

PROFESSIONAL ARTICLES

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Professional article
Stručni članak
 UDK 616.71/.74:616.8-009.7]-057.875
<https://doi.org/10.2298/MPNS2204109B>

DIFFERENCES IN THE PREVALENCE OF MUSCULOSKELETAL PAIN BETWEEN HEALTH CARE STUDENTS AND STUDENTS OF SPORTS AND PHYSICAL EDUCATION

RAZLIKE U PREVALENCIJI MIŠIČNO-SKELETNOG BOLA IZMEĐU STUDENATA ZDRAVSTVENE NEGE I STUDENATA SPORTA I FIZIČKOG VASPITANJA

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Summary

Introduction. Musculoskeletal pain is one of the most common types of pain affecting muscles, bones, joints, ligaments and tendons. The aim of this study was to determine the differences in the prevalence of musculoskeletal pain between students of sports and physical education and health care students. **Material and Methods.** The cross-sectional study included a total of 50 students, of whom 25 (50%) were students of sports and physical education, and 25 (50%) were students of health care. Data on the musculoskeletal system of students were collected through a questionnaire for the analysis of musculoskeletal symptoms. **Results.** The results showed that the neck and upper back pain was not negligible (14 respondents, 28%) as well as the lower back pain (27, 54%). Based on the Chi-square test, it was concluded that low back pain was significantly more common in students of health care ($\chi^2 = 3.945$; $p = 0.047 < 0.05$) than in students of sports and physical education. Also, neck pain was significantly more common in health care students ($\chi^2 = 6.349$; $p = 0.012 < 0.05$). **Conclusion.** Based on the obtained results, it can be concluded that students mostly presented with low back pain, followed by the neck and upper back pain. Engaging in proper exercises on weekly basis and excess weight reduction can prevent low back pain.

Key words: Musculoskeletal Pain; Prevalence; Students; Neck Pain; Back Pain; Low Back Pain; Surveys and Questionnaires

Introduction

Musculoskeletal pain is one of the most common types of pain that affects muscles, bones, joints, ligaments and tendons, and it can be acute or chronic. Acute musculoskeletal pain may be strong in intensity, but it is usually short-lived and most often caused by fractures, sprains, dislocations and infec-

Sažetak

Uvod. Mišićno-skeletni bol je jedan od najčešćih tipova bola koji zahvata mišiće, kosti, zglobove, ligamente i tetive. Cilj ovog rada bio je utvrđivanje razlike u prevalenciji mišićno-skeletnog bola između studenata Sporta i fizičkog vaspitanja i studenata Zdravstvene nege. **Materijal i metode.** Studija preseka obuhvatila je uzorak od ukupno 50 studenata, od kojih je bilo 25 (50%) studenata Sporta i fizičkog vaspitanja, a 25 (50%) studenata Zdravstvene nege. Podaci o stanju mišićno-skeletnog sistema studenata prikupljeni su upitnikom za analizu mišićno-skeletnih simptoma. **Rezultati.** Rezultati su pokazali da prisustvo bola u vratu i gornjem delu leđa nije bilo zanemarljivo (14 ispitanika, što čini njih 28%), ali i u donjem delu leđa (27, što čini 54% ispitanika). Na osnovu Hi-kvadrat testa zaključeno je da je bol u donjem delu leđa bio značajno više zastupljen kod studenata Zdravstvene nege ($\chi^2 = 3.945$; $p = 0.047 < 0.05$), nego kod studenata Sporta i fizičkog vaspitanja. Takođe, i bol u vratu je bio značajno češći kod studenata Zdravstvene nege ($\chi^2 = 6.349$; $p = 0.012 < 0.05$). **Zaključak.** Na osnovu dobijenih rezultata može se zaključiti da je među studentima najviše bio prisutan bol u donjem delu leđa, zatim u vratu i gornjem delu leđa. Pravilno vežbanje svake nedelje i smanjenje prekomerne težine može sprečiti bol u donjem delu leđa.

