croatia introduced lockdown in mid-March 2020 in order to reduce the spread of coronavirus. This reduced the time of engaging in leisure activities, which was less than recommended even before the proclaimed measures. The introduction of restrictive measures and the closure of indoor and outdoor sports facilities further reduced the amount of time spent in some type of activity (Guthold et al., 2018). Being closed into one's own home reduced daily movement requirements (commuting to work, daily purchases of household items). During lockdown, about 50% of young people started working from home and about 18% of adults and 14% of older people became unemployed. These changes contributed to dissatisfaction in households and in the financial status of the community (Epifanio et al., 2021). Also, there was a significant decline in physical activity and a higher food intake, which consequently negatively affected body mass gain (Violant-Holz, 2020).

Given the introduced epidemiological measures, it is necessary to determine how the global pandemic has affected the quality of life of active individuals in the Republic of Croatia. The aim of this research is to determine the quality of life of participants in the Nordic walking program via the WHOQOL-BREF questionnaire through 3 time points (before, during and after the lockdown).

METHODS

The implementation of this study involved 72 respondents (83.3% women and 16.7% men), participants in the Nordic walking program within the project "Health-oriented physical activity - GETFIT4FREE". Respondents' age ranged from 35 to 65 years, and they conducted 2 workouts per week (Nordic walking). The population included in the project has not been physically active for the previous 5 years and at the time of exercise did not have locomotor difficulties.

Table 1. Basic descriptive indicators of the sample of respondents

Gender	N	Mean	Minimum	Maximum	St.Dev.
F	60	53,37	39,00	65,00	6,39
M	12	51,58	38,00	65,00	9,93
Total	72	53,07	38,00	65,00	7,02

* N = sample of respondents; Minimum = lowest value; Maximum = maximum value; St.Dev. = Standard deviation

The duration of the training was 60 minutes. The exercise program began in late February 2020 (between February 17 and 21, 2020). With the occurrence of the virus in Croatia, epidemiological measures took place that initially only partially limited certain activities, but outdoor exercise could be carried out without hindrance. Since mid-March (March 16, 2020), group outdoor activities have been banned and a lockdown has occurred. The program continued after the number of infected people began to decrease, and in May, a week after the measures were relaxed (May 25, 2020), exercise resumed. Respondents completed an initial quality of life questionnaire (WHOQOL-BREF) prior to the start of the program. They also completed the questionnaire after the end of the lockdown and one month after resuming training. A total of 216 questionnaires (N = 72) were collected at 3 time points (G1 Before the lockdown, G2 During the lockdown, G3 After the lockdown).

	Spirituality / Religion / Personal beliefs Thinking, learning, memory, and concentration
3. Social relationships	Personal relationships Social support Sexual activity
4. Environment	Financial resources Freedom, physical safety and security Health and social care: accessibility and quality Home environment Opportunities for acquiring new information and skills Participation in and opportunities for recreation / leisure activities Physical environment (pollution / noise / traffic / climate) Transport

WHOQOL and WHOQOL-BREF domains are highly interrelated (r = 0.89 and high-

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er) and also have good metric characteristics established (The WHOQOL Group, 1998). Authors Skevington et al. (2004) determined the psychometric characteristics of a shortened version of the questionnaire. Hawthorne et al. (2006) defined general norms for the WHOQOL-BREF questionnaire. The results of the general population in the physical health domain are 73.5 ± 18.2, psychological health 70.6 ± 14.0, social relationships 71.5 ± 18.2 and the environment 75.1 ± 13.0. Also, the stability of the retest (test-retest) was determined for a particular domain in a time interval of 2-8 weeks (Alilović et al., 2013).

After data collection, according to official instructions (WHO, 1998), the entered data were checked, three negatively formed questions were transformed and values by domains were summed. Basic descriptive parameters (Mean, Minimum, Maximum, St.Dev.) were calculated for 6 observed facets. Multivariate analysis of variance (MANOVA) was used to determine the differences between the 3 time points at which the questionnaires were completed. The Tukey post hoc test was used to define the differences between the domains. In order to be able to compare the results with the previous research of the WHOQOL questionnaire, the data were transformed into values of 0-100.

