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The Impact of the COVID-19 Pandemic on Physical Activity and Quality of Life Among Ukrainian Students

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ABSTRACT

The COVID-19 pandemic continues to pose serious challenges to society. Strategies such as social distancing are employed to reduce its spread; however, this can lead to a sedentary lifestyle. Many people report difficulties in maintaining a healthy level of physical activity during the pandemic. The aim of this study was to examine the levels of physical activity and quality of life among Ukrainian university students during the COVID-19 pandemic. A diagnostic questionnaire was used, and the International Physical Activity Questionnaires (IPAQ) were employed to assess participants' physical activity levels. The study involved 662 students from three Ukrainian universities. A significant decrease in physical activity and an increase in sleep duration were observed during the COVID-19 pandemic. One of the main advantages of this study was the use of both cross-sectional and longitudinal analyses. The study also allowed for the evaluation of two types of behavior: physical activity and sleep. The conclusions. After the onset of the COVID-19 pandemic, physical activity was low in 90% of students, amounting to 791±7.3 MET, with a significant amount of time (8.6±1.2 hours) spent on sleep, while less than half of the participants (40.2%) met the recommended physical activity guidelines.

KEYWORDS: Physical activity, quality of life, Ukrainian university students, International Physical Activity Questionnaires (IPAQ).

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El impacto de la pandemia de COVID-19 en la actividad física y en la calidad de vida de los estudiantes ucranianos

RESUMEN

La pandemia de COVID-19 sigue planteando serios desafíos para la sociedad. Muchas personas informan dificultades para mantener un nivel saludable de actividad física durante la pandemia. El objetivo de este estudio fue examinar los niveles de actividad física y calidad de vida entre los estudiantes universitarios ucranianos durante la pandemia de COVID-19. Se utilizó un cuestionario diagnóstico y se emplearon los Cuestionarios de Actividad Física Internacional (IPAQ) para evaluar los niveles de actividad física de los participantes. El estudio involucró a 662 estudiantes de tres universidades ucranianas. Se observó una disminución significativa en la actividad física y un aumento en la duración del sueño durante la pandemia de COVID-19. El estudio también permitió la evaluación de dos tipos de comportamiento: actividad física y sueño. Las conclusiones. Después del inicio de la pandemia de COVID-19, la actividad física fue baja en el 90% de los estudiantes, con un total de 791±7,3 MET, con una cantidad significativa de tiempo (8,6±1,2 horas) dedicado al sueño, mientras que menos de la mitad de los participantes (40,2%) cumplieron con las pautas de actividad física recomendadas.

PALABRAS CLAVE: Actividad física, calidad de vida, estudiantes universitarios ucranianos, Cuestionarios de Actividad Física Internacional (CAFI).

Introduction

In 2018, the World Health Assembly (WHA) approved a new Global Action Plan on Physical Activity (GAPPA) for 2018-2030 and adopted a new voluntary global target to reduce levels of insufficient physical activity among adults and adolescents by 15% by 2030. Under the WHO Resolution, Member States requested WHO to update the 2010 Global Recommendations on Physical Activity for Health.

The coronavirus disease 2019 (COVID-19) pandemic, caused by the SARS-CoV-2 virus, has emerged as a new global challenge in implementing the World Health Assembly's plan. The novel coronavirus originated locally but quickly spread to all continents, including reaching Ukraine.

In Ukraine, the first confirmed case of the disease was registered on March 3, 2020. A national quarantine was declared from March 12 to April 3. Ukrainian universities began suspending classes on March 10, with all universities closing on March 12. On March 25, 2020, Ukraine recorded 113 cases. On the same day, the Cabinet of Ministers declared a state of emergency throughout Ukraine for 30 days, until April 24, 2020. New restrictive quarantine measures were introduced, including the prohibition of public gatherings, restrictions on people's movement and access to public places, and limited direct social interaction. Stringent restrictions that practically prohibited the use of public places were in effect until May 11. Since December 9, 2020, depending on the epidemiological situation in Ukraine, a "green," "yellow," "orange," or "red" level of epidemiological danger of COVID-19 spread has been established.

As known, access for students to the university enables social interactions, establishment of new social relationships, participation in sports and recreational activities, and attendance of artistic and cultural events.

