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PHYSICAL ACTIVITY AND PSYCHOLOGICAL WELLBEING OF STUDENTS OF THE UNIVERSITY OF LJUBLJANA DURING THE COVID-19 PANDEMIC

TELESNA DEJAVNOST IN PSIHOLOŠKO BLAGOSTANJE ŠTUDENTOV UNIVERZE V LJUBLJANI MED PANDEMIJO COVID-19

ABSTRACT

Regular physical activity is an essential factor of a healthy lifestyle. The goal of our study was to assess the consequences of the COVID-19 pandemic on the regularity of physical activity, weight gain, and psychological wellbeing of students at the University of Ljubljana (n=4911). We used an online Likert type questionnaire to compare groups of more and less frequently active students and observed gender differences in physical activity and psychological wellbeing. We found that, on average, students have been slightly less physically active than before the pandemic, and their psychological wellbeing is moderately worse than before the pandemic. Compared to less active students, students who were more regularly physically active were less likely to describe their psychological wellbeing as worse or much worse than before the pandemic. In addition, the least regularly physically active students were more likely to gain body weight compared to more active students. When comparing gender differences, we found that the drop in physical activity was less pronounced in female students. Male students were physically active more frequently than female students, and female students assessed their psychological well-being lower than that of male students. The pandemic had a predominantly negative effect on the physical activity and psychological wellbeing of the students of University of Ljubljana. However, further research is needed for a more detailed analysis of the impact of the pandemic on the student population.

Keywords: healthy lifestyle, gender differences, physical activity levels, Slovenia

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IZVLEČEK

Redna telesna dejavnost je pomemben dejavnik pri zdravem načinu življenja. Predavatelji športne vzgoje na Univerzi v Ljubljani smo s pomočjo ankete poskušali preveriti, kakšen je bil vpliv pandemije Covid-19 na telesno dejavnost, telesno težo in psihološko stanje študentov Univerze v Ljubljani (n=4911). Medsebojno smo primerjali skupine bolj in manj telesno dejavnih študentov in primerjali razlike med spoloma v telesni dejavnosti in v psihološkem počutju. Ugotovili smo, da v povprečju študenti ocenjujejo, da so bili nekoliko manj telesno dejavni kot pred pandemijo in da je njihovo psihološko počutje slabše kot pred pričetkom pandemije. Študenti, ki so bili bolj telesno dejavni so manj pogosto opisovali svoje psihološko počutje kot slabše ali veliko slabše v primerjavi s tistimi, ki so bili telesno manj dejavni. Telesna teža se je v največjem odstotku povežala študentom, ki so bili najmanj pogosto telesno dejavni in v največjem odstotku znižala študentom, ki so bili najpogosteje telesno dejavni. Pri ženskah je bil upad telesne dejavnosti nekoliko manjši kot pri moških. Moški so bili telesno dejavni nekoliko bolj pogosto v primerjavi z ženskami, ženske so svoje psihološko stanje v povprečju ocenile kot nekoliko slabše v primerjavi z moškimi. Ugotavljamo, da je pandemija večinoma negativno vplivala na telesno dejavnost in psihološko stanje študentov Univerze v Ljubljani. Za bolj podrobno analizo stanja in iskanje rešitev bodo pomembne nadaljnje raziskave na področju vpliva pandemije na študentsko populacijo.

Ključne besede: zdrav življenjski slog, razlike med spoloma, raven telesne aktivnosti, Slovenija

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INTRODUCTION

Regular physical activity is one of the most effective ways to prevent premature death (Warburton & Bredin, 2017). The World Health Organization (WHO) recommends at least 150 minutes of moderate physical activity, 75 minutes of high-intensity activity per week, or a combination of both. Such activity causes us to breathe heavily and sweat. In addition, strength development exercises should be performed at least twice a week (Bull et al., 2020). These recommendations represent the minimum amount of recommended physical activity. However, to improve physical performance, the activity must be significantly longer, as more intense, and more regular physical activity brings greater health benefits. We need to be aware of this and encourage students to be as physically active as possible during the pandemic. One study reports that students sit for more than nine hours a day (Castro et al., 2020). The World Health Organization's goal is to reduce the prevalence of physical inactivity by 15 % worldwide by 2030 (Bull et al., 2020).