RESULTS

Table 3. Basic descriptive indicators of an individual's perception of their own quality of life (Q1) and personal health (Q2)

DOMAIN	Group	N	Mean	Minimum	Maximum	St.Dev.
Q1	G1	72	3,72	2,00	5,00	0,76
	G2	72	3,24	1,00	5,00	0,99
	G3	72	3,69	2,00	5,00	0,82
Q2	G1	72	3,69	1,00	5,00	0,88
	G2	72	3,46	2,00	5,00	0,79
	G3	72	3,67	2,00	5,00	0,75

Table 3 shows the basic descriptive indicators of facets on the perception of quality of life and one's own health. Average Q1 values indicate a decrease in the level of perception of quality of life during the lockdown (G2). This group has the lowest value (Min = 1), i.e., the assessment of the quality of life is very poor (frequency = 3). Before and after the lockdown, respondents rated the quality of life as *fair-*

ly good, while during the lockdown they rated it *neither good nor bad*. Average Q2 values also have the lowest average value during the lockdown. Although the Q2 results during the lockdown were lower compared to other periods, the respondents rated their own health *neither satisfied nor dissatisfied* through all three measurement points.

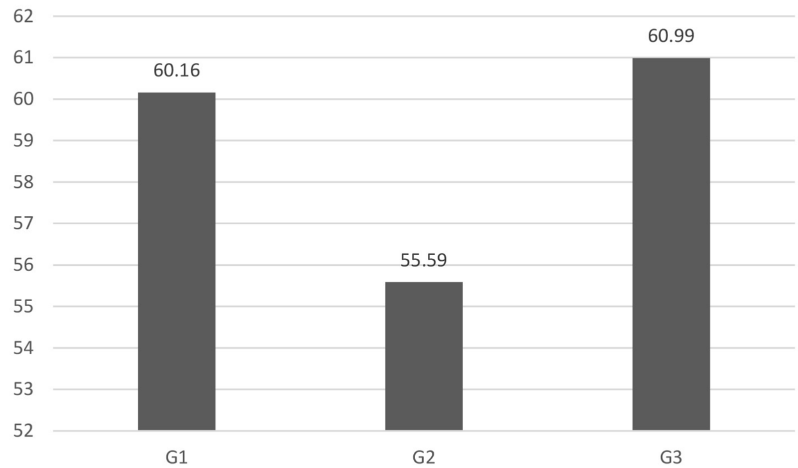
Table 4. Basic descriptive indicators of physical health (DOM1), psychological health (DOM2), social relationships (DOM3), environment (DOM4)

DOMAIN	Group	N	Mean	Minimum	Maximum	St.dev.
DOM1	G1	72	14,99	7,00	20,00	2,68
	G2	72	13,60	6,00	19,00	2,85
	G3	72	15,76	6,00	20,00	2,56
DOM2	G1	72	14,68	8,00	20,00	2,66
	G2	72	13,57	6,00	19,00	3,03
	G3	72	14,88	8,00	20,00	2,49
DOM3	G1	72	15,06	8,00	20,00	2,52
	G2	72	14,35	7,00	20,00	2,67
	G3	72	15,18	9,00	20,00	2,61
DOM4	G1	72	15,43	10,00	20,00	2,15
	G2	72	14,07	7,00	20,00	2,91
	G3	72	15,17	9,00	20,00	2,53

* DOM1 - physical health; DOM2 - psychological status; DOM3 - social relationships; DOM4 - environment; G1 - quality of life before the lockdown; G2 - quality of life during the lockdown; G3 - quality of life after the lockdown; N = sample of respondents; Minimum = lowest value; Maximum = maximum value; St.Dev. = Standard deviation

Table 4 shows basic descriptive indicators of quality of life according to different observation domains or areas of quality of life. The lowest average values were determined in all domains during the lockdown period. The highest average value for DOM1, DOM2 and DOM3 was after the lockdown while for DOM4 the results were better in G1.

The summary results of all observed domains in three measurement points (Graph 1) show the lowest values of quality of life during the lockdown. With the relaxation of restrictive measures and the beginning of training, satisfaction i.e., quality of life increased (+5.40). Quality of life results after the lockdown were higher than before.



Graph 1. Display of the overall results of the WHOQOL-BREF questionnaire according to different time points

Table 5. Statistical significance (MANOVA) of an individual's perception of quality of life (Q1) and own health (Q2).

Test	Lambda value	F	p
Wilks	0,94	3,57	0,01*
* marked values are significant with error p<0.05			

Table 5 shows a statistically significant difference between the observed groups (G1, G2, G3) in the attitudes of the individual's perception of quality of life and their own health.

Table 6. Tukey post hoc test for questions of individual perception of quality of life (Q1) and own health (Q2)

Q1; Between MS = ,74511, df = 213,00			
Group	**{1} 3,72**	**{2} 3,24**	**{3} 3,69**
1		0,00*	0,98
2	0,00*		0,00*
3	0,98	0,00*	
Q2; Between MS = ,65330, df = 213,00			
Group	**{1} 3,69**	**{2} 3,46**	**{3} 3,67**
1		0,19	0,98
2	0,19		0,27
3	0,98	0,27	
* marked values are significant with error p<0.05			

By looking into the post hoc test (Table 6), it can be concluded that the quality of life changed significantly during the lockdown period compared to other measurements. The perception of health does not differ significantly over different periods of time.

