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Research article

LUMBOSACRAL PAIN AMONG STUDENTS AT THE FACULTY OF SPORTS AND PHYSICAL EDUCATION

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Abstract. *The aim of the research was to determine the presence, prevalence, and causes of lumbosacral pain (LP), as well as the connection between lifestyle habits and the occurrence of LB among students at the Faculty of Sports and Physical Education (FSPE) at the University of Belgrade. The sample consisted of 187 third- and fourth-year students. Data collection regarding personal characteristics, lifestyle habits, and characteristics of LP was conducted using a non-standardized questionnaire. The data were presented in terms of response frequency and percentage representation of each category. The significance of the differences between response categories, as well as differences between genders, was tested using the t-test for independent samples for parametric variables, while the chi-square test was used for non-parametric variables. The results show that 48.1% of all the respondents had experienced pain at least once in their lifetime; 20.3% reported pain once in the past 12 months; 13.5% experienced pain 2-4 times in the past 12 months; and 18.1% had LP more than 4 times during the past year. Reported LB most commonly ceased within a few hours to one day after onset (66.6%), and rarely lasted longer than 7 days (6.2%). The conclusion is that the prevalence of LP among FSPE students is high, but the pain itself most often lasted briefly and did not significantly impair their daily activities. To reduce the prevalence of LP in the future, greater attention should be directed towards developing and implementing various preventive measures that may include specific forms of exercise and corrected sitting postures.*

Key words: *lifestyle habits, sitting, physical activity, prevention*

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1. INTRODUCTION

The prevalence of musculoskeletal disorders, particularly spinal diseases accompanied by lumbosacral pain (LP), has shown an increasing trend over the past few decades, despite technological advancements that have contributed to a reduction in the physical workload and the emergence of a sedentary lifestyle characterized by insufficient movement (LeBlanc & LeBlanc, 2010). Insufficient movement (hypokinesia) is one of the leading contributors to the impairment of the morpho-functional integrity of the spine, alongside obesity and osteoporosis (Bhupathiraju & Hu, 2016; Rodulfo, 2019).

LP occurs in the lower back and extends from the height of the 12^{th} rib to the gluteal folds (Hartvigsen et al., 2018). Various studies have shown that the leading risk factors for the onset of LP include poor lifestyle habits (obesity, smoking, lack of physical exercise), degenerative changes in the spine due to aging, and the presence of comorbidities accompanied by physiological disorders of the locomotor system (acute spinal trauma, congenital spinal deformities, osteoporosis, diabetes, malignant diseases) (Manchikanti et al., 2014; Hartvigsen et al., 2018). The rapid increase in the incidence of LP in recent decades is present regardless of gender, age, and social status (Hartvigsen et al., 2018; Hoy et al., 2012). Data from various studies indicate that the average prevalence rate of LB among adolescents is as high as 40% (Garvick et al., 2019; Altaf et al., 2014). It is estimated that LP is the second most common reason for visiting a doctor (only respiratory infections are more common), and more than 80% of the population experiences back problems at least once in their lifetime (American Chiropractic Association, 2020). Furthermore, LP is a leading cause of work incapacity worldwide (Hoy et al., 2012).

Previous research has shown that LP is particularly prevalent among individuals between their third and sixth decades of life but is increasingly occurring among those in their twenties (Ganesan et al., 2017; Garvick et al., 2019; Hoy et al., 2010). Students represent a significant portion of the working-age population who are exposed to prolonged sitting due to their academic obligations. Organized physical exercise at universities often does not exist or is insufficiently practiced, contributing to reduced mobility and postural disturbances. Due to such a lifestyle, students fall into a particularly vulnerable category prone to developing LB. Recent studies confirm that 70% to 80% of them have experienced LP at least once in their lives, which occasionally recurs (AlShayhan et al., 2018; Tavares et al., 2019; Vujić et al., 2018). Most students reported that LP disrupts their daily functioning (sitting, standing, sleeping, physical activity) and negatively affects their mental state (Kedra, 2016; Tavares et al., 2019). Additionally, LP has caused significantly higher monthly consumption of analgesics among students (Amelot et al., 2019).

