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INFLUENCE OF PHYSICAL ACTIVITY AND TIME IN THE SITTING POSITION ON THE CONDITION OF LOW BACK PAIN AMONG UNIVERSITY STUDENTS

INFLUÊNCIA DA ATIVIDADE FÍSICA E DO TEMPO NA POSIÇÃO SENTADA NO QUADRO DE LOMBALGIA EM ESTUDANTES UNIVERSITÁRIOS

INFLUENCIA DE LA ACTIVIDAD FÍSICA Y DEL TIEMPO EN LA POSICIÓN SENTADA EN EL DOLOR DE LA REGIÓN LUMBAR EN ESTUDIANTES UNIVERSITARIOS

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ABSTRACT

Objective: To verify the influence of sedentary behavior and physical activity on the prevalence and situation of low back pain in medical students at a higher education institution. Methods: Cross-sectional study with a quantitative approach, conducted with 220 students. Data were collected between January and February 2021, using the Roland-Morris Disability Questionnaire. Data were analyzed using the Statistical Package for the Social Sciences Program. Values of $p \leq 0.05$ were accepted as statistically significant. Results: Sixty-five percent of the participants were female, the average student age was 24.19 years, and a predominance of students were in the clinical cycle (60.9%). Of the total sample, 75.9% (n=167) stated that they performed physical activities and 28.2% (n=62) responded that they spend between 7-10 hours sitting studying. The prevalence of low back pain was high (84.1%; n=185), however, only 1.5% (n=3) had scores indicative of functional disability. Women (Mean=5.07, SD=0.35) had greater functional disability than men (Mean=3.33, SD=0.35; p=0.008). Sedentary students had greater disability (Mean=5.79, SD=4.55) than active students (Mean=4.04, SD=3.62; p=0.007); individuals who spent more than 7 hours a day sitting also had higher scores (p=0.02). Conclusion: The findings indicated a significant self-reported prevalence of low back pain among medical students, with greater functional disability in females, sedentary individuals, and those who sat for more than 7 hours a day. ***Level of Evidence II; Cross-sectional study.***

Keywords: Sedentary Behavior; Low Back Pain; Prevalence; Physical Activity.

RESUMO

Objetivo: Verificar a influência do sedentarismo e da atividade física na prevalência e no quadro de dor lombar em estudantes de medicina em instituição de ensino superior. Métodos: Estudo transversal com abordagem quantitativa, realizado com 220 estudantes. Os dados foram coletados entre janeiro e fevereiro de 2021, a partir do Questionário de Incapacidade Roland-Morris. Os dados foram analisados no software IBM SPSS. Foram aceitos como estatisticamente significativo os valores de $p \leq 0,05$. Resultados: Do total de participantes, 65% eram do sexo feminino, a média de idade foi de 24,19 anos e predominância de estudantes no ciclo clínico foi 60,9%. Do total, 75,9% (n = 167) afirmaram realizar atividades físicas e 28,2% (n = 62) responderam que passam entre 7-10 horas sentados, estudando. A prevalência de lombalgia foi alta (84,1%; n = 185), porém, apenas 1,5% (n = 3) com pontuações indicativas de incapacidade funcional. As mulheres (Média = 5,07, DP = 0,35) apresentaram maior incapacidade funcional do que os homens (Média = 3,33, DP = 0,35; p = 0,008). Os sedentários apresentaram maior incapacidade (Média = 5,79, DP = 4,55) do que os estudantes ativos (Média = 4,04, DP = 3,62; p = 0,007); os indivíduos que passaram mais de 7 horas por dia sentados apresentaram também maior pontuação (p = 0,02). Conclusões: Os achados indicaram significativa prevalência autorreferida de lombalgia entre os estudantes de medicina, com maior incapacidade funcional nos indivíduos do sexo feminino, sedentários e que permaneciam mais de 7 horas por dia sentados. ***Nível de Evidência II; Estudo Transversal.***