Table 7. Results of ANOVA for repeated measurements according to the domains of the WHOQOL-BREF questionnaire

Test	Lambda value	F	p
Wilks	0,88	3,51	0,00
* marked values are significant with error p<0.05			

Table 7 shows a statistically significant difference between the observed groups (G1, G2, G3) in the areas of physical health, psychological status, social relationships, and environment. The presented results indicate a statistically significant change in quality of life during different time periods of the COVID-19 pandemic.

Table 8. Tukey post hoc test for individual domains of the WHOQOL-BREF questionnaire

DOM1; Between MS = 7,2831, df = 213,00			
Group	**{1}14,99**	**{2}13,60**	**{3}15,76**
1		0,01*	0,19
2	0,01*		0,00*
3	0,19	0,00*	
DOM2; Between MS = 7,4891, df = 213,00			
Group	**{1}14,68**	**{2}13,57**	**{3}14,88**
1		0,04*	0,91
2	0,04*		0,01*
3	0,91	0,01*	
DOM3; Between MS = 6,7547, df = 213,00			
Group	**{1}15,06**	**{2}14,35**	**{3}15,18**
1		0,23	0,96
2	0,23		0,13
3	0,96	0,13	
DOM4; Between MS = 6,5179, df = 213,00			
Group	**{1}15,43**	**{2}14,07**	**{3}15,17**
1		0,00*	0,81
2	0,00*		0,03*
3	0,81	0,03*	
* marked values are significant with error p<0.05			

Table 8 shows the difference between measurement groups (G1, G2, G3) according to the observed areas i.e., domains. In domains 1, 2 and 4, a significant difference was found between the results before the lockdown and during the lockdown. Also, in the aforementioned domains, a statistically significant difference was found between the lockdown and after the lockdown. In DOM3 (social relationships) there is no statistically significant difference between the observed facets.

DISCUSSION

As expected, the results of the WHOQOL-BREF questionnaire showed the lowest quality of life (QOL) values during the lockdown period. The presented results confirm previous studies that looked at quality of life during the COVID-19 pandemic (Fuzeki et al., 2020; Nguyen et al., 2020; Chen et al., 2020; Sprang & Silman, 2013). Respondents rated the quality of life and their own health during lockdown as *neither good nor bad*, while before and after that period they considered these two facets to be *quite good*. The DOM1-3 results had the highest average values after the end of the lockdown. This distribution of results can be explained by the fact that people felt relieved after being locked up in their own homes for a long time and enabling them to carry out group activities by opening certain institutions had a very positive effect on physical and psychological health and social relationships. Also, re-involvement in activities after a long lockdown leads to a more significant need of the individual for social connection, and re-inclusion in the group exercise program has improved the social status of the individual and thus changed the perception of the importance of the social component in everyday life. Alilović et al. (2013) observed a healthy population and their perception of quality of life and their own health (Q1 = 3.81 / Q2 = 3.79). When comparing the results, it can be concluded that the quality of life and health is lower in all three measurement points in comparison to the research conducted eight years ago. Also, Radošević-Vidaček et al. (2004) determined a higher level of quality of life by applying the WHOQOL-BREF questionnaire in comparison with the current measurement. Compared to the defined norms of the WHOQOL-BREF questionnaire (Hawthorne et al., 2006), during lockdown all the presented results were below the general population level. Also, although the quality of life was assessed to be better before and after the lockdown, it is still below defined norms. This fact is one of the main reasons for including the inactive population in a project aimed at increasing physical activity and, in the long run, achieving changes in other aspects of life that can improve the overall health status of each individual, which includes the physical, social, and mental component.

The results obtained in DOM2 during the lockdown are significantly lower (59.89 vs. 69.83) compared to the values obtained during the same period in Austria (Pieh et al., 2020). Comparing the assessment of the quality of life in Italy (Epifanio et al., 2021) with the conducted research, it can be concluded that the respondents of this project had a higher assessment of the quality of life (Italy 54.48 vs. Croatia 55.58). The research conducted in Italy included the general population, while this research observed previously physically inactive population involved in the sports-recreational project. This was a positive change for them compared to previous habits and daily routine, which may be the reason for higher recorded results values of quality-of-life perception.

Transformed data (0–100 scale) also track the distribution of abbreviated questionnaire results. When comparing the transformed results, it can be concluded that the observed population had higher values in DOM1 and DOM4 compared to the population of medical students (Chawla et al., 2021).

