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ORIGINAL ARTICLE

BY-NC

Assessment of the prevalence of lower back pain syndromes among students during the remote teaching period

Klaudia Kuliga[1,A,D-F] ✉, **Marcin Kuliga**[2,A-D]

[1] *St. Michael the Archangel Hospital, Łańcut, Poland*
[2] *Faculty of Medical Sciences, University of Rzeszów, Poland*

A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation, D – Writing the article, E – Critical revision of the article, F – Final approval of the article

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Abstract

Introduction and Objective. The COVID-19 pandemic has significantly affected the lives of students. The epidemic situation promoted the development of civilization diseases, among them lower back pain syndromes. These syndromes are the most common reasons for visits to the offices of doctors and physiotherapists The aim of this study was to demonstrate the relationship between physical activity and the incidence of lower back pain among students of the University of Rzeszów, south-eastern Poland, during the COVID-19 pandemic.

Materials and method. A cross-sectional study was conducted among students of the University of Rzeszów. The criterion for inclusion was the current status of the student, age between 19–26 years and good general health. Persons with physical disabilities, sick and staying for the last 7 days in hospital, and pregnant women were excluded from the survey. A total of 179 responses were obtained and 176 students were included in the study. The study was conducted using an author's questionnaire containing own questions and questions from the Polish version of the short International Physical Activity Questionnaire (IPAQ).

Results. The intensity of lower back pain had no statistically significant effect on the metabolic equivalent measured by the IPAQ questionnaire. Decreased physical activity in the study group resulted in a statistically significant change in body weight. Year of study had a statistically significant effect on the onset of lower back pain.

Conclusions. The level of lower back pain does not affect the physical activity of the students in the study. The field of study had a significant influence on physical activity. The duration of lower back pain in the study group had a significant effect on the level of pain in the VAS scale.

Key words

lower back pain, students, COVID-19, activity

INTRODUCTION

The COVID-19 pandemic, caused by SARS-CoV-2 virus, significantly affected the professional and private lives of all people, including students. The magnitude of the problem, as well as the unpredictability of subsequent illnesses, posed a number of challenges and problems to the entire structure of countries, which previously (before 2020) may have seemed unrealistic. The pandemic caused a significant number of people to start working remotely [1], including students, who are the target group in this study.

Lower back pain most often affects the lumbar, lumbosacral and iliac-sacral regions, but the pain can also radiate toward the buttocks and lower extremities. Although the vast majority of these complaints resolve quickly, some are unfortunately more problematic, and prolonged pain leads patients to report to doctors and physical therapists. About 50% of acute pain resolves spontaneously after up to 2 weeks, while 25% of these complaints last up to 4 weeks, and 15% last up to 3 months. In 10%, the affliction lasts longer and the pain becomes chronic [2, 3]. One of the most common reasons that patients report to their primary care physician is specific lumbosacral pain. It is estimated that as many as 80–100% of the adult population reports at least one pain episode involving the spine in their lifetime [4].

Physical activity is considered a positive factor and an integral part of a healthy lifestyle which is a determinant of health in all its dimensions. Physical activity is considered a health-promoting behaviour that can help reduce and even prevent back pain. The reduction in daily physical activity during the pandemic was influenced by the temporary ban on recreational movement, including a ban on entering forests and parks, and the closure of playgrounds, gyms, swimming pools and other sports and recreational facilities. The restrictions changed temporarily due to the changing number of infected people in the country.

OBJECTIVE

The aim of the study was to demonstrate the relationship between physical activity and the incidence of lower back pain among of University students in Rzeszów during the COVID-19 pandemic.