Today, physical inactivity is considered one of the most common causes of premature mortality (Bull et al., 2020), which is also due to changing family lifestyles that strongly affect physical activity and, consequently, physical performance and diseases associated with physical inactivity (Booth et al., 2012). Decreased physical activity negatively affects our health. In contrast, regular physical activity has a positive effect on lowering high blood pressure, helps regulate body weight, and reduces the risk of heart disease, stroke, type 2 diabetes, and various types of cancer. Physical activity also improves psychological wellbeing, muscle strength and at the same time improves balance, flexibility, and fitness (Bassuk & Manson, 2005; Sawatzky et al., 2007).

The coronavirus pandemic has changed our way of life. Many students were forced to stay indoors and turn to remote work (Li et al., 2020). Both group and individual workouts in gyms, as well as some outdoor centres, were prohibited from by law, so students who were otherwise physically active in organized workout groups had to adapt to the new circumstances. It was even more difficult for students who had not been included in any regular physical activity prior to the pandemic.

During the pandemic, anxiety and stress levels were proven to have increased, which was especially prevalent among those who already had mental distress (Elbay et al., 2020). Distress during the COVID-19 epidemic was so severe in certain individuals that they felt hopeless (Lee, 2020). A study on the student population showed that students found themselves in a very

difficult situation. They were emotionally disturbed by their classmates or close friends. Apart from this, both male and female students had reduced work performance (Meo et al., 2020).

After reviewing the literature, we found that a study analysing the impact of the COVID-19 pandemic on physical activity and mental state had not yet been done in Slovenia. However, Starc et al. (2021) found a sharp decline in the physical performance of children in primary and secondary schools. Since physical education in primary and secondary schools is compulsory and much more uniform than in Slovenian universities, where only certain member faculties have physical education as a compulsory subject, some have it as an elective subject, and some do not offer it at all (Zovko & Čater, 2016), our goal is to research the situation in the student population.

During the pandemic, researchers observed a generally negative effect on the intensity of physical activity, an increase in unhealthy food consumption, and a 28.6 % increase in sedentary lifestyle (Ammar et al., 2020). In addition, a decrease in physical activity was observed in students (Gallo et al., 2020), along with a higher levels of anxiety between the ages of 18 and 34 (Antunes et al., 2020).

However, several factors that emerge in an individual's life can facilitate or hinder human behaviour, with the transition from high school to university being the defining moment (Aceijas et al., 2017). During this time, young adults develop their lifestyle habits, so the role of universities and a sense of the healthy habits they acquire during this stage is essential to maintaining a healthy lifestyle in the years to come (Haas et al., 2018).

To find these answers, the Group of Sports Educators at the University of Ljubljana (UL) decided that in this study, we will attempt to analyse the physical activity, physical performance, and psychological wellbeing of students at the UL before and during closure. The purpose of the Group of Sports Educators is to raise awareness and motivate students for a healthy lifestyle. The study results will show the importance of physical education for students and the impact it has on their health and wellbeing and precisely show how successful we are as educators in these challenging conditions.

Due to the COVID-19 pandemic, students attended classes online, and their social life was restricted due to the ban on crossing municipal borders and the police curfew. In addition, during this time, students were faced with a new way of working and juggled their private and student lives, as working from home usually took place throughout the day.

In addition to the implementation of restrictions in distance learning, the measures very likely affected the psychophysical problems of students and increased social differences between them (Pišot et al., 2020).

With regular exercise, we take care of our bodies and have an easier time maintaining our weight. Based on the study, regular physical activity was carried out in Italy, which is necessary for maintaining physical and mental health during COVID-19, where exercise is very restricted, and only single activities are allowed (Maugeri et al., 2020).

In recent months, students have been forced to study from home due to the pandemic. According to UNESCO, schools were suspended in 188 countries as of April 8th, 2020, representing about 1.5 billion young people (Lee, 2020).

This study aimed to evaluate the physical activity of the UL students before and during closure when their social and environmental setting was restricted due to closure.