In our region, there are no major epidemiological studies addressing the prevalence of LP among students. The only published research on this topic was conducted by researchers from the Faculty of Medicine at the University of Belgrade (Vujić et al., 2018). The results showed that 75.8% of medical students had experienced LP at some point in their lives; 59.5% had it in the last 12 months; 17.2% were suffering from LP at the time they were surveyed; and 12.4% reported chronic LP. The prevalence of LP was somewhat higher among women than men. The most commonly cited triggers with strong and extremely strong effects on LB included improper body posture, lack of exercise, and fatigue. Additionally, reported pain triggers included mental stress during exams, sitting at university, poor sleeping mattresses, house cleaning, intense sports activities, and weather conditions. Students indicated that LB affects their condition and daily functioning most significantly regarding

sleep (14.6%) and walking (12.0%). Most students expressed concern about LP and reported feeling angry about it.

Previous research has mainly focused on students from medical fields (future doctors, dentists, nurses, physiotherapists), who typically spend many hours studying or are forced during practical classes to adopt positions that exacerbate LP (e.g., dental students) (Alsalameh et al., 2019; Amelot, 2018; Vujic et al., 2018. 2021). In contrast to them, students at the Faculty of Sports and Physical Education (FSPE), due to the specifics of their curriculum, spend fewer hours sitting in lectures while engaging in diverse physical activities during practical classes (ball sports, athletics, gymnastics, swimming, etc.). There are no published works on this topic concerning students active in the fields of sports and physical education in the available literature; hence this research was conducted.

The aim of this study was to determine the presence, prevalence, possible causes of LP, as well as the possible association of lifestyle habits with the occurrence of LP among the students of the Faculty of Social Sciences of the University of Belgrade.

2. THE METHOD

The research was conducted at the Faculty of Social Sciences of the University of Belgrade during the winter semester of the 2020/2021 academic year.

2.1. Subject sample

The number of respondents was determined based on a review of previous research. The study primarily included 191 third- and fourth-year undergraduate students, and after applying the elimination criteria (presence of LB as a consequence of the presence of a chronic disease, congenital spinal deformity, recent surgery, acute disease or injury), 187 students (63 women and 124 men) were examined.

Due to the above elimination criteria, 4 students were excluded from the study −one student due to the presence of a chronic disease and three students due to the presence of an acute disease or recent surgery. In this way, the possibility of respondents with LB not directly related to their habits being included in the interpretation was eliminated.

2.2. Instruments

The primary tool used for data collection was a non-standardized questionnaire. At the beginning of the questionnaire, criteria for exclusion from the study were outlined, along with a visual representation of the lumbosacral region of the spine to aid in understanding the body part in question. The questionnaire consists of four sections and contains a total of 25 questions related to:

1. Characteristics of the respondents (7 questions regarding gender, age, height, weight, faculty, year of study, and average grade);
2. Habits of the respondents (smoking, alcohol consumption, drug use, medication, coffee consumption, and mobile phone usage);
3. Physical activity of the respondents (extent of engagement in sports and recreation, as well as the number of hours spent in a seated position);
4. LP of the respondents (frequency, duration and psychophysical impact of LP).

2.3. Statistical analysis

Statistical data processing was conducted using the SPSS statistical package (SPSS 21.0; Chicago, IL) and Microsoft Office Excel 2010 (Microsoft Corporation, Redmond, WA, USA). For all parametric variables, the mean, standard deviation (SD), minimum, and maximum values were calculated. Data about habits, presence, and frequency of low back pain (LBP) were presented as response frequencies and the percentage representation of each category, both in the sub-samples of men and women and in the overall sample. The significance of differences between men and women was tested using the t-test for independent samples for parametric variables, while the chi-square test was used for non-parametric variables. All "p" values less than 0.05 were considered significant.

3. RESULTS

Table 1 presents some of the habits of students from the FSPE. The majority of respondents (88%) identified as non-smokers and reported that they have never used drugs (81.5%). Alcohol consumption was significantly higher among men than women, with most of them consuming alcohol 1-4 times per month. Additionally, 80% of the respondents indicated that excessive use of mobile phones affects the quality of their lives to a greater or lesser extent.

Table 1 Lifestyle habits of students − smoking, alcohol, drugs, and mobile phone use

Habits	Answers	Total sample		Men		Women		*p*
		number	%	number	%	number	%	
Smoking	smoker, ex-smoker	19	12.0	16	15.0	3	5.0	0.075
	non-smoker	143	88.0	91	85.0	52	95.0	
Alcohol	never	36	22.2	16	15.0	20	36.4	**0.002**
	once a month	62	38.3	39	36.4	23	41.8	
	2-4 times a month	52	32.1	42	39.3	10	18.2	
	2 or more times a week	12	7.4	10	9.3	2	3.6	
Drugs	never	132	81.5	83	77.6	49	89.1	0.074
	used/ still use	30	18.5	24	22.4	6	10.9	
Mobile phone	no	36	22.2	25	23.4	11	20.0	0.551
	affects to a lesser extent	76	46.9	52	48.6	24	43.6	
	affects to a greater extent	50	30.9	30	28.0	20	36.4	

p - the value represents the level of significance of gender differences.