✉ Address for correspondence: Klaudia Kuliga, St. Michael the Archangel Hospital, Ignacego Paderewskiego 5, 37-100 Łańcut, Poland
E-mail: pecakklaudia@gmail.com

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MATERIALS AND METHOD

A cross-sectional survey was conducted among students at the University of Rzeszów in south-eastern Poland. Participation in the study was voluntary. A survey questionnaire was made available to all full-time and part-time students at the University. The criteria for inclusion in the study were current student status, age between 19–26, and good general health. Anyone with physical disabilities, in the period of convalescence and rehabilitation, who were ill and had been hospitalized for the last 7 days, and pregnant women were not eligible. 179 responses were obtained from whom 176 people were included in the study (3 people were excluded due to pregnancy, illness and convalescence period). The survey was conducted once among the student population of the University using the social survey method of a questionnaire. The questionnaire was written in Polish and included information for respondents about the purpose of the study. The survey lasted for 19 days, from 30 November – 18 December 2020 during the COVID-19 pandemic, when some students of the University of Rzeszow participated exclusively in classes conducted remotely. Respondents received surveys via a URL generated directly from Google: https://docs.google.com/forms. Using the link shared on the student group on Facebook and sent in private messages via social networks Facebook, Instagram and the Microsoft Teams service, students were asked to complete the questionnaire which consisted of 43 questions. Its first part consisted of 27 closed, own interview questions. The first seven questions related to age, gender, height, weight, residence and field of study. The next two questions referred to gainful employment. Questions 10 – 15 concerned:

- time spent in front of the computer as part of work and university activities,
- computer use outside of work and university activities,
- time spent in front of the computer as part of hobbies and leisure time,
- the position adopted during online activities,
- maintaining an ergonomic position,
- taking breaks for gymnastics during prolonged time spent in a static position.

The next questions, 16–20, referred to changes due to the pandemic period, attending college classes in a stationary form, time spent in a sedentary position, increase in the amount of time spent in a seated position, changes in body weight, and decrease in physical activity during the epidemic period. Questions 21–27 asked about lower back pain, the use of pharmacological agents for lower back complaints, the level of pain on the VAS scale, factors exacerbating the complaints, duration of the problems, and the negative impact of the complaints on various areas of life. In the second part of the questionnaire, the respondents were assessed in terms of physical activity using the Polish version of the short International Physical Activity Questionnaire (IPAQ). Statistical analysis of the questionnaire results was performed using Microsoft Excel and Statistica 13.3.

RESULTS

179 students participated in the study, of whom 176 met the inclusion criteria and were qualified for analysis. 103 women (58.5%) and 73 men (41.5%) responded to the questions asked. The survey included students at various stages of study, from the first year up to the sixth year. The largest group of respondents were iun the their first year of study (34.66%).

The arithmetic mean age of the respondents was 21.71, and the standard deviation from this value was 2.14. The variable variation measured by the coefficient of variation was 9.85%, which indicates that there was little variation in this characteristic among those surveyed. Among the respondents at the University of Rzeszów, the majority were studying in the College of Medical Sciences, a total of 140 (79.55%) students. However, there were also another 36 (20.36%) from other faculties of the University. Among the respondents, the most numerous group were students of physiotherapy (34.66%), the second largest group was physical education students (26.14%), followed by students of medicine (14.77%), food technology and human nutrition (10.23%), economics (9.66%), emergency medicine (2.84%), and dietetics (1.14%). The least numerous group were law students (0.57%). The survey included students at various stages of study, from the first year up to the sixth year. The largest group of respondents were in their first year of study (34.66%).

Table 1. Statistics of the study

Year of study	Quantity	Percentage
I	61	34,66
II	17	9,66
III	14	7,95
IV	25	14,20
V	57	32,39
VI	2	1,14

Respondents were examined and classified into their respective weight categories according to Body Mass Index (BMI) measurements. Among the respondents, those with an optimal body weight predominated. The second largest group was made up of overweight students (15.91%), followed by those who were underweight (6.25%); interestingly this group included only women. The least numerous group were obese students (2.27%).

Table 2. BMI of surveyed students

Category by BMI	Women	% Women	Men	% Men	Total	% Total
Underweight	11	10,68	0	0,00	11	6,25
Optimal weight	77	74,76	56	76,71	133	75,57
Overweight	13	12,62	15	20,55	28	15,91
Obesity	2	1,94	2	2,74	4	2,27

65% of respondents believed that their physical activity decreased during the COVID-19 pandemic period, while almost 90% believed that they had spent more time in a sedentary position during the pandemic period.