The purpose of the study was to obtain students' opinions on how much the COVID-19 pandemic affected their physical activity and psychological wellbeing of students. In the results, we will present whether differences have emerged.

METHODS

The Group of Sports Educators at the UL prepared a short multiple-choice questionnaire to gain insight into the changes in students' physical activity habits and their psychological wellbeing during the COVID-19 pandemic.

Participants

The survey included 4,911 or 12.1 % of students of the UL. Students from 18 out of the 26 faculties responded to the survey. A total of 2,975 (60.6 %) of the participants identified themselves as female, while 1,936 (39.4 %) identified themselves as male. 64.1 % of the students who answered did not participate in any of the sports programs organized by the UL during the pandemic. All others (35,9 %) participated in at least one of the organized sports activity programs.

Instrument

The survey was prepared in Google Forms and emailed to students individually by their physical education lecturers, or in individual cases by the faculty student office or the faculty student council. It was conducted from January 4th to February 10th 2021. The questionnaire included informed consent, gender, study year and eight additional questions about students' physical activity and their psychological wellbeing during the COVID-19 pandemic. The questionnaire used a five-point Likert type scale for responses regarding psychological wellbeing (ranging from much worse to much better) and physical activity (from much more to much less active), and a four-point scale for weight changes (lower weight, same weight, higher weight, and I don't know). When performing data analysis of body weight changes the "I don't know" responses were excluded.

Data analysis

The data collection was carried out by Google Sheets and the statistical analysis by SPSS version 25. To find the correlation between physical activity and the psychological wellbeing of the students, and physical activity and body weight, we used the Chi square test of correlation. After testing the normality of the distribution of collected data with the Shapiro - Wilk test, we used the Mann - Whitney U test to assess differences between genders.

RESULTS

One of the aims of this study was to find out the opinion of the students regarding the consequences of the pandemic on their physical activity. We expected to find some differences in their physical activity because the COVID-19 pandemic caused a long lockdown, with many of the sports being unavailable to the public.

The results shown below focused on the correlation between students' physical activity levels during the pandemic and their psychological well-being as well as the correlation between their physical activity and weight gain or weight loss. In addition, we also examined the differences between the genders regarding their physical activity levels and their psychological wellbeing.

Table 1. Chi square test of association between students physical activity and psychological wellbeing during the pandemic.

		Physical activity * Psychological wellbeing Crosstabulation						
		Psychological wellbeing					Total	
			much worse	worse	neither better nor worse	better	much better	
Physical activity	much less active	Count	312	332	146	22	5	817
		% within Physical activity	38.2 %	40.6 %	17.9 %	2.7 %	0.6 %	100.0 %
		% within Psychological wellbeing	36.4 %	17.8 %	9.2 %	5.0 %	3.4 %	16.6 %
		% of Total	6.4 %	6.8 %	3.0 %	0.4 %	0.1 %	16.6 %
	less active	Count	258	597	389	51	13	1308
		% within Physical activity	19.7 %	45.6 %	29.7 %	3.9 %	1.0 %	100.0 %
		% within Psychological wellbeing	30.1 %	31.9 %	24.4 %	11.5 %	8.7 %	26.6 %
		% of Total	5.3 %	12.2 %	7.9 %	1.0 %	0.3 %	26.6 %
	same	Count	147	467	518	126	35	1293
		% within Physical activity	11.4 %	36.1 %	40.1 %	9.7 %	2.7 %	100.0 %
		% within Psychological wellbeing	17.1 %	25.0 %	32.5 %	28.4 %	23.5 %	26.3 %
		% of Total	3.0 %	9.5 %	10.5 %	2.6 %	0.7 %	26.3 %
	more active	Count	98	374	394	138	46	1050
		% within Physical activity	9.3 %	35.6 %	37.5 %	13.1 %	4.4 %	100.0 %
		% within Psychological wellbeing	11.4 %	20.0 %	24.7 %	31.2 %	30.9 %	21.4 %
		% of Total	2.0 %	7.6 %	8.0 %	2.8 %	0.9 %	21.4 %
	much more active	Count	43	99	145	106	50	443
		% within Physical activity	9.7 %	22.3 %	32.7 %	23.9 %	11.3 %	100.0 %
		% within Psychological wellbeing	5.0 %	5.3 %	9.1 %	23.9 %	33.6 %	9.0 %
		% of Total	0.9 %	2.0 %	3.0 %	2.2 %	1.0 %	9.0 %
Total	Count	858	1869	1592	443	149	4911	
	% within Physical activity	17,5 %	38.1 %	32.4 %	9.0 %	3.0 %	100.0 %	
	% within Psychological wellbeing	100,0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	
	% of Total	17,5 %	38.1 %	32.4 %	9.0 %	3.0 %	100.0 %	