When all the observed domains are viewed as a whole, the long-term consequences of the lockdown, as well as all possible future lockdowns, are to be expected. In order to try to reduce the negative consequences, it is necessary to maintain the capabilities of the locomotor system before, during and after the lockdown, i.e., to prepare the whole organism physically and mentally for all activities of everyday life.

CONCLUSION

The aim of the study was to determine whether there are differences in quality of life during the lockdown period in recreational athletes who are included in the Nordic walking program twice a week. Quality of life was observed by a WHOQOL-BREF questionnaire consisting of domains: physical health, psychological status, social relationships, and environment. Self assessment of quality of life and own's health was lowest during the lockdown period. Also, in all areas of observation, the lowest average values were determined during the period of the lockdown. The period before and after the lockdown did not significantly differ in the questionnaire domains. In contrast, quality of life assessment was significantly reduced during the lockdown. By restricting movement, daily active time was negatively affected. Therefore, long-term implementation of indoor exercise makes it difficult to maintain physical and psychological health. The negative impact of lockdown can be avoided by providing accurate and quality information and by promoting a healthy lifestyle through online training and examples of exercises to do from one's own home.

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A LOOK AT THE PEDAGOGICAL PROCESSES OF PHYSICAL EDUCATION IN TIMES OF THE COVID-19 PANDEMIC AND ITS INCIDENCE TODAY

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ABSTRACT

This article aims to examine the process of Physical Education in times of COVID-19, in order to rethink our pedagogical work in today's society. Consequently, the research is based on the quantitative paradigm with a transversal non-experimental design. It determines a population made up of various teachers who teach Physical Education at different levels in the Latin American context; with a representative sample of 85 teachers. The technique implemented was a survey with eleven (11) questions, to be answered on a frequency scale of four options (items). In this regard, the results show that the COVID-19 pandemic is an opportunity to rethink Physical Education, using new learning strategies from information and communication technologies (ICT). In summary, teachers recognize that their specific training in the area of Physical Education has improved significantly in these uncertain times.

Keywords: Physical Education, pedagogy, COVID-19

INTRODUCTION

The present work is a part of a completed research that analyses how the formative processes have been oriented throughout the COVID-19 pandemic in the area of Physical Education from its different levels and jointly take advantage of this time of uncertainty, to rethink our pedagogical task as teachers in today's society. Physical Education has throughout history been present in school and society, building imaginaries, practices, concepts, organizations, teaching and learning models. They are today transformed in a context of globalization, diversity, technological development, and tradition towards the diversity of knowledge and new sensibilities; seeking individual and cultural democratic freedom that influence the curricular perspective for the attention of new human competencies and openness to a new vision of the human being and the nation (Ministerio de Educación Nacional (2000)).

Currently, the world is going through a health emergency of the coronavirus disease pandemic (COVID-19), which has caused an unprecedented crisis in all areas of life. This has brought as consequence massive closure of face-to-face activities in educational institutions in more than 190 countries in order to prevent the spread of the virus and mitigate its impact. Thus, three main fields of action have risen that adapt to this new reality: the deployment of distance learning modalities through the use of a diversity of formats and platforms (with or without the use of technology); the support and mobilization of educational personnel and communities; and attention to the health and integral wellbeing of students (CEPAL & UNESCO, 2020).

As proposed by UNICEF (2021), the unforeseen confinement turned into an earthquake that has shaken our educational system, during which the majority of students, families and teachers have worked quickly, tirelessly, ingeniously, and productively. In contrast, a slow administration has been evidenced, unaware of many realities and casuistry of our system and its members. Unable to make decisions and have adequate resources, it has resorted to the autonomy of educational centres, delegating responsibility to teachers and management teams (Gil-Espinosa, 2020).

Therefore, although technological development is not the same in all nations and territories, it has become urgent to take alternatives that improve the didactics of Physical Education to distant places where the pandemic has forced education to rethink its methods and objectives, either in school or in college. How to impart the contents of Physical Education? What materials to use (structured, alternative, reused, newly created) to teach classes in virtual classrooms? How to train sports techniques in high schools and at the university? What methodologies should be used to evaluate student performance? Undoubtedly, the crisis of the pandemic has changed Physical Education compared to the way it had been done until just a few years ago. This way seems as distant as it could be from its basic concepts, which ultimately adopts the distance education method as the e-learning variant and virtual education (Posso Pacheco et al., 2020).