The results show that all the students are physically active to a lesser or greater extent (table 2). Men engage in sports significantly more than women (44.9% compared to 32.7%), while, conversely, women participate more in recreational activities (65.5% compared to 46.7%). A small number of respondents (4.3%) reported spending more than 5 hours a day in a seated position. Overall, 88.2% of them expressed the opinion that exercise should be introduced as an elective or mandatory form of instruction at the university level.

Table 2 Lifestyle habits of students- physical activity

Habits	Answers	Total sample		Men		Women		*p*
		number	%	number	%	number	%	
Physical activity	yes, I am an active athlete	66	40.7	48	44.9	18	32.7	
	yes, I do regular recreation	86	53.1	50	46.7	36	65.5	**0.043**
	occasionally with friends or walking	10	6.2	9	8.4	1	1.8	
Volume of physical activity	daily	93	57.4	58	54.2	35	63.6	
	2-3 times a week	62	38.3	42	39.3	20	36.4	0.120
	1-4 times a month	7	4.3	7	6.5	0	0.0	
Sitting	up to 3 hours	88	54.7	58	54.7	30	54.5	
	up to 5 hours	66	41.0	43	40.6	23	41.8	0.946
	more than 5 hours	7	4.3	5	4.7	2	3.6	
Exercise at the University	yes, as an elective form of teaching	84	52.2	58	54.2	26	48.1	
	yes, as a mandatory form of teaching	58	36.0	35	32.7	23	42.6	0.434
	no	19	11.8	14	13.1	5	9.3	

p - the value represents the level of significance of gender differences.

In table 3, the results of the research related to the frequency, duration of LP, and the use of medication for its relief are presented. The data obtained show that 48.1% of all respondents have experienced pain at least once in their lifetime; 20.3% of the respondents felt pain once in the past 12 months; 13.5% experienced pain 2-4 times in the past 12 months; and 18.1% reported experiencing pain more than 4 times during the past 12 months. LP among the respondents most commonly lasted briefly, subsiding within a few hours to one day from its onset (66.6%), while it rarely lasted longer than 7 days (6.2%). FSPE students used pain relief medication (analgesics/non-steroidal anti-inflammatory drugs) in a very small percentage (8.6%) during episodes of LP. When observed by gender, a statistically significant higher number of women (18.2%) resorted to medication compared to men (3.7%).

Table 3 Frequency, duration of LB and use of medication

	Answers	Men		Women		Total sample		*p*
		number	%	number	%	number	%	
Frequency of LP	at least once in your life	49	45.8	29	52.7	78	48.1	0.473
	once in the past 12 months	25	23.4	8	14.5	33	19.7	
	2-4 times in the past 12 months	12	11.2	9	16.4	22	13.5	
	more than 4 times in the past 12 months	21	19.6	9	16.4	29	18.1	
Duration of LP	short (instantaneous to a few hours)	52	48.6	24	43.6	76	46.9	0.552
	one day	21	19.6	11	20.0	32	19.7	
	2-7 days	26	24.3	18	32.7	44	27.2	
	more than 7 days	8	7.5	2	3.6	10	6.2	
Medication use	never	103	96.3	45	81.8	148	92.6	**0.002**
	occasionally or often	4	3.7	10	18.2	14	8.6	

p - the value represents the level of significance of gender differences.

In table 4, the most common causes of LP according to the surveyed students are presented. The factors that they believe contribute the most to the occurrence of LP are: lack of movement (82.7%), poor posture (87.1%), obesity (74.7%), prolonged sitting (81.4%), and uncomfortable benches at the faculty (48.7%).