Social distancing measures during COVID-19, limited access to public spaces, and significantly restricted open social and physical activities. The new and unprecedented crisis has affected societal moods and physical activity. Changes in daily routines, social distancing, partial or complete isolation lead to emotional stress.

The research included surveys of university students, who were asked to describe the impact of the state of emergency declared due to the COVID-19 epidemic. The survey was conducted during the state of emergency.

According to Marek et al. (2005), university students prefer "positive" solutions to address negative emotions, including social interaction and sports activities - activities that typically require access to public places.

Sport plays an important role, and research Bray et al. (2004), shows that mood disorders strongly correlate with low levels of physical activity. Physical exercises contribute to improving the quality of life by enhancing overall physical and mental health. Physical activity can play an important role in treating mild to moderate mental disorders, especially depression and anxiety Ćosić K et al. (2020).

During the pandemic, personal meetings have been replaced by online communication through social networks and phone calls. The development of virtual communication has been facilitated by the emergence of the Internet, messengers, and

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social media. These means of communication are particularly popular among people experiencing social anxiety Anderson (2001). However, this transition to virtual communication can negatively impact people's levels of physical activity Caplan (2003), as they spend less time in motion and feel less motivated to lead an active lifestyle. The lack of personal meetings may lead to an increase in sedentary behavior and a decrease in motivation for sports or physical activity.

Prolonged isolation can lead to a significant decrease in mood. Sudden changes in daily routines and uncertainty about the future exacerbate stress Palinkas et al. (2004).

The virtual environment, public online spaces, and online communities completely replaced physical public spaces during this time.

Długosz (2020) reported a noticeable decrease in the psychosomatic well-being of university students during isolation from COVID-19. Social distancing leads to anxiety and tension.

To date, several studies have presented relevant data for various population groups in different countries. A longitudinal study conducted in Shanghai, China, Xiang et al. (2020), showed that since the outbreak of COVID-19, children and adolescents have engaged in less physical activity by 435 minutes and spent 28 more hours per week in front of screens. A national study in Canada Moore et al. (2020), also showed that during the COVID-19 pandemic, children and adolescents had lower levels of physical activity, higher sitting time (including leisure screen time), and more sleep. Similar results were obtained for adults, Stanton et al. (2020), such as negative changes in physical activity and sleep in Australia.

40.5% of inactive Canadians become less active Lesser et al. (2020). Moreover, a national survey involving 35 research organizations reported the negative impact of COVID-19 on all levels of physical activity intensity and increased daily sitting time Ammar et al. (2020).

Thus, there is insufficient data on the impact of the COVD-19 pandemic on the physical activity and psychological well-being of university and college students in Ukraine.

The aim of this study was to investigate the levels of physical activity and quality of life among students during the COVID-19 pandemic.

1. Materials and methods

Study Participants. The study involved 662 university students (Zaporizhzhia National University, Uzhhorod National University, Kremenchuk Humanitarian and Technological Academy), including 357 males and 305 females. In the surveyed group, 73% of respondents were enrolled in bachelor's programs (first level), and 27% were enrolled in master's programs (second level).

1.1. Organization of the study

The study included a diagnostic survey with a questionnaire. This research method was used to collect quantitative and qualitative data.

To assess participants' levels of physical activity, the International Physical Activity Questionnaires (IPAQ) were utilized. The short version of the IPAQ with validity and reliability was tested in 12 countries Craig et al. (2003), demonstrating its suitability for population surveillance and large-scale studies. Three items were assessed using IPAQ: vigorous physical activity - PA (VPA), moderate physical activity - PA (MPA), and walking. Moderate to vigorous physical activity (MVPA) was calculated by adding MPA and VPA. MET-minutes per week (MET.min/week) were calculated using the formula: intensity (MET) × duration × frequency. Additionally, to assess the impact of COVID-19 on physical activity, another question was posed: "What was your level of physical activity before the onset of the COVID-19 pandemic? (e.g., increased, unchanged, decreased)."

Participants were also asked five additional questions and four demographic questions (age, gender, educational program, year of study), in addition to IPAQ, related to COVID-19: (1) "Please indicate your source of information about the COVID-19 pandemic: newspapers or television, government websites, work colleagues/friends, Facebook/Twitter/Instagram/YouTube"; (2) "Have you ever been on home quarantine or in a quarantine center for mandatory quarantine?"; (3) "I am worried about other family members or friends who have contracted COVID-19" - participants' responses to questions (3) and (4) used one of the following five options: "not at all worried, slightly worried, somewhat worried, moderately worried, extremely worried"; (5) "How often do you employ these strategies to prevent the spread of COVID-19?" - three of the most common and effective preventive methods were selected, including "regular handwashing with soap,

wearing a face mask, and avoiding restaurants/gyms/shops." "Always, often, sometimes, rarely, and never" were the response options.