Looking at students' psychological wellbeing in relation to their physical activity (Table 1), we can see that students who were more or much more active than before the pandemic had a lower number of worse or much worse responses when describing their psychological wellbeing,

compared to before the pandemic. The significantly less active students were the most likely of all groups to describe their psychological wellbeing as significantly worse. The Chi-square test of correlation showed a weak correlation between both variables (Cramer's $V = 0,20$).

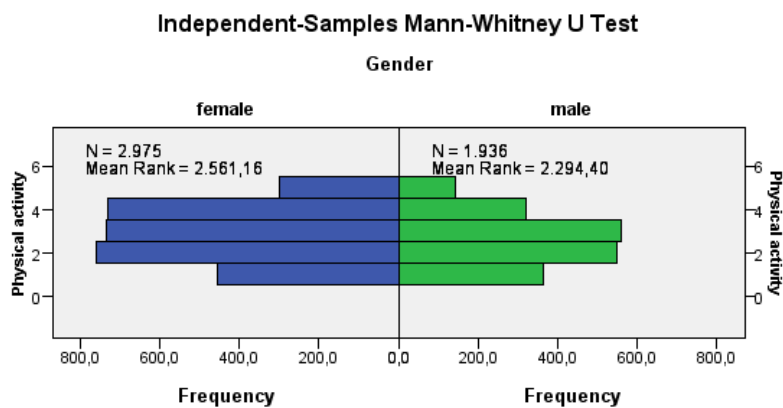
Table 2. Chi square test of association between students physical activity and weight changes during the pandemic.

Physical activity * Weight (recoded) Crosstabulation						
			Weight (recoded)			Total
			lower	same	higher	
Physical activity	much less active	Count	139	304	330	773
		Expected Count	182.4	414.6	176.0	773,0
		% within Physical activity	18.0 %	39.3 %	42.7 %	100,0 %
		% within Weight (recoded)	12.7 %	12.2 %	31.2 %	16,6 %
		% of Total	3.0 %	6.5 %	7.1 %	16,6 %
	less active	Count	189	689	358	1236
		Expected Count	291.6	662.9	281.5	1236,0
		% within Physical activity	15.3 %	55.7 %	29.0 %	100,0 %
		% within Weight (recoded)	17.2 %	27.6 %	33.8 %	26,6 %
		% of Total	4.1 %	14.8 %	7.7 %	26,6 %
	same	Count	242	814	184	1240
		Expected Count	292.5	665.1	282.4	1240,0
		% within Physical activity	19.5 %	65.6 %	14.8 %	100,0 %
		% within Weight (recoded)	22.1 %	32.6 %	17.4 %	26,7 %
		% of Total	5.2 %	17.5 %	4.0 %	26,7 %
	more active	Count	328	522	138	988
		Expected Count	233.1	529.9	225.0	988,0
		% within Physical activity	33.2 %	52.8 %	14.0 %	100,0 %
		% within Weight (recoded)	29.9 %	20.9 %	13.0 %	21,2 %
		% of Total	7.1 %	11.2 %	3.0 %	21,2 %
much more active	Count	199	165	49	413	
	Expected Count	97.4	221.5	94.1	413,0	
	% within Physical activity	48.2 %	40.0 %	11.9 %	100,0 %	
	% within Weight (recoded)	18.1 %	6.6 %	4.6 %	8,9 %	
	% of Total	4.3 %	3.5 %	1.1 %	8,9 %	
Total	Count	1097	2494	1059	4650	
	Expected Count	1097,0	2494,0	1059,0	4650,0	
	% within Physical activity	23,6 %	53,6 %	22,8 %	100,0 %	
	% within Weight (recoded)	100,0 %	100,0 %	100,0 %	100,0 %	
	% of Total	23,6 %	53,6 %	22,8 %	100,0 %	