Descritores: *Sedentarismo; Dor Lombar; Prevalência; Atividade FÍsica.*

RESUMEN

Objetivo: Verificar la influencia del sedentarismo y la actividad física en la prevalencia y el estado del dolor de la región lumbar en estudiantes de medicina de una institución de educación superior. Métodos: Estudio transversal con enfoque cuantitativo, realizado con 220 alumnos. Los datos se recopilaron entre enero y febrero de 2021 mediante el Cuestionario de Discapacidad de Roland-Morris. Los datos se analizaron con el software IBM SPSS.. Se aceptaron valores de $p \leq 0,05$ como estadísticamente significativos. Resultados: Del total de participantes, el 65% eran mujeres, la edad promedio fue de 24,19 años y el predominio de estudiantes en el ciclo clínico era del 60,9%.Del total, el 75,9% (n=167) afirmó que realizaba actividades físicas y el 28,2% (n=62) respondió que pasa entre 7 y 10 horas estudiando sentado. La prevalencia de dolor lumbar fue alta (84,1%; n=185); sin embargo, sólo el 1,5% (n=3) con puntuaciones que indicaban discapacidad

Study conducted at the Centro Universitário de Patos, Patos, PB, Brazil.
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funcional. Las mujeres (Media=5,07, DE=0,35) presentaron una mayor discapacidad funcional que los hombres (Media=3,33, DE=0,35; p=0,008). Los individuos sedentarios presentaron mayor discapacidad (Media=5,79, DE=4,55) que los estudiantes activos (Media=4,04, DE=3,62; p=0,007); los individuos que pasaban más de 7 horas al día sentados también presentaron puntuaciones más altas (p=0,02). Conclusión: Los hallazgos indicaron una prevalencia significativa de dolor lumbar autoinformado entre los estudiantes de medicina, con una mayor discapacidad funcional en las mujeres, los individuos sedentarios y los que pasaban más de 7 horas al día sentados. ***Nivel de Evidencia II; Estudio transversal.***

Descriptores: *Conducta Sedentaria; Dolor de la Región Lumbar; Prevalencia; Actividad Física.*

INTRODUCTION

Among the various types of pain that affect humans, low back pain is defined as the painful sensation that affects the lower region of the spine. This musculoskeletal disorder is a widespread problem and one of the main reasons for general medical consultations. More than 80% of the world population develops lumbar region pain at some point in their lives, and most of these cases resolve spontaneously. Only 5% of individuals affected by low back pain experience symptoms lasting more than six months or have some associated disability.[1] Due to its high prevalence, low back pain is responsible for high health care system expenses and contributes significantly to employee absences, causing major impacts to productivity and negatively affecting the economy.[2]

Most cases of low back pain have a multifactorial etiology and are of non-specific origin. Therefore, factors like physical inactivity, smoking, alcohol consumption, obesity/body mass index (BMI), sex, education level, muscle strength, and the ergonomic position at work are related to the onset of low back pain.[3]

Physical inactivity negatively affects physical health, especially the musculoskeletal structures. It is associated with greater structural changes in the spine and disability than in physically active individuals and, thus, characterized as a risk factor for low back pain.[4] On the other hand, regular physical exercise and an active lifestyle are essential for the prevention and control of chronic non-communicable diseases, as well as for better mobility and functional capacity. In addition to reducing the risk of low back pain, regular physical exercise leads to less severe conditions when they occur.[5]

Among the populations at risk for low back pain, medical students stand out due to factors such as the high stress load to which they are subjected, the countless hours of study and training spent in incorrect ergonomic positions, and the scarcity of physical activities.[6] This situation results from the demands inherent in the acquisition of skills required to be a good doctor.[7]

All these problems are even more significant when they affect medical students, given the important impact they have on their professional training process. Because of the unfavorable repercussions that low back pain conditions can create for medical students, it is essential to establish associated risk factors to make minimization of their prevalence possible.[8] These assertions justify this research, which proposes verification of the influence of a sedentary lifestyle on the prevalence of low back pain in medical students at an institution of higher learning.