1.2. Statistical Analysis

The research data were processed using the statistical analysis program IBM SPSS 20. The research protocol was approved by the University Ethics Committee. Additionally, students were fully informed about all aspects of the study.

2. Results

Participant characteristics are shown in Table 1. The average age of participants was 21.1 years, with 67.1% of them younger than 22 years, 23.5% aged 22 to 25 years, and 9.4% older than 25 years. According to WHO recommendations, 12.2% of males and 23.3% of females were overweight, respectively.

Table 1. Participant Characteristics of the Cross-sectional Study Stratified by Gender Indicators

Indicators	$\overline{X} \pm S$			
	Total number of students (n-662)	Males (n-357)	Females (n-305)	p
Age	20,5±3,2	21,1±3,1	19,8±2,6	0,01
Height (cм)	177,5±4,3	179,5±2,4	176,5±3,3	‹0,001
Weight (kg)	65,8±2,7	65,2±2,1	62,8±2,3	‹0,001
BMI	20,9±3,1	21,2 ± 2,0	20,2 ± 2,4	‹0,001

32% of participants adhered to recommendations regarding physical activity, while more than half of the participants (64.5%) did not engage in any vigorous physical activity during the COVID-19 pandemic. Overall, 76% of participants reported that their level of physical activity had decreased since the onset of the COVID-19 pandemic (Table 2).

Walking (minutes/day): Women spend less time walking compared to men. This may indicate lower overall physical activity levels among women.

Moderate and vigorous physical activity (PA): There were no significant differences between men and women in these categories of physical activity. However, overall, both genders demonstrate insufficient amounts of moderate and vigorous physical activity.

Adherence to WHO physical activity recommendations: Both genders show a low level of adherence to the World Health Organization's recommendations regarding physical activity. This may indicate a potential risk of developing various diseases associated with a sedentary lifestyle.

Sleep: Men and women have similar sleep durations, but the quality of sleep seems slightly better in men. However, the majority of participants, regardless of gender, do not adhere to the WHO recommendations for sleep patterns.

Table 2. Lifestyle and physical activity of participants for the longitudinal study with gender stratification

Indicators	$\overline{X} \pm S$ and %			
	Total number of students (n-662)	Males (n-357)	Females (n-305)	p
Walking (min/day)	17,3 (25,5)	17,1 (27,8)	13,3 (27,4)	‹0,001
Moderate PA (min/day)	2,9 (12,2)	2,7 (11,4)	2,6 (10,2)	‹0,001
Vigorous PA (min/day)	0,0 (8,6)	0,0 (9)	0,0 (8,5)	‹0,001
From Moderate to Vigorous PA (min/day)	8,5 (22)	8,4 (21)	6,7 (18)	‹0,001
Total Energy Expenditure MET (min/day)	791 (1398)	862 (1836)	790 (1227)	‹0,05
Changes in PA level				
Increased	16,2	12,0	19,1	–
No change	11,0	10,8	11,4	–
Decreased	72,8	77,2	69,5	–
Compliance with WHO PA recommendations*	28,1	29,4	28,3	0,05
Sleep				
Sleep duration (hrs/day)	8,6±1,2	8,5±1,2	8,7±1,2	0,05
Sleep quality	5,6±1,4	4,6±1,5	5,2±2,2	0,05
Compliance with WHO sleep guidelines**	40,2	46,3	39,4	0,05

Notes: PA - physical activity, WHO - World Health Organization. *At least 150 minutes of moderate-intensity aerobic activity or at least 75 minutes of vigorous-intensity aerobic activity throughout the week. **Sleep quality assessment ‹5 with 7-9 hours of sleep.

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In conclusion, both genders demonstrate insufficient levels of physical activity and fail to adhere to recommendations regarding physical activity and sleep, which may have a negative impact on their health and well-being.