Ključne reči: muskuloskeletni bol; prevalenca; studenti; bol u vratu; bol u leđima; lumbalni bol; ankete i upitnici

tions. In contrast, chronic musculoskeletal pain is persistent over an extended period of time and is probably related to other factors [1].

Low back pain has become a serious problem, since it has a high incidence in the working population, but also in adolescents and children [2]. The prevalence of low back pain in children is similar to that in adult population [3]. A longitudinal study of 12- to 15-year-

olds showed that the annual incidence of musculoskeletal pain in the spine was 21.5% [4]. Risk factors for the development of low back pain in students are numerous, such as gender, height and weight, reduced muscle flexibility and mobility, hypermobility, obesity, psychosocial factors, participation in competitive sports, weight, type and manner of carrying a backpack, bad posture habits, sedentary lifestyle that includes spending a lot of time in front of a TV and computer, as well as low levels of physical activities [5, 6].

Apart from low back pain, it was found that neck and shoulder pain are the most common [7] and pain in the neck, shoulders and arms may also affect the students' quality of life [8]. It has been established that female students present with significantly more pain in the neck, shoulders, wrists, hands and upper and lower back compared to male students [9].

Health care students are generally less physically active than students in other fields, such as sports and physical education, due to the relatively more demanding curriculum, which is associated with the sedentary behavior. Thus, the increased incidence of musculoskeletal pain in these students can be explained in this way, because students of sports and physical education are mostly more physically active [10].

Having all this in mind, the main aim of this paper was to determine the differences in the prevalence of musculoskeletal pain between students of sports and physical education and students of health care.

Material and Methods

This research was conducted as a cross-sectional study from November 1 to 15, 2021 in Serbia. The sample included 50 students, of whom 25 were students of sports and physical education and 25 were students of health care at the State University in Novi Pazar. In this study, the standardized Nordic questionnaire for the analysis of musculoskeletal symptoms [11] was used to collect data on the prevalence of musculoskeletal symptoms in students. In addition to this questionnaire, the participants were asked several questions related to: gender, age, duration and fre-

quency of physical activities, body position in which they spend most of the day, the existence of musculoskeletal pain and the history of these problems.

The objectives of the study were explained to potential participants at the very beginning of the research. Participation in the study was voluntary and with informed consent, and confidentiality and anonymity of the data obtained was guaranteed. All data were protected and were available only to the research team.

The research was approved by the Institutional Ethics Committee of the State University of Novi Pazar. The procedures of this study were in line with the provisions of the Declaration of Helsinki on Medical Research Involving Human Subjects [12].

A special database was created, and the collected data were processed using the statistical software IBM SPSS statistics, version 25 (SPSS Inc., Chicago, IL, USA). The statistical data processing included the basic measures of central tendency and variability of descriptive statistics, frequency analysis to show the participation of certain modalities (groups or characteristics) of a variable in relation to the total sample size, Chi-square independence test to examine the significance of the representation of a particular characteristic in groups of respondents that are of importance. In addition, the Shapiro-Wilk test was used to analyze the normality of distribution of variables of interest, and the post-hoc tests. The p value is a number describing how likely it is that our data would have occurred by random chance. For $p < 0.05$ it is concluded that there is a significant difference or deviation from the expected theoretical model.

Results

The gender distribution of respondents is shown in **Table 1**, while the results of descriptive statistics for the students' body weight and body height are shown in **Table 2**.

Table 3 shows the incidence of pain in a particular part of the body in the last 12 months.