In this way, it should also be mentioned that the COVID-19 pandemic represents a public health challenge, which requires an urgent and collaborative effort in all social sectors to reduce the health risk and loss of life of the population. Therefore, one of the challenges in the Latin American context is public health literacy in the face of the emergence of this pandemic. Furthermore, it must go hand in hand with digital literacy, which is, although not a skill of all teachers, a requirement to be used to effectively guide the student body with appropriate information and communication technologies (Hall-López & Ochoa-Martínez, 2020).

This is how the sustainable development of a country begins with physically active, healthy, and engaged citizens; where the COVID-19 pandemic has highlighted the importance of good health and the deficiencies of existing health infrastructures in each nation, leading to addressing health gaps in order to undertake recovery efforts. In addition, schools are a natural entry point to encourage lifestyle-related behavioural changes. As such, it is wise to invest in innovative and comprehensive provision of education, exercise, and good nutrition as a fundamental aspect of efforts to mitigate contagion (UNESCO, 2021).

Therefore, the main challenge of physical education at this time continues to be the development of a quality, well-founded and coherent educational practice. Likewise, it is true that, little by little, an increasing percentage of Physical Education teachers are meeting these challenges, but sometimes these processes of change spread slowly. Therefore, both initial and continuous education play a transcendental role to begin to establish with clarity and priority the current challenges of Physical Education and what professional competencies teachers should have (López Pastor et al. 2016)

In merit of the above, the fundamental objective of this research is to identify the different pedagogical experiences of Physical Education in times of COVID-19 pandemic, as a strategy to improve the teaching-learning processes in today's society.

METHODOLOGY

The research is based on the quantitative approach, because according to Rodríguez-Peñuelas (2010), the quantitative method focuses on the facts or causes of the social phenomenon, with little interest in the subjective states of the individual. The questionnaire, inventories and demographic analysis are used and statistically analysed to verify, approve, or reject the relationships between the operationally defined variables, with a presentation of the results of quantitative studies expressed in statistical tables, graphs and a numerical analysis (López, 2011, p. 116).

According to Hernández Sampieri et al. (2003), this research is of a non-experimental design, since it is divided considering the time during data collection, which are: Cross-sectional design, where data are collected in a single moment, in a single time, its purpose is to describe variables and their incidence of interrelation at a given moment, and the Longitudinal design, where data is collected over time in points or periods (Secretaría de Salud de México (2018)).

POPULATION AND SAMPLE

The population was made up of teachers who teach Physical Education at different educational levels in Latin America. According to Jany (1994), as cited in Course Hero (n.d.), population is "the totality of elements or individuals that have certain similar characteristics and about which it is desired to make inference" (p. 48); or unit of analysis (Bernal, 2006). The sample was of intentional participation, primarily in countries where there was greater accessibility. For this study, the sample used is intentional non-probabilistic, in view that it tells us (Hurtado, 2010) that this type of sample is one that is not chosen at random, but rather, for specific reasons. The researcher decides and chooses at the same time, as it is sometimes necessary because not all members of the population are accessible. In this research, the prevailing criterion for its non-probabilistic sample was the open availability of Physical Education teachers to carry out this study. There were 85 teachers who teach Physical Education in various educational settings.

The sample of eighty-five (85) teachers in total responded to the demands and objectives outlined for this study – through the interaction with each teacher we used new information technologies as a tool in our favour and communication.

On next page is Table 1 of the countries that opened their doors to this initiative:

Table 1. Participating countries for the development of the research

Country	City or state	Number of teachers (sample)
Colombia	Barranquilla	36
	Bogotá D.C.	
	Barrancabermeja	
	Sucre	
	Nariño	
	Cartagena	
	Cali	
	Valledupar	
	Córdoba	
México	Tamaulipas	22
	San Luís Potosí	
	Estado de México	
	Puebla de Zaragoza	
	Toluca de Lerdo	
	Río Verde San Luís Potosí	
	Morelos	
Venezuela	Caracas	8
	Maracaibo	
	Barquisimeto	
El Salvador	San Salvador	5
	Santa Ana	
Argentina	Buenos Aires	3
Perú	Lima	3
	Ica	
Ecuador	Quito	3
	Machala	
Chile	Santiago de Chile	1
Honduras	Tegucigalpa	1
Costa Rica	San José	1
Bolivia	La Paz	1
Uruguay	Montevideo	1
TOTAL	31	85

Data collection techniques, according to McDaniel and Gates (2005), is the process of assigning numbers or markers to objects, people, states, or events, according to specific rules to represent the quantity or quality of an attribute. The results obtained are subjected to a triangulation process, that is, a process to contrast the data obtained as much as possible. In this way, the researcher can have comprehensive and varied information to understand and interpret the situation under study (Orellana López & Sánchez Gómez, 2006).