Table 2 shows the correlation between students' physical activity and their weight gain or weight loss. In the group of students who were significantly less active than before the pandemic, most (42.69 %) gained weight. In the groups of less active, equally active and more active students, most students (55,74 % in the less active group, 65,65 % in the same activity group and 52, 83 % in the more active group) maintained the same weight as before the

pandemic. In the group of much more active students, most (48.18 %) lost weight. The Chi-square test of correlation showed a weak correlation between the variables (Cramer's $V = 0,24$). Before testing, we eliminated the "I don't know" answers, so only relevant replies were included.

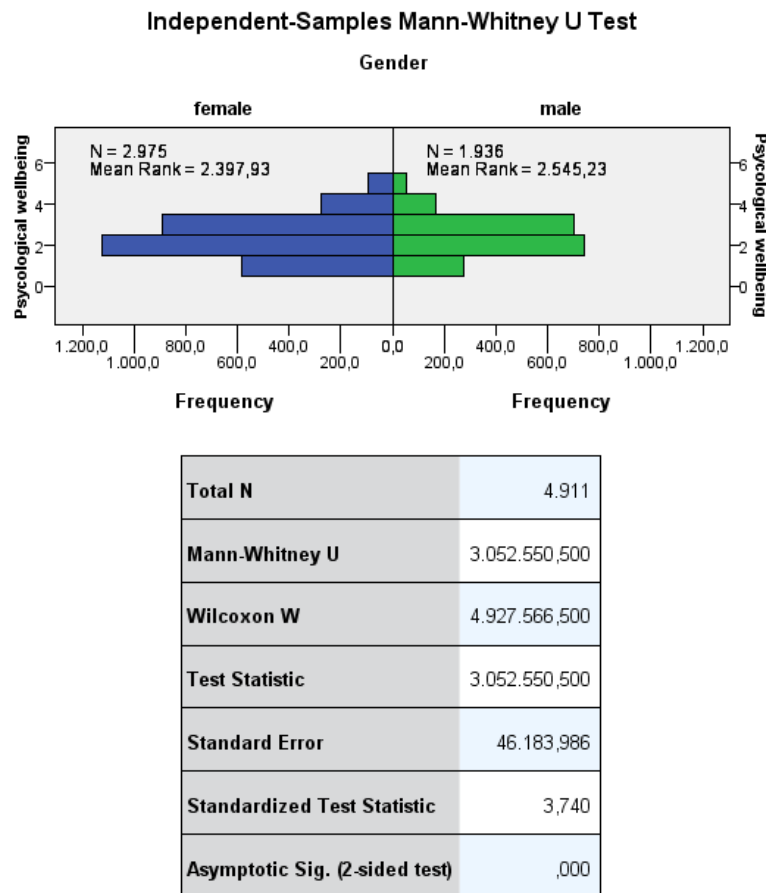
Figure 1. Mann-Whitney U test for gender differences in students physical activity during the pandemic.



Total N	4.911
Mann-Whitney U	2.566.939,500
Wilcoxon W	4.441.955,500
Test Statistic	2.566.939,500
Standard Error	47.269,407
Standardized Test Statistic	-6,619
Asymptotic Sig. (2-sided test)	,000

On average, the students assessed their physical activity as slightly less active than before the pandemic. There were slight differences in the assessment of their physical activity from the beginning of the pandemic between male and female students. On average, male students assessed themselves as less physically active compared to before the pandemic (mean = 2.29). With For female students, their average assessment was closer to that of the same level of activity as before the pandemic (mean = 2.56). The Mann-Whitney U test showed the differences to be statistically significant.

Figure 2. Mann-Whitney U test for gender differences in students psychological wellbeing during the pandemic.