The highest Metabolic Equivalent of Work (MET) in the study population was 9324.00, while the lowest value of the index was 165.00. The maximum difference between the METs of the respondents was 9159.00. The mean value of the metabolic equivalent of the respondents was 2504.94.

Table 3. Descriptive statistics of MET metabolic equivalent in the study group

Metabolic equivalent – MET	
N	176
X	2504,94
Me	2017,00
Min	165,00
Max	9324,00
Q1	883,50
Q3	3633,00
SD	1871,58
CV	74,72

N – size of the group; X – arithmetic mean; Me – median; Min – minimum value; Max – maximum value; QI – lower quartile; Q3 – upper quartile; SD – standard deviation; CV – coefficient of variation

In the study group, the largest number of respondents opted to maintain their pre-pandemic weight (45.45%). The occurrence of pain involving the lower back in the last month was declared by 113 students (64.20%).

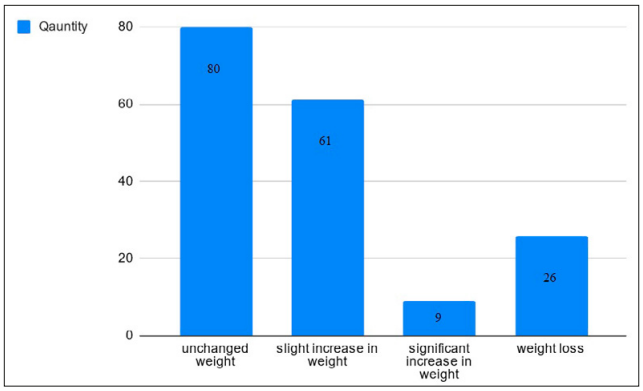

Figure 1. Change in body weight of students during the pandemic period

The Jackson-Moskowitz scale was were used to assess lower back pain. The largest group of respondents were those with intermittent back pain (3.52%), occasional back pain (27.84%), and no lower back pain (25.57%).

The relationship was evaluated between the physical activity of the students surveyed, according to the IPAQ questionnaire and the intensity of lower back pain, as well as the field and year of study. The first analysis examined whether there was a relationship between the intensity of lower back pain measured by the Jackson- Moskowitz scale and the level of physical activity, measured by the metabolic equivalent from the IPAQ questionnaire. Due to the ordinal nature of the variable intensity of lower back pain, a non-parametric Kruskal-Wallis correlation analysis was used. The analysis showed that there was no significant statistical correlation between the variables ($p = 0.8736 > \alpha = 0.05$). This shows that the intensity of lower back pain was not related to the level of physical activity. The next part of the analyses examined whether there was a relationship between the field of study and the level of physical activity expressed by the metabolic equivalent volume (MET). The non-parametric Kruskal-Wallis test was used for the analysis, which showed a statistically significant correlation between the variables ($p = 0.003$). This means that the field of study was related to the level of physical activity. The relationship between

The Jackson-Moskowitz's scale-assessment of pain	Frequency	Percentage
0 - absence of pain	45	25,57
1 - sporadic pain - occurring several times per year, after exertion, not limiting daily functioning	49	27,84
2 - periodic pain - occurring several times per month, after exertion, not affecting daily activity	59	33,52
3 - frequent pain - occurring several times per week, limiting what daily activity	19	10,8
4 - very frequent pain - occurring even daily, limiting activity and requiring medical advice, use of pharmacotherapy, exemptions from from work/university activities	2	1,14
5 - continuous pain - limiting the ability to function completely	2	1,14

Figure 2. The Jackson-Moskowitz's scale
3 – periodic pain – occurring several times per month, after exertion, limiting daily activity

the year of study and the incidence of back pain was also investigated. The Chi-square NW test (highest reliability) was used for the analysis. The result ($p = 0.00347$), with the accepted level of significance ($\alpha = 0.05$) indicates the rejection of the verified null hypothesis, which means that the year of study had a significantly statistical effect on the occurrence of lower back pain.