The study revealed that wearing masks during exercise leads to a significant increase in physiological demand. The individual behavior of young people has changed in response to the threat of COVID-19. Based on our results, 91% of participants reported that they always wear a face mask when leaving home, while only 8.6% of participants reported never wearing a face mask. This may affect physical activity or physical behavior of individuals.

Similarly, a recent study showed that 99% of participants reported wearing face masks when leaving the house. Additionally, 85% of participants reported always or often washing their hands with soap.

3. Discussion

To the best of our knowledge, this is one of the first studies to investigate levels of physical activity and quality of life among students in Ukraine during the COVID-19 pandemic.

The main findings of our study revealed that participation in all forms of physical activity significantly decreased following the outbreak of COVID-19. Our data on the reduction of all types of physical activity (MPA, VPA, and walking) after the COVID-19 outbreak align with a recent national survey in Canada Moore et al. (2020), which reported a significant decline in all types of physical activity among children and adolescents. In China Wong et al. (2020), researchers reported that children and adolescents engaged in 105 minutes per week of physical activity during the COVID-19 pandemic. The low volume of physical activity undertaken by participants may be attributed to social distancing measures (e.g., cancellation of all team sports practices and competitions and closure of gyms), remote work, and concerns about the threat posed by COVID-19.

The COVID-19 pandemic has disrupted daily routines, with flexible schedules due to the closure of schools, colleges, and universities. Low physical activity is closely associated with stress, which participants report may be exacerbated by the threat of COVID-19. Analysis shows Stanton et al. (2020), that 40.7% of Australian adults reported negative changes in physical well-being since the onset of COVID-19 due to behavior changes related

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to physical activities, as well as work and relationship issues. Therefore, during the COVID-19 pandemic, it is important to maintain a regular regimen of physical activity.

The majority of surveyed students adhered to social distancing rules during the quarantine. The implemented restrictions significantly reduced access to both open and closed public spaces and limited outdoor activities to those deemed essential for meeting basic needs. Young people felt the negative impact of these changes and restrictions on access to public places. The absence of daily social interactions with friends in bars, gyms, parks, and pools was a source of stress and had a negative effect on their social lives and interactions. Partially, these restrictions were compensated for by modern technologies and remote communication tools such as the Internet and mobile phones. However, these means were unable to fully replace direct social contact in public places. Despite being part of the digital generation and being familiar with modern technology and virtual communication tools since childhood, most surveyed individuals experienced negative consequences of quarantine measures. The survey results indicated that social distancing rules heightened the value of direct human contact for students, especially contact with friends.

Students are distancing themselves from each other, staying at home, and studying online, which subsequently leads to increased screen time and a sedentary lifestyle. Specifically, students spent less time on physical activity, less time in physical education classes, and a greater portion of the academic semester on screen time during online learning. Thus, we also found that time spent watching television and using computers significantly increased after the COVID-19 outbreak.

Limitations of this study include the use of subjective measures to assess physical activity and sleep, which are associated with an increased risk of systematic error. Although all questionnaires used in this study were validated, objective measurements, such as accelerometer use, would provide more accurate assessments of participants' physical activity. Furthermore, the sample size in this longitudinal study was limited. The current study may suffer from selection bias as participation was voluntary.

Conclusions

One of the main strengths of this study is the application of both cross-sectional and longitudinal analyses. Secondly, a large sample size was utilized in the cross-sectional

analysis. Thirdly, the current study evaluated two types of behaviors (physical activity and sleep).

Research using the modified IPAQ questionnaire and the recalculations of the obtained data into MET units showed that after the onset of the COVID-19 pandemic, physical activity was low in 90% of students, amounting to 791±7.3 MET, with a significant amount of time (8.6±1.2 hours) spent on sleep, while less than half of the participants (40.2%) met the recommended physical activity guidelines. Additionally, a significant decrease in physical activity (72.8%) was observed among young individuals compared to baseline data. Almost 90% of participants did not meet the WHO recommendations for physical activity, particularly regarding moderate and vigorous activity. The duration of sleep among participants was adequately maintained after the implementation of quarantine measures. However, sleep quality did not reach optimal levels. These findings may have important implications for public health policy and serve as evidence for future intervention studies. Thus, the identified indicators of physical activity and sleep quality point to the need for further research and the development of programs to support healthy lifestyles among student populations in the context of the pandemic.

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Conflict of interest

The authors declare no conflict of interest.

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