Table 4 Causes of LP

Causes of LP	Answers	Total sample		Men		Women		*p*
		number	%	number	%	number	%	
Lack of movement	no or small impact	15	9.6	8	7.8	7	13.2	0.550
	medium impact	12	7.7	8	7.8	4	7.5	
	large impact	129	82.7	87	84.5	42	79.2	
Weather conditions	no or small impact	116	74.8	80	77.7	36	69.2	0.127
	medium impact	26	16.8	13	12.6	13	25.0	
	large impact	13	8.4	10	9.7	3	5.8	
Bad posture	no or small impact	6	3.9	3	2.9	3	5.8	0.642
	medium impact	14	9.0	10	9.7	4	7.7	
	large impact	135	87.1	90	87.4	45	86.5	
Obesity	no or small impact	14	9.1	7	6.9	7	13.5	0.265
	medium impact	25	19.2	15	14.7	10	19.2	
	large impact	115	74.7	80	78.4	35	67.3	
Uncomfortable benches at the faculty	no or small impact	28	18.2	18	17.6	10	19.2	0.154
	medium impact	51	33.1	39	38.2	12	23.1	
	large impact	75	48.7	45	44.1	30	57.7	
Stress before exams	no or small impact	89	57.4	63	61.2	26	50.0	**0.028**
	medium impact	29	18.7	22	21.4	7	13.5	
	large impact	37	23.9	18	17.5	19	36.5	
Sitting	no or small impact	6	3.8	5	4.9	1	1.9	0.212
	medium impact	23	14.7	18	17.6	5	9.3	
	large impact	127	81.4	79	77.5	48	88.9	
Intense physical activity	no or small impact	55	35.0	37	36.3	18	32.7	0.746
	medium impact	51	32.5	31	30.4	20	36.4	
	large impact	51	32.5	34	33.3	17	30.9	

p - the value represents the level of significance of gender differences.

4. DISSCUSION

The aim of this research was to determine the prevalence of LP and the possible causes leading to it among students at the FSPE. The findings suggest that LP is a common occurrence among the FSPE student population. Nevertheless, the symptoms are predominantly transient in nature and do not appear to cause significant disruptions in the students' daily activities or overall functioning, which is most likely due to less time spent in a seated position and a higher level of physical activity.

The lifestyle habits of FSPE students differ significantly from those of students from other faculties. The results indicate that students at the FSPE, University of Belgrade, consume significantly fewer cigarettes compared to other Belgrade University students, supported by recent research showing that more than 60% of students regularly or occasionally consume cigarettes (Obradović, 2020). Interestingly, compared to the University of Belgrade average

(28.3%), a higher percentage of FSPE students (38.3%) consume alcohol at least once a month compared to students from other faculties (37.4%) (Obradović, 2020). These results are consistent with data from a study conducted in 2010 (Popović, 2010).

Compared to the same results from 2010 obtained during research at the University of Belgrade, there are significantly more active athletes among FSPE students (40.7% versus 15.5%) and those who regularly engage in recreation (53.1% versus 30.6%) compared to the average at the University of Belgrade. This large difference can be explained by the fact that FSPE studies include students who are professionally oriented towards physical activity. Additionally, all of them have practical learning and skill enhancement in various sports disciplines as part of their regular and mandatory curriculum (gymnastics, athletics, swimming, wrestling, skiing, dance, ball games, etc.), unlike respondents from other faculties at the University of Belgrade where physical activity is not part of the educational process (Popović, 2010).

The results show that LP is surprisingly present among FSPE students. As many as 162 students (107 men and 55 women) reported experiencing LP at least once or more during their lifetime, representing 86.6% of the total sample (table 3). No significant differences were found in the frequency and duration of LP between men and women. These results are not consistent with previous studies, suggesting that LP occurs somewhat more frequently in women (Vujicic et al., 2018; Meucci et al., 2015; Tavares et al., 2018; Crawford et al., 2018). In a study by Vujicic et al. (2018), conducted on a sample of medical students at the University of Belgrade, these differences were found among respondents who experienced LP at least once in their lifetime and once in the past 12 months.

The respondents in this research identified lack of movement, poor posture, obesity, prolonged sitting, and uncomfortable benches at the faculty as main causes of LP. These factors were also noted by a large majority of respondents in other studies (AlShayhan & Saadeddin, 2018; Kedra et al., 2016; Tavares et al., 2019; Amelot et al., 2019). Results from a study involving students from India contradict our respondents' views, indicating that strenuous exercise and stress are among the main causes of LP (Ganesan et al., 2017). Some authors argue that young athletes are prone to LP due to regular intense physical activities, which our respondents believe is not the case for FSPE students (Patel & Kinsella, 2017).

Observing the overall sample, no significant correlation was found between the frequency of LP occurrence and most student habits, except for sitting. The obtained results showed that, unlike other student habits, the length of time spent sitting had a significant impact on the occurrence of LP. Statistical indicators in this case are borderline significant, but based on the obtained results it is clear that students who spend less time sitting experience LP less frequently.