The instrument was designed with eleven questions, to be answered on a frequency scale of four options (items) and it was validated by experts in the area. Finally, the data collected were analysed with descriptive statistics.

Description of the procedure used to carry out this research:

Stage 1 - Recognition of the problem and theoretical-scientific study

Based on the research idea, "Physical Education in times of COVID-19: An opportunity to rethink our pedagogical work in today's society", the population and sample are determined. Then the documentary review and the theoretical-scientific bases that founded the study are directed.

Stage 2 - Design and application of instruments

From the operationalization of the variable, supported by the theoretical-scientific references of the research, the data collection instrument was designed. This instrument was designed to be able to be answered with five options for each question. The instrument was subjected to the validation process of experts in the area of Physical Education. Finally, there is data collection for the study.

Stage 3 - Analysis of the results

The data were analysed with descriptive statistics, which allowed us to know the different experiences obtained by Physical Education teachers throughout the COVID-19 pandemic from their pedagogical acts, where the results are discussed, which provides a solid foundation for this study.

RESULTS

The results are presented according to the data processed for each indicator. In this way, Figure 1 shows the indicator*: Educational levels where Physical Education is taught*, with its detailed results of 45% with responses in "Basic education" (preschool and primary), 29% in "Middle and high school education (secondary and high school"), 13% in "Higher education" and 13% "At present I am not practicing the profession".

Regarding the indicator *Definition of pedagogical acts before the COVID-19 pandemic* (see Figure 2), it presents detailed results of 2% with responses in "Terrible", 8% in "Regular", 60% in "Good" and 30 % in "Excellent".

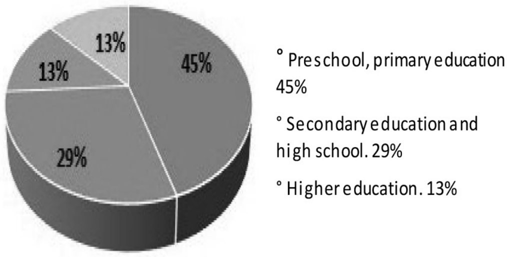

Figure 1. Indicator. Educational levels where Physical Education is taught.

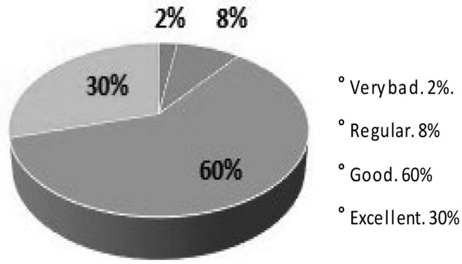

Figure 2. Indicator. Definition of educational events prior to the COVID-19 pandemic.

Regarding the indicator *Definition of pedagogical acts in the current COVID-19 pandemic* (see Figure 3), it presents detailed results of 4% with responses in "Terrible", 29% in "Regular", 61% in "Good" and 6% in "Excellent".

Indicator Didactic *Strategies used to develop an optimal teaching-learning climate* (see Figure 4), presents detailed results of 27% with responses in "Exercise routines and recreational activities", 40% in "Digital platforms and graphic media", 21% in "Workbooks and Guides" and 12% in " Neuroeducational Strategies".

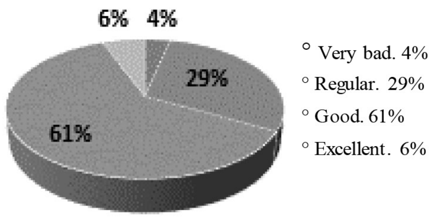

Figure 3. Indicator. Definition of pedagogical acts in the current COVID-19 pandemic.

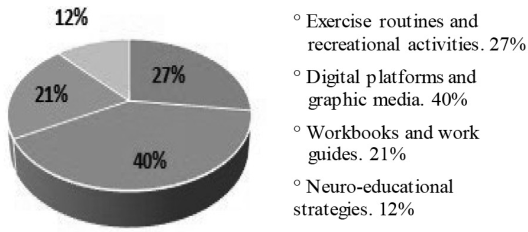

Figure 4. Indicator. Didactic strategies used to develop an optimal teaching-learning climate.

Considering the indicator *Aspects from the presence that you miss to include within the synchronous or asynchronous pedagogical acts* (see Figure 5), it presents detailed results of 37% with answers in "Interaction and Exchange of knowledge", 56% in "Sports venues and implements", 6% in "Formative evaluation" and 1% in "None".

Regarding the indicator *Aspects from the virtual modality, what would you incorporate in the future within the pedagogical acts in person* (see Figure 6), it presents detailed results of 55% with responses in "Synchronous sessions, orientation videos and virtual classroom", 18% in "Gamification and portfolio of activities", 22% in "Sociomotor and ethical values" and 5% in "None".