The results of questionnaire showed that 54% of all respondents presented with low back pain. We

Table 1. Gender distribution of respondents

Tabela 1. Polna struktura ispitanika

	No./Br.	%
Male/Muški	19	38.0
Female/Ženski	31	62.0
Total/Ukupno	50	100.0

Table 2. Descriptive statistics for students' body weight and body height

Tabela 2. Rezultati deskriptivne statistike za telesnu masu i visinu studenata

	Mean Aritmetička sredina	Standard deviation Standardna devijacija	Minimum Minimum	Maximum Maksimum
BW/TM	69.42	10.742	48	92
BH/TV	174.24	9.942	152	199

Legend/Legenda: BW/TM – Body weight/Telesna masa (kg), BH/TV – Body height/Telesna visina (cm)

Table 3. The incidence of pain in a particular part of the body**Tabela 3.** Učestalost prisustva bola u određenom delu tela

	Pain/Bol	No./Br	%
Neck Vrat	No/Ne	36	72
	Yes/Da	14	28
	Total/Ukupno	50	100
Upper back Gornji deo leđa	No/Ne	36	72
	Yes/Da	14	28
	Total/Ukupno	50	100
Lower back Donji deo leđa	No/Ne	23	46
	Yes/Da	27	54
	Total/Ukupno	50	100

Table 4. The pain prevalence in different body regions and statistical difference between health care students and students of sports and physical education**Tabela 4.** Zastupljenost bola u različitim delovima tela i statistička razlika između studenata Zdravstvene nege i studenata Sporta i fizičkog vaspitanja

	With pain/Sa bolom		Without pain/Bez bola		χ^2	p
	No./Br.	%	No./Br.	%		
Upper back/Gornji deo leđa	14	28	36	72	0.397	0.529
Knee joints/Zglobovi kolena	10	20	40	80	2.000	0.157
Ankles/Skočni zglobovi	10	20	40	80	0.000	1.000
Shoulders/Ramena	10	20	40	80	2.000	0.157
Wrists/Ručni zglobovi	9	18	41	82	3.388	0.066
Hips/Kukovi	5	10	45	90	0.222	0.637
Elbows/Laktovi	1	2	49	98	1.020	0.312

Legend/Legenda: χ^2 – Chi-square/Hi-kvadrat; p – Statistical significance/Nivo statističke značajnosti

investigated if gender distribution and the study program affected the incidence of low back pain.

It should be noted that pain in the neck and upper back was not negligible (14 respondents, 28%), followed by pain in the knee joints and ankles (20%), in the shoulders (20% had pain in at least one shoulder), and in the wrists (18% had pain in at least one wrist). Pain in the hips (10%) and elbows (2%) was less common. **Table 4** shows the pain prevalence in different body regions.

Lower back pain

When it comes to the curricula, it was found that in the last 12 months low back pain was more prevalent among health care students (17, 68% of surveyed students), while among students of sports and physical education this problem was less reported (15, 60%). Based on the Chi-square test, it was concluded that low back pain was significantly more prevalent in health care students in the last 12 months ($\chi^2 = 3.945$; $p = 0.047 < 0.05$).

Table 5 shows the difference in the prevalence of low back pain between health care students and students of sports and physical education.

There were more male respondents who did not report pain in the low back (12, 63.2%) while most respondents with low back pain were female (20, 64.5%). The Chi-square test showed that the prevalence of low back pain in the last 12 months did not differ significantly between male and female students ($\chi^2 = 3.632$; $p = 0.057 > 0.05$).

lence of low back pain in the last 12 months did not differ significantly between male and female students ($\chi^2 = 3.632$; $p = 0.057 > 0.05$).

All students (12) who spent most of the day standing claimed that they did not have low back pain. A total of 75% of students who spent their day mostly in a sitting position reported low back pain, while in students who spent their day in variable positions, the difference was not significant, i.e. 15 of them (53.6%) reported low back pain and 13 (46.4%) claimed that they did not have low back pain. The prevalence of low back pain in students who spent most or great part of the day in a sitting position was statistically significant ($\chi^2 = 9.886$; $p = 0.007 < 0.05$).