Regarding the subsample of male respondents, the results showed that a statistically significant higher number of men who sit more than 5 hours daily had LP more often compared to those who sit up to 3 hours daily. Additionally, it was shown that a large percentage of men who exercised daily or 2-3 times a week experienced LP less frequently than those who exercised 1-4 times a month. These data confirm previous research findings indicating that prolonged sitting is one of the main risk factors for developing LP (Vujicic et al., 2018; Crawford et al., 2018; AlShayhan & Saadeddin, 2018).

Results for the female respondents showed that a statistically significant percentage of women who consume coffee daily (41.2%) experienced LP more than 4 times over the past 12 months compared to those who do not consume coffee (5.6%). Given that no

studies were found discussing the correlation between coffee consumption and LP, it is likely related to the harmful effects associated with sitting while drinking coffee. Supporting this is the fact that 88.9% of the female respondents believe that sitting significantly impacts the occurrence of LP.

Half of the respondents who sit more than 5 hours daily reported that their LP lasted briefly (currently up to several hours), while for the other half it did not last longer than 7 days. When comparing lifestyle habits and duration of LP, it was shown that respondents who regularly engage in physical activities generally feel short-term LP.

Our study has several important strengths. To our knowledge, this is the first study to investigate the presence of LP among FSPE students. The results indicate that a high prevalence of LP can be observed within this specific population. The study focused on a clearly defined and highly relevant group, providing valuable insights into the occurrence of LP among physically active young adults. By comparing our findings with the existing literature, the study contributes to a more comprehensive understanding of musculoskeletal health across different student populations. A potential weakness of this research is the use of a non-standardized questionnaire, which may complicate result interpretation and comparison with other studies. Later insights into results led to the conclusion that for an adequate number of categories within each question, a larger number of respondents would be needed to meet minimum expected frequencies within each offered answer. Additionally, the sample predominantly included male students, making results related to females less representative. Despite its limitations, this research holds significant practical and clinical value in the prevention of LB and the improvement of health among the student population.

5. CONCLUSION

Students from the FSPE, like students from other faculties, are not exempt from experiencing LP. The results obtained indicate that excessive sitting has a significant impact on the occurrence of this spinal dysfunction symptom, while physical activity can play a crucial role in preventing the onset of this pain. Sitting for five or more hours a day can have negative effects, whereas engaging in sports and recreation more than three times a week may have a potentially beneficial effect. Despite involving a relatively small number of respondents who were not evenly represented by gender, our study demonstrated that to reduce the prevalence of LP, greater attention should be directed towards the development and implementation of preventive measures. These measures should include the reintroduction of organized physical activity at the university level. The majority of our respondents agreed that such measures would best be implemented through elective physical education classes.

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LUMBOSAKRALNI BOL KOD STUDENATA FAKULTETA SPORTA I FIZIČKOG VASPITANJA

Cilj istraživanja je bio da se utvrde prisustvo, prevalencija, uzroci lumbosakralnog bola (LB), kao i povezanost životnih navika sa pojavom LB kod studenata Fakulteta sporta i fizičkog vaspitanja (FSFV-a) Univerziteta u Beogradu. Uzorak ispitanika je činilo 187 studenata treće i četvrte godine akademskih studija. Prikupljanje podataka o ličnim karakteristikama, životnim navikama i karakteristikama LB je izvršeno pomoću nestandardizovanog upitnika. Podaci su predstavljeni frekvencijom odgovora i procentualnom zastupljenošću svake kategorije. Značajnost razlike između kategorija odgovora, kao i razlike između polova su testirane t-testom za nezavisne uzorke kod parametrijske varijable, dok je kod neparametrijskih korišćen Hi-kvadrat test (chi-

square test). Rezultati pokazuju da je 48,1% svih ispitanika osetilo bol barem jedanput u životu, 20,3% ispitanika je bol osetilo jednom u proteklih 12 meseci, 13,5% ispitanika 2-4 puta u proteklih 12 meseci. a 18,1% ispitanika je imalo LB više od 4 puta tokom proteklih 12 meseci. Prijavljeni LB je najčešće prestajao nakon nekoliko sati do jednog dana od momenta javljanja (66,6%), a retko je trajao duže od 7 dana (6,2%). Zaključak je da je prevalencija LB kod studenata FSFV-a na visokom nivou, ali je sam bol najčešće trajao kratko i nije u većoj meri ugrožavao njihove svakodnevne aktivnosti. U cilju smanjenja prevalencije LB, u budućnosti bi veću pažnju trebalo usmeriti na razvoj i primenu različitih preventivnih mera koje mogu uključivati primenu specifičnih oblika vežbanja i korigovanog načina sedenja.

Ključne reči: *životne navike, sedenje, fizička aktivnost, prevencija*