METHODS

A cross-sectional, descriptive field study was conducted using a quantitative approach. The population comprised 510 students from the Centro Universitário de Patos (UNIFIP) Medical School and a simple randomized probabilistic sample of 220 students was adopted (sampling error of 5%, confidence level of 95%). Students duly enrolled at the institution and aged 18 years or over were included. Students under 18 years of age were excluded.

The study was initiated after approval by the Institutional Review Board (IRB) of UNIFIP, CAAE: 39974620.4.0000.5181/Opinion Number: 4.430.999/2020.

Due to the pandemic scenario present during the study period, data collection was conducted online using the Google Forms tool during January and February 2021. The questionnaire was sent to the students via WhatsApp, in groups corresponding to all the course cycles. It is important to note that the anonymity of the participants was protected and that those who decided to participate in the study agreed virtually to the Informed Consent Form (ICF), satisfying the requirements of National Health Council Resolution 510/2016, in effect in Brazil, which regulates research involving human beings with the fundamental objective of ensuring and protecting the rights of research participants.

The collection tool covered, preliminarily, the general sample characterization data (sex, age range, course cycle, physical activity level, time spent sitting per day, and whether medication was used for instances of low back pain). Additionally, the Roland-Morris Disability Questionnaire, duly translated and validated for Brazil, was administered.[9] It consists of 24 questions designed to assess the repercussions of low back pain on work and daily life activities. Each "YES" answer is scored as 1 point and each "NO" answer is given a score of 0 points. The result is calculated as the sum of the items, ranging from a minimum of 0 to a maximum of 24 points and, according to the author, values above 14 points indicate functional disability resulting from low back pain.[10]

The data from the collection tool were analyzed using the Statistical Package for the Social Sciences (SPSS) program, version 21.0. In addition to the descriptive relative (%) and absolute (N) frequency statistics, the t test for independent samples was used. A statistical significance of $p \leq 0.05$ was adopted.

RESULTS

Table 1 shows that the sample consisted mostly of female students (65%, n=143). Student ages ranged from 18 to 58 years, with most students between 18 and 24 years of age (70%, n=154), and the mean age was 24.19±5.1 years. Regarding the stages of the course, there was a predominance of students in the Clinical Cycle (60.9%, n=134).

Most of the students practice physical activity (75.9%, n=167) and, of these, 52.69% (n=88) exercise more than 3 times a week. Another variable analyzed was the period during which the student is seated while studying, revealing that most (61.8%, n=167) spend up to 7 hours a day.

Furthermore, most of the 220 students in the sample (84.1%, n=185) had already experienced low back pain while in medical school.

Table 2 shows the Roland-Morris questionnaire scores obtained by students, which show that only 1.5% (n=3) of the sample had scores higher than 14 points and, consequently, functional disability. It is also noteworthy that no student obtained the maximum score (24 points).

Table 3 shows the statistical comparisons between the Roland-Morris questionnaire scores according to the sample characterization questionnaire variables. Using the t test for independent samples, we observed significant results when we compared the degree of functional disability by sex ($\rho = 0.008$; $p<0.05$), showing a higher level of disability in females.

Another variable compared in relation to the Roland-Morris questionnaire was the practice of physical activities. The t test for independent samples yielded a significantly higher degree of disability ($\rho = 0.007$; $p<0.05$) among those who do not practice physical activities.

Finally, the Roland-Morris scores of two groups of students,

Table 1. Overall characterization of the sample by sex, age, course cycle, regular practice of physical exercise, time spent seated, and whether they had already suffered from low back pain.