In the last 7 days, low back pain was reported by fewer students. A total of 15 (30%) students claimed to have felt pain. It turned out that the data did not give reliable results depending on other variables, so for that reason we considered them to be a consequence of chance or individual characteristics, as well as the habits of the respondents.

Neck pain

Among other parts of the body, significant differences in the prevalence of neck pain were found for some variables. Namely, 14 (56%) students of health care and 22 (88%) students of sports and physical education reported no neck pain. Although in both cur-

Table 5. Differences in the prevalence of low back pain in health care students and students of sports and physical education**Tabela 5.** Razlika u prevalenciji bola u donjem delu leđa između studenata Zdravstvene nege i studenata Sporta i fizičkog vaspitanja

	Pain/Bol	Low back/Donji deo leđa	
		No./Br.	%
Health care Zdravstvena nega	No/Ne	8	32
	Yes/Da	17	68
	Total/Ukupno	25	100
Sports and physical education Sport i fizičko vaspitanje	No/Ne	15	60
	Yes/Da	10	40
	Total/Ukupno	25	100

Table 6. Differences in the prevalence of neck pain in health care students and students of sports and physical education**Tabela 6.** Razlika u prevalenciji bola u vratu između studenata Zdravstvene nege i studenata Sporta i fizičkog vaspitanja

	Pain/Bol	Neck/Vrat	
		No./Br.	%
Health care Zdravstvena nega	No/Ne	14	56
	Yes/Da	11	44
	Total/Ukupno	25	100
Sports and physical education Sport i fizičko vaspitanje	No/Ne	22	88
	Yes/Da	3	12
	Total/Ukupno	25	100

ricula more students had no neck pain, the number was statistically significantly lower among students of sports and physical education. Neck pain was significantly more common in health care students ($\chi^2 = 6.349$; $p = 0.012 < 0.05$). Differences in the prevalence of neck pain between health care students and students of sports and physical education are shown in **Table 6**.

Also, 17 (89.5%) male students and 19 (61.3%) female students claimed that they had no neck pain. The prevalence of neck problems in the last 12 months was significantly lower among male students ($\chi^2 = 4.641$; $p = 0.031 < 0.05$). It has been proven that neck pain does not depend on the position in which the student spends most of the day ($\chi^2 = 0.471$; $p = 0.790 > 0.05$).

In the last 7 days, the prevalence of neck pain has decreased so much that it could not be associated with any other variables, i.e. it was considered to be a consequence of individual characteristics and habits of the subjects.

In regard to other parts of the body, the prevalence of problems was insignificant (20% or less) to draw reliable conclusions and they were considered to be a consequence of chance, individual characteristics and habits of individual respondents. This is especially pronounced due to a small number of respondents.

Discussion

The study suggests that musculoskeletal pain is common in the educational environment and that it is a significant risk factor affecting health and qual-

ity of life of students, requiring special health services, and thus significantly burdening the health system. An additional concern is the fact that back pain during adolescence may have health consequences in later adulthood. Our study examined differences in the prevalence of musculoskeletal pain between students of sports and physical education and students of health care.

A study that investigated the prevalence, pattern, and possible risk factors for musculoskeletal pain over 12 months in a sample of 145 students of occupational therapy and physiotherapy found that the prevalence of musculoskeletal pain among students was 89.7%. The neck pain was most common (66.2%), followed by low back pain (64.4%) [13]. The findings are not in line with the results of our study, because in our sample low back pain was the most common, followed by neck and upper back pain. The duration of daily commutes and participation in regular exercises are significantly related to the prevalence of musculoskeletal pain. Also, in the mentioned study, students who exercised regularly had a 9.47 times lower chance of developing musculoskeletal pain [13]. Our findings show that in the last 12 months, 60% of health care students had problems in the lower back, while among students of sports and physical education this problem was much less present. This can be explained by the fact that students of sports and physical education are generally more physically active [10, 13].