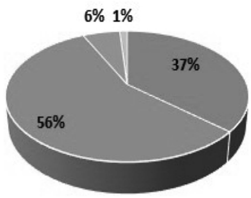

Figure 5. Indicator. Aspects of presence that you miss to include within the synchronous or asynchronous pedagogical acts.

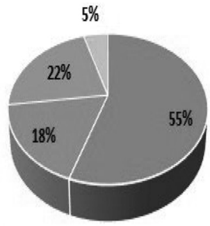

Figure 6. Indicator. Aspects from the virtual modality that you would incorporate in the future within the pedagogical aspects in the classroom.

The Indicator *Challenges assumed as a teacher to improve my pedagogical work today* (see Figure 7), presents detailed results of 66% with answers in "Train me constantly", 26% in "Read or inquire about a current topic", 6% in "Review documents from a few years ago" and 2% in "None".

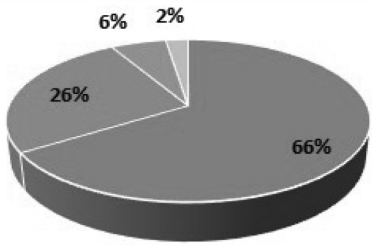

Figure 7. Indicator. Challenges assumed as a teacher to improve my pedagogical work today.

In reference to the indicator *Benefits obtained as a teacher when taking on new challenges in their professional lif*e (see Figure 8), 33% present detailed results with answers in "Improving ICT skills", 29% in "Learning new teaching strategies", 34 % in "Reinvent myself" and 4% in "Few or None".

The Experiences Indicator, the COVID-19 pandemic is an opportunity to rethink Physical Education (see Figure 9), presents detailed results of 88% with answers in "Yes, I think it has been a great opportunity", 6% in "No, I do not think it has been a great opportunity", 1% in "I have not experienced the experience yet " and 5% in "I still don't know the answer, I'm still doing my analysis".

From the indicator *You feel comfortable using the new information and communication technologies to develop your pedagogical acts* (see Figure 10), it presents detailed results of 49% with answers in "I feel comfortable using these tools", 8% in "I do not feel comfortable using these tools", 37% in "I try to adapt to this new reality" and 6% in "It is very difficult for me to adapt to this new reality".

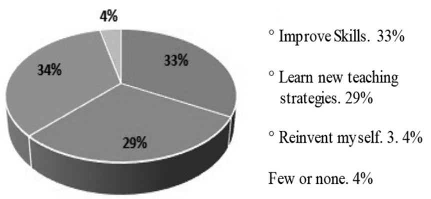

Figure 8. Indicator. Benefits obtained as a teacher when taking on new challenges in their professional life.

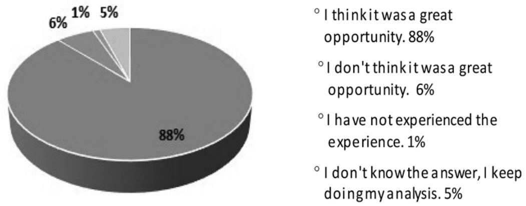

Figure 9. Indicator. The experiences.

Finally, the *Vision* indicator, what Physical Education would be like after the COVID-19 pandemic (see Figure 11), presents detailed results of 33% with responses in "Valued", 20% in "Digital and face-to-face", 32% in "Innovative and creative" and 15% in "Difficult, Terrible or Obsolete".

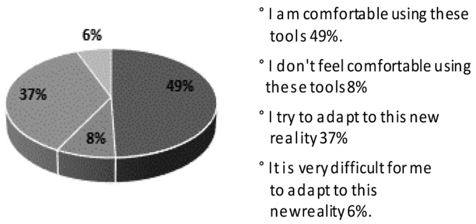

Figure 10. Indicator. You feel comfortable using the new information and communication technologies to develop your pedagogical acts.

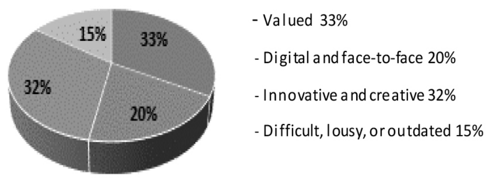

Figure 11. Vision Indicator.