Variables	Frequency	Percentage
Sex		
Female	143	65
Male	77	35
Age Range		
18-24 years	154	70
25-30 years	46	20.9
Above 30 years	20	9.1
Course Cycle		
Basic	45	20.4
Clinical	134	60.9
Internship	41	18.7
Do you practice physical exercise?		
Yes	167	75.9
No	53	24.1
How many times a week do you practice activities?		
Up to once a week	18	10.8
2-3 times a week	61	36.5
More than 3 times a week	88	52.7
Time spent seated while studying		
Up to 7 hours a day	136	61.8
More than 7 hours a day	84	38.2
Have you had low back pain since beginning the course?		
Yes	185	84.1
No	35	15.9

Source: Study data, 2021.

Table 2. Description of the Roland-Morris Questionnaire responses.

Variable	Frequency	Percentage
Roland-Morris Questionnaire scores		
0	27	12.3
1	17	7.7
2	38	17.3
3	28	12.7
4	29	13.2
5	17	7.7
6	17	7.7
7	8	3.6
8	8	3.6
9	5	2.3
10	2	0.9
11	3	1.4
12	8	3.6
13	8	3.6
14	2	0.9
18	1	0.5
19	1	0.5
20	1	0.5

Source: Study data, 2021.

divided according to time they spend seated per day studying (up to 7 hours/day and more than 7 hours/day), were compared using the t test. Significantly higher degrees of disability were observed among those who spent more time sitting ($\rho = 0.02$; $p<0.050$).

DISCUSSION

Low back pain is a frequent musculoskeletal disturbance in the general population.[1] In the evaluation of the prevalence of musculoskeletal pain among university students, 98% reported feeling pain in some region of the body, with both the greatest prevalence of involvement (66%) and the highest mean pain intensity observed in the lumbar region.[11] In a study of students from the Centro Universitário Franciscano in the city of Santa Maria, Rio Grande do Sul, 82.23% reported feeling back pain, with most complaints of spinal pain corresponding to the lumbar region (47.9%), followed by the thoracic region (32.6%), and the cervical region (19.38%).[12] In a study of undergraduate health sciences students, the incidence of low back pain observed was 40.3%.[13]

Table 3. Degree of low back pain compared by sex, regular practice of physical activity, and time seated.

Variable	Frequency	Mean	Standard Deviation	ρ-value
Sex				0.008
Female	143	5.07±	0.35	
Male	77	3.33	0.35	
Practice physical activity				0.007
Yes	167	4.04	3.62	
No	53	5.79	4.55	
Hours seated for study				0.02
Up to 7 hours/day	136	3.94	3.53	
More than 7 hours/day	84	5.30	4.39	

Source: Study data, 2021.

In the present study, the occurrence of low back pain was reported in 84.1% of the participating medical students. Other studies have reported lower low back pain prevalence rates compared to our sample.[14-18]

When studying the prevalence of low back pain in medical and nursing students, it was shown that medical students are more affected (72% x 41%).[14] A study conducted at the Bezmialem Vakif University, in Turkey, showed that medical students had a higher prevalence of low back pain than dentistry, pharmacology, and health sciences students ($\rho = 0.004$).[15] One possible explanation, which is in line with the findings of the present study, may be correlated with the time the student spends in a sitting position. Students who spend more than 7 hours a day sitting had worse results in terms of severity and functional changes than students who spend less than 7 hours a day sitting.

When estimating the prevalence of neck, shoulder, and low back pain in medical students at Jizan University in southwestern Saudi Arabia and exploring the associated factors, 33.4% of the students reported lumbar pain the week before the study and 61.4% during the year prior to the study.[16] Another study of 119 medical students at the Universidade Federal do Amazonas showed that 74.78% suffered some percentage of low back pain.[17]

In a study with 459 fourth-year Belgrade Medical School students, a low back pain prevalence of 75.8% was observed.[18] A cross-sectional study of chronic pain in 395 students from all levels of the medical program at the Universidade de Taubaté revealed that the lumbar region was the most often affected (23.13%).[19]