Alshagga et al. [14] studied the prevalence of musculoskeletal pain among Malaysian medical students

and found that 45.7% of respondents had musculoskeletal pain in at least one part of the body during the past seven days and 65.1% of all students during the past year [14]. It is in line with our study in which the prevalence of respondents who experienced low back pain in the last year was 54%, while in the past seven days it was significantly lower, 30% of all students.

Algarni et al. [15] reported that the prevalence of musculoskeletal pain among medical students in Saudi Arabia was also high. They found that 85.3% of all subjects had musculoskeletal pain in at least one part of the body at any given time, 54.4% in the past week, and 81.9% in the past year [15]. These values are significantly higher than those obtained in our study, but also in the study conducted in medical students of the University of Belgrade, where the prevalence of low back pain was 17.2% [16]. This can be related to similar academic curricula at all medical schools in Serbia, and differences in relation to the curricula around the world. In contrast to these national studies, low back pain was less present among Brazilian medical students, with a prevalence of 9.2% [17].

Kompal et al. [18] reported a high prevalence of neck and low back pain (54%) that occurs regularly in medical students in Pakistan, while Hayes et al. [19] and Lorusso et al. [20] concluded that low back pain was more common than shoulder and neck pain. The results of their research are in line with the findings of our study.

Contrary to our findings, Cho et al. [21] concluded that in a sample of high school students, neck and shoulder pain (56%, 45%, respectively) were more common compared to low back pain (37%).

In the literature, studies including student population reported different estimates of the prevalence of musculoskeletal pain, with varying degrees of severity. These variations can be explained by different populations and methodologies used in different studies. A meta-analysis of 25 relevant studies examining risk factors of musculoskeletal pain, with a focus on the prevalence of low back pain among nurses, showed that the prevalence rate of low back pain varied among different studies conducted in Italy, ranging from 33% to 86%. Previous studies also suggest that female gender, physical factors, and psychosocial factors are important risk factors for low back pain [20]. Our study also showed that gender is an important risk factor of musculoskeletal pain, because a significantly higher number of students who had both low back pain and neck pain were female. This

finding is also consistent with the results of research conducted by Wijnhoven, De Vet and Picavet [9].

In addition to physical, some psychological factors, such as depression and psychosomatic symptoms, may also be risk factors of musculoskeletal pain, and are therefore associated with reduced quality of life [22].

Neck and lower back pain are the main sources of morbidity and the main symptoms that patients complain about to their general practitioners in all countries and in all segments of the population [23]. Low back pain is a common occurrence among health care students, with serious consequences for their private life and work. Engaging in proper exercises on weekly basis and excess weight reduction can prevent lower back pain and reduce the use of analgesics. The competent authorities of medical schools should be aware of this health problem and undertake preventive measures, because we assume that short educational support could improve knowledge, attitudes and beliefs of health students on musculoskeletal pain (such as pain in the neck, shoulders and low back). The burden of low back pain is increasing in low- and middle-income countries, such as Serbia, and it negatively affects the health system by increasing health care costs.

Strengths and limitations of the study

To the best of our knowledge, our study was among the first in Serbia to examine differences in the prevalence of different types of musculoskeletal pain in students of health care and students of sports and physical education in Serbia. Although the practical implications of the results of this study can be very important for health interventions that lead to a better quality of life for students, this study has some limitations that should be mentioned. Namely, based on the design of the cross-sectional study, it was not possible to detect cause-and-effect relationships [24]. Also, the use of self-assessment questionnaires can lead to systematic bias in answering. These findings are limited, among other things, due to sample size and non-representative sample.

Conclusion

Based on the obtained results, it can be concluded that students mostly presented with low back pain, followed by the neck and upper back pain. Musculoskeletal pain is very common among healthcare students and is significantly associated with sedentary postures and low levels of physical activities.

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Rad je primljen 8. V 2022.

Recenziran 19. VIII 2022.

Prihvaćen za štampu 19. VIII 2022.

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