The results obtained from this research, based on figure 1, show that, of the 85 selected teachers, 38 teach Physical Education in basic primary, 25 in secondary and high school education, 11 in higher education and 11 are currently not practicing the profession. In figure 2, we find that 2 people classify their pedagogical acts before the COVID-19 pandemic as terrible, 7 define them as regular, 51 as good and 25 as excellent. From figure 3, it should be noted that 3 people classify their pedagogical acts in the current COVID-19 pandemic as terrible, 25 define them as regular, 52 as good and 5 as excellent. Referring to figure 4, it is clearly stated that 23 people use exercise routines and recreational activities as didactic strategies, 34 use digital platforms and graphic media, 18 work primers and guides, and 10 neuroeducational strategies. Regarding figure 5, it is shown that 31 people miss including the interaction and exchange of knowledge with their students within their synchronous or asynchronous pedagogical acts, 48 need sports scenarios and implements, 5 apply the formative evaluation and 1 do not need anything. In relation to figure 6, it is indicated that, in the future, 47 people would incorporate synchronous sessions, orientation videos and virtual classroom within the pedagogical acts, 15 would add gamification and portfolio of activities, 19 socio-motor skills and ethical values, and 4 would add nothing. Referring to figure 7, it is emphasized that 56 people have taken up the challenge to improve their pedagogical work with constant training, 22 with reading or investigating a current topic, 5 with reviewing documents from a few years ago and 2 have still done nothing to expand their knowledge. Regarding figure 8, it is highlighted that 28 people, by taking on new challenges in their professional life, have obtained benefits such as improving ICT skills, 25 subjects learning other didactic strategies, 29 feel that they have reinvented themselves and 3 have not yet received beneficial results. Regarding figure 9, 75 people highlight that the COVID-19 pandemic has been an opportunity to rethink Physical Education, 5 do not believe that it has been a great opportunity for the sector, 1 has not yet experienced this pandemic and 4 are still doing their analysis of the situation. Referring to figure 10, it is shown that 42 people feel comfortable using new information and communication technologies, 7 do not feel comfortable with these tools, 31 try to adapt to the new reality and 5 find it difficult. Finally, in figure 11, it is detailed that 28 people view Physical Education after the COVID-19 pandemic more valued, 17 specify that it will be developed digitally and face-to-face, 27 see it as innovative and creative, and 13 view it as difficult, lousy, or outdated.

DISCUSSION

The objective of this research was to identify the different pedagogical experiences of Physical Education in times of the COVID-19 pandemic, as a strategy to improve the teaching-learning processes in today's society. It was conducted by using a sample of 85 teachers who teach Physical Education at different educational levels, which represents a percentage of the population group intervened in 12 countries. An evaluation instrument built using Google Forms was designed and shared in the first week of April through specific groups of Latin American Physical Education teachers created in various social networks. The results are quite relative to the studies conducted at Florida Universitaria de Valencia, Spain (López Secanell, 2020).

Thus, after reviewing the databases related to the tools of new information and communication technologies (ICT), the existence of research conducted in the sector of Physical Education in times of COVID-19 and confinement in the country of Spain is evident. Moreover, according to some databases, 100% of the information is found in scientific journals.

This research, developed by different teachers at the University of Valladolid, Spain, and teachers of the specific knowledge in the levels of Primary and Secondary Education of Segovia and Madrid, allows affirming that there is a marked relationship with the present research. Its author collects the reflections of Physical Education teachers on how they have experienced the situation of confinement and distance education during the compulsory confinement of schools due to the COVID-19 pandemic.

On the other hand, in Latin America, and particularly in Colombia where the research was developed, this work is unique. This makes it relevant in the international context, to the extent that if it is intended to expand the sample studied to other countries of the continent and improve the teaching-learning processes of Physical Education in today's society, it is necessary to manage information from the contribution of a scientific team that collects the reflections of Physical Education teachers, before and during the COVID-19 pandemic.

CONCLUSIONS

Once the analysis of the present research has been completed and in order to comply with the objectives set, the following conclusions have been reached:

Having reviewed the documents and research that support the investigation, it can be affirmed that there are few theoretical and methodological foundations that guarantee the development of this type of research in Latin America, as well as the strengthening the knowledge that Physical Education teachers should handle to achieve an optimal teaching-learning climate in the development of synchronous, asynchronous, or face-to-face pedagogical acts.

In general terms, it can be appreciated in the results obtained from the eleven (11) questions designed for this research that face-to-face teaching of Physical Education is irreplaceable to achieve high levels of quality. However, advancing in the use of new information and communication technologies (ICT) is also important for the implementation of more active methodologies that allow students to empower knowledge and, at the same time, involve families in the pedagogical processes. Thus, they will be able to achieve high standards of motor competence for the health and quality of life of today's society.

> "Every significant experience in the human being, must be the positive sum towards positive changes and the subtraction to negative behaviors".
>
> *José Francisco Mora Núñez 2021*

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