In most medical schools there is a significant demand placed on students to seek excellence in their education and make the maximum effort to reach their intellectual capacity. This demand often results in the abandonment of healthier lifestyles with time for leisure and the practice of physical activities. In addition, there is also a social demand, since they are being trained to deal with the lives of others and, therefore, must master all the technical-scientific knowledge, which requires time and exhaustive dedication. All these factors contribute to a stressful and sedentary routine that is strongly associated with the onset of low back pain.[7]

Regarding the stage of the course of study, there was a predominance of students in the clinical cycle (60.9%), a value similar to that observed in another study where the percentage observed was 60.4%. [6] In another study, a predominance of third-year students was reported (60%).[13]

In the present study, the mean participant age was 24.19 years

(standard deviation=5.1), which is higher than that reported by several other studies.[6,13,14,20] Two studies reported the same mean age of 21.4 years, with standard deviations of 1.9 and 3.64 years, respectively.[13,20] In another study, a mean age of 22.84 years (standard deviation=5.85) was observed.[14] In a study with second- and sixth-year French medical students, a mean age of 23.3 years (standard deviation=2.9) was reported.[6]

When comparing low back pain by sex, we observed a higher prevalence of low back pain among female students ($\rho=0.008$; $p<0.05$), similarly to two other studies, which reported significances of $\rho = 0.003$ and $\rho = 0.03$, respectively.[15,20] However, a caveat regarding the characteristics of the sample must be added, since the percentage of females was significantly higher than males in both studies. Therefore, for a better characterization of the sex variable in relation to low back pain, studies with populations that are more evenly distributed between the sexes are recommended.

Nevertheless, studies with medical students from the same university center investigated in our research indicate that women account for the larger proportion of undergraduate medical students.[21-24] Only one study showed that male students accounted for 49%.[25]

It was found that 31% of health sciences undergraduates spent between 6 and 8 hours per day and another 31% spent more than 9 hours per day studying seated, and that 12% of these categorized their physical fitness level as poor. The authors also observed a correlation between the physical fitness self-assessment ($X2 = 7.0$, $\rho = 0.02$) and hours spent sitting ($X2 = 8.7$, $\rho = 0.03$).[13] This relationship was also observed in the present study, in which more intense and more frequent conditions were confirmed in students who do not practice physical activities ($\rho = 0.007$, $p<0.05$) and in those who spent more time sitting and studying ($\rho = 0.02$, $p<0.05$). Lack of physical exercise ($\rho = 0.001$) and poor posture ($\rho = 0.005$) were also observed as risk factors for low back pain, most likely due to flaccidity of the trunk and abdominal muscles.[18,26]

Although low back pain is considered a problem that affects millions of people worldwide, the findings were considered a risk for the population studied, since they indicated a higher prevalence than all the studies presented. Albeit one of the causes for this condition could be related to the moment of data collection, as in the year leading up to it the world had been living with the pandemic, which impacted the routine of students, including medical students. Nor can psychosocial conflicts and a sedentary lifestyle be ruled out.[27]

Regardless of the related factors, it is essential to implement health promotion strategies aimed at complementary measures to minimize these episodes. Health education actions are effective through postural guidance, information on how to sit, stand, bend down to pick up objects, and even sleep correctly. Encouraging the practice of physical activities and offering a team dedicated to psychological support is a fundamental need.

Finally, regarding the limitations of the study, we emphasize the fact that the study was conducted in a population of university students at a single institution of higher learning and with only a sample versus 100% of the students in the medical school program. Due to its cross-sectional approach, we could not assertively infer anything about causality.

CONCLUSION

A significant prevalence of low back pain, even higher than that reported in other studies, was found among our medical students. Furthermore, it was found that sex, degree of physical activity, and sitting for extended periods while performing daily academic activities influence low back pain. Hopefully this will encourage dialog around the effects caused and reflection on ways to implement primary prevention actions.

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