Both genders assessed their psychological wellbeing as worse compared to the time before the pandemic. Again, some statistically significant differences were found between genders. On average, female students (mean = 2,40) assessed their psychological wellbeing as worse than male students (mean = 2,55).

DISCUSSION

As mentioned above, some negative consequences of the COVID-19 pandemic were expected. Previous research (Pišot et al., 2020) revealed negative effects of COVID-19 pandemic measures, such as longer periods of physical inactivity, longer screen times, and shorter periods of walking and sport engagement. Our survey similarly showed that, on average, students reported lower levels of physical activity and psychological wellbeing during the pandemic.

There was a correlation between students' psychological well-being and the level of their physical activity during the pandemic. The active students also reported better levels of psychological wellbeing compared to the students who were not regularly active. This confirms the findings of many authors (Adams et al., 2007; Harris, 2018; Tyson et al., 2010) who have linked good mental health with sufficient physical activity. Research also links regular physical activity with weight loss (Catenacci & Wyatt, 2007; Kruger et al., 2006). In contrast, the lack of physical activity is linked with weight gain and, consequently, risk factors such as cardiovascular disease, type 2 diabetes, and certain types of cancer (Bull et al., 2020). According to the responses to our survey, the most frequently physically active students were also the most likely to lose weight, and the least active students were the most likely to gain weight.

There were some differences between genders. Female students reported a lower decrease in physical activity during the pandemic than their male counterparts; male students were active more frequently than female students on average, and female students expressed worse psychological well-being levels during the pandemic than their male peers. In other studies (Orlandi et al., 2021), it was shown that women showed a lower tendency to reduce their physical activity during the COVID-19 pandemic. The adjustment to physical activities that can be done at home or with minimal equipment and social contact may be easier for women. A study on the popularity of sports activities in Slovenia (Pori & Sila, 2010) in relation to gender and education showed that women prefer sports such as mountain climbing and aerobics, while men more often choose sports such as football, basketball and skiing. During the lockdown it was much easier in Slovenia to engage in individual sports, like mountain climbing, or sports such as online aerobics classes, and almost impossible to engage in team sports (with the exception of top athletes). Nevertheless, on average, male students were still physically active more days per week, which is in line with some studies of sport participation in Slovenia (Leskošek et al., 2002). Studies (Hou et al., 2020; Lo Coco et al., 2021; Pieh et al., 2020) have also shown that the COVID-19 pandemic has negatively impacted the psychological well-being of women compared to men, which is consistent with the findings of this survey.

Although students on average reported a decrease in their physical activity during the pandemic, there was a higher than expected percentage (30.4 %) who reported an increase in their physical activity. Further studies should examine the reasons for this increase. Was this a part of the student population that was involved in university sports programs? Were they motivated by

their physical education lecturers, or were they not in any programs and had to motivate themselves? Was their schedule, studying from home, and not having to commute a factor?

Do they prefer individual sports activities? All of these factors should be explored more in detail.

Physical education lecturers at the UL have been striving to implement physical education programs for all the faculties. Since there are physical education lecturers present at all the faculties, an objective fitness measurement program should be available to all university students in the future. Numerous studies support the idea of students' regular physical activity (Bray & Kwan, 2006). Our findings can only further confirm that physical activity is essential to a healthy, high quality lifestyle of students.

There have been few studies on the student population regarding the direct and indirect consequences of the COVID-19 pandemic, so more in the future are crucial to find solutions and minimize the damage it has caused. Sufficient physical activity is a helpful tool to improve health, fitness and psychological wellbeing during the pandemic, and its use should not be neglected.

Limitations

First limitation of the study is the lack of objective methods for observing physical activity and physical fitness.

Second limitation is the insufficiently precise questionnaire. Standardised questionnaires should be used to assess mental health.

Third limitation is that many of the students included in it the study came from faculties with sports programs in their curricula. Future studies should include more students from faculties with no sports programs so that the sample better represents the student population to avoid possible bias in some of the responses.

Because of the pandemic, we could not measure the students' fitness and had to rely on their self-assessment. The questionnaire was not precise enough for some questions, which caused some problems when analysing data; not all tools could be used. Improvements to the questionnaire are necessary for future use.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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