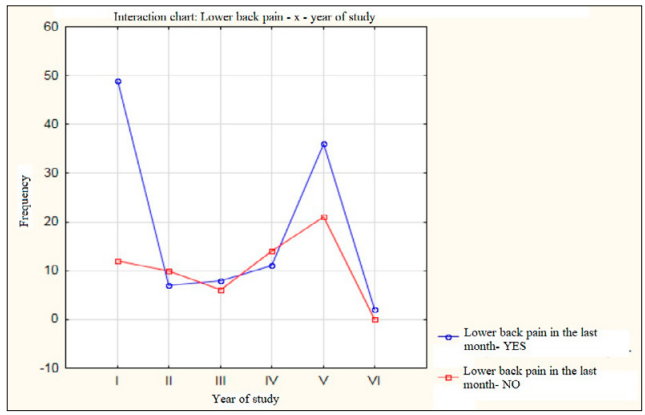

Figure 3. Year of study and frequency of lower back pain

Investigation of the relationship between decreased physical activity and change in body weight was performed using the Chi-square NW (highest reliability) test. The result of $p = 0.00592$, at the accepted level of significance ($\alpha = 0.05$) indicates the rejection of the verified null hypothesis. This means that a reduction in physical activity in the study group resulted in a significantly statistical change in body weight.

DISCUSSION

With the tremendous impact of physical activity on health, more and more researchers are examining how the COVID-19 pandemic contributed to changes in health-seeking behaviour. Although home isolation is an effective way to prevent transmission of the SARS-CoV-2 virus [5], this can be problematic in terms of its impact on the musculoskeletal system, and can cause lower back discomfort [6]. When verifying the level of physical activity, a frequently recommended questionnaire is the International Physical Activity Questionnaire (IPAQ) which is used extensively in many European countries, and can be used to assess elderly, middle-aged and young people [7].

Many studies indicate that the higher the level of physical activity, the less the lower back pain [8, 9]. The results obtained in the current study are in line with previous studies which reported an increase in time spent sitting, and a decrease in physical activity during the COVID-19 pandemic. According to the literature, the restrictions introduced, triggered by the epidemiological situation, caused an increased risk of inactivity, with possible health consequences [10]. The results of the current study indicate that as many as 64.20% of the students experienced lower back pain in the month prior to the survey. A study by Toprak Celenay et al. indicated that during the three-month blockade caused by COVID-19, those who worked and studied remotely had more musculoskeletal complaints of lower back pain than those who worked and studied in a traditional stationary mode during the same period [1]. Interestingly, with the overall decrease in the levels of physical activity and an increase in time spent in a sedentary position, in more than 45% of the students surveyed, body weight did not change, and in less than 35% it increased only slightly. Correlation analysis showed an association between a decrease in the level of physical activity in the study group of students and a change in body weight. These results are in contrast to the study by Gallè et al., in which no significant changes were noted in the BMI of the respondents, despite an increase in sedentary behaviour and a decrease in physical activity. However, it should be taken into account that Gallè et al. noted that most of the subjects in their study declared that they had not changed or improved their diet. Therefore, it is possible that the negative effect of inactivity on BMI may have been offset by healthier eating habits [11].

Limitations of the study. First, the lack of objective measurements of physical activity, resulting from the fact that participants were asked to self-report their level of physical activity and sitting, which could have resulted in reporting error. Second, the sample consisted predominantly of students of physiotherapy and physical education, and students from other faculties were a less representative group; therefore, the results cannot be generalized to a larger student population.

It should be noted that studies conducted during the period of the COVID-19 pandemic may also differ due to the dynamics of change during that period, as well as the stage of introduction and lifting of sanitary restrictions. However, regardless of its limitations, this study contributes to the characterization of the side-effects of the severe restrictions on human behaviour. The information gathered in this study underscores the need for the promotion of physical activity aimed at the student population.

CONCLUSIONS

Although the COVID-19 pandemic resulted in an increase in the amount of time spent sitting and a decrease in physical activity among students, the reduction in levels of physical activity did not affect the level of pain involving the lower back in the study group. Lower back pain was more common among first- and final-year students than among second- and fourth-year students. Overweight and obese students did not have more frequent lower back pain than those of optimal weight and underweight.

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