LOW BACK PAIN IN MEDICAL STUDENTS AND PROFESSORS DURING THE PANDEMIC: RETROSPECTIVE COHORT STUDY

LOMBALGIA EM ESTUDANTES E DOCENTES DE MEDICINA DURANTE A PANDEMIA: COORTE RETROSPECTIVO

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**ABSTRACT**

**CONTEXT AND OBJECTIVE:** Medical students and professors are exposed to highly demanding schedules and constant curricular pressures, making them susceptible to developing low back pain. During the pandemic, face-to-face classes were canceled, beeing replaced by online classes. This modification increased the exposuse to some risk factors associated with low back pain, such as long sitting time. Thus, these individuals could become even more susceptible to developing low back pain. This study aimed to determine the prevalence of low back pain before and during the pandemic, comparing both periods.

**DESIGN AND SETTING:** Retrospective cohort study, perfomed in a brazilian medical school.

**METHODS:** In order to assess the prevalence of low back pain in medical students and professors in three Brazilian medical schools during the pandemic, in addition to potential associated risk factors, a questionnaire was administered, containing questions about the presence of low back pain, sociodemographic characteristics and environmental factors that could be related to such pain.

**RESULTS:** Among the 978 responses obtained, the prevalence of low back pain during the pandemic was 69.94%, which represented a significant increase over values ​​from the pre-pandemic period. A high prevalence of low back pain was found between the groups, especially among women. Some factors were associated with the incidence of low back pain, such as having previously diagnosed spinal problems and sedentary lifestyle.

**CONCLUSIONS**: The prevalence of low back pain increased significantly during the pandemic in the studied groups.

**KEY WORDS:** Low Back Pain; Students; Faculty; Prevalence; Risk Factors.

**RESUMO**

**CONTEXTO E OBJETIVO:** Estudantes de medicina e professores estão expostos a horários altamente exigentes e constantes pressões curriculares, tornando-os suscetíveis ao desenvolvimento de lombalgia. Durante a pandemia, as aulas presenciais foram canceladas, sendo substituídas por aulas online. Essa modificação aumentou a exposição a alguns fatores de risco associados à lombalgia, como o longo tempo sentado. Assim, esses indivíduos podem se tornar ainda mais suscetíveis a desenvolver dor lombar. Este estudo teve como objetivo determinar a prevalência de lombalgia antes e durante a pandemia, comparando os dois períodos.

**TIPO DE ESTUDO E LOCAL:** Estudo coorte retrospectivo realizado em uma faculdade de medicina brasileira.

**MÉTODOS:** Com o objetivo de avaliar a prevalência de lombalgia em estudantes e professores de medicina de três faculdades de medicina brasileiras durante a pandemia, além de potenciais fatores de risco associados, foi aplicado um questionário contendo perguntas sobre a presença de lombalgia, características sociodemográficas e fatores ambientais que poderiam estar relacionados a essa dor.

**RESULTADO:** Entre as 978 respostas obtidas, a prevalência de lombalgia durante a pandemia foi de 69,94%, o que representou um aumento significativo em relação aos valores do período pré-pandemia. Foi encontrada uma alta prevalência de lombalgia entre os grupos, principalmente entre as mulheres. Alguns fatores foram associados à incidência de lombalgia, como ter problemas de coluna previamente diagnosticados e estilo de vida sedentário.

**CONCLUSÕES:** A prevalência de lombalgia nos grupos estudados aumentou consideravelmente durante a pandemia.

**PALAVRAS-CHAVE:** Dor lombar; Estudantes; Docentes; Prevalência; Fatores de risco.

**INTRODUCTION**

Approximately 80% of the population, at some point in their lives, will suffer a brief and acute episode of low back pain.1, 2 Generally, low back pain is divided into two types: specific and nonspecific, where the nonspecific has no apparent cause and accounts for up to 90% of the cases.3 Low back pain, in addition to limiting various daily activities and impairing quality of life, is also one of the main factors responsible for absenteeism from work and decreased productivity in the workplace.4

A number of risk factors are described in the literature that can play a crucial role in the etiology of low back pain, such as being female, overweight, previous history of spinal problems, family history of spinal problems, prolonged sitting time and sedentary lifestyle,5-8 or even psychological factors, such as anxiety and stress.8, 9 Due to the highly demanding schedule of medical courses, students and professors are often exposed to several of these risk factors, such as stress and sedentary lifestyle, long hours in hospitals and clinics, which can contribute to a higher prevalence of low back pain when compared to the general population.10 Furthermore, the presence of low back pain can affect the productivity and participation of students during classes, which could influence their future medical career.10

A study carried out in Brazil with 629 medical students revealed that recurrent low back pain was present in 81% of them.11 Another study, carried out with 1,243 medical students from a French college, reported a prevalence of low back pain of 72.1%.12 Despite the limitation that musculoskeletal pain represents for adolescents and young adults, there is a lack of data regarding low back pain in medical students.13

Similarly, few studies have investigated the presence of low back pain in professors,14 and this dearth is even greater when it comes to medical school professors, who are also exposed to several risk factors for the presence of low back pain, such as repetitive movements when writing, standing for long periods of time and daily use of the computer.15 In a study carried out with teachers at a primary school in Ethiopia, a prevalence of low back pain of 74.8% was found, which was related to some risk factors, such as standing for a long period of time, lack of sleep and sedentary lifestyle.16

During the COVID-19 pandemic, face-to-face classes were canceled, forcing universities to adopt a remote learning model, in order to preserve everyone’s safety. However, this change favored some aspects related to the prevalence of low back pain, such as sitting for a long period of time, physical inactivity and greater psychological stress, which could increase the prevalence of low back pain in students and professors during this atypical period. The aim of this study was to determine the prevalence of low back pain in medical students and professors at three Brazilian universities during the pandemic and compare this to the pre-pandemic period, in addition to identifying associated risk factors.

**OBJECTIVES**

The present study aimed to determine the frequency of low back pain among medical students and professors before and after the pandemic in order to compare both periods; and secondarily to investigate risk factors associated with low back pain.

**METHODS**

**Questionnaire and participants**

This research has been approved by the IRB (Institutional Review Board) of the authors’ affiliated institutions, and consent was obtained from all participants. A retrospective cohort study was carried out through the administration of a questionnaire to medical students and professors from three Brazilian medical schools located in different states of the country. The inclusion criteria were that participants had to be medical students or professors from the three participating universities. Participants were excluded from the study if they disagreed in signing consent form, those who were not medical students or professors from the participating universities, and women in gestational period. The questionnaire was distributed between December 2020 and March 2021 and covered questions about sociodemographic caracteristics (such as gender, age and ethnicity), presence of low back pain before and during the pandemic, quantification of the intensity of this low back pain, family history of diseases and spinal surgeries and several behavioral factors that could be associated with the prevalence of low back pain in this population, in addition to the impact on their daily activities and on their emotional state.

**Statistical analysis**

In view of the approximate total of 3,000 medical students and 200 professors in these three universities,we adopted a confidence level of 95% and a margin of error of 5%, calculating a sample of 341 students and 132 professors. And since the three universities are located in different states and may present regional discrepancies, with the purpose of analyzing subgroups by educational institution, while maintaining a 95% confidence level and 5% margin of error, the sample by institution had to be at least 278 students and 60 professors.

Descriptive analysis of the results was performed to characterize the research participants. To describe the results, the absolute frequency and percentage for categorical variables were used. In order to compare the proportion of low back pain before and during the pandemic within the different groups, the McNemar test was used. To investigate possible factors associated with low back pain during the pandemic, univariate logistic regression was used, estimating odds ratios as a measure of effect, with a 95% confidence interval. Subsequently, the variables that showed at least moderate association (p<0.25) with the variable of interest were selected using the chi-square test. These variables were included in the multivariate model, estimating the adjusted odds ratio, considering possible interactions between them. The quality of the multivariate model was assessed using the Hosmer and Lemeshow test. For all analyses, only p<0.05 was considered statistically significant.

**RESULTS**

In total, 978 individuals answered the questionnaire. Among them, 831 were students from the 1st to the 4th year, 60 students from the 5th and 6th year (medical internship) and 87 professors (Table 1).

**Students from 1st to 4th year**

 Among the 831 students from the 1st to the 4th year, 75.45% are female. Most of them (58.6%) are between 21-30 years old. Among them, 73.77% are white and only 1.81% are black. Among the three universities that participated in the survey, there was a similar proportion of responses from 1st to 4th year students, with 35.5% from university 1, 30.08% from university 2 and 34.42% from university 3. Among them, 22.62% reported previous spinal problems, and 51.26% had a family history of spinal problems.

Only four students in this group (0.48%) had undergone spinal surgery and only two (0.24%) were pregnant. Before the pandemic, only 42.12% of 1st to 4th year students sat for more than 6 hours a day. During the pandemic, however, that number rose to 79.9%. Despite the long sitting time, only 1.44% reported sitting correctly. Regarding the consumption of alcoholic beverages, 64.02% reported consuming it, and no significant differences in consumption were found when comparing before and during the pandemic. The same happened with the consumption of coffee and tobacco, which remained without significant differences before and during the pandemic period.

**Students from 5th and 6th year**

Among the 60 students in the 5th and 6th year, 75% are female. Most of them (91.67%) are between 21 and 30 years old. Among them, 70% are white. In addition, 63.33% reported having a problem already diagnosed in their spine and 50% reported a family history of spinal diseases. Only one woman reported being pregnant. In this group, there was also a considerable increase in the number of individuals who spent more than 6 hours sitting daily, with only 15% before and 48.33% during the pandemic. Despite the large number of individuals who spend many hours sitting daily, none of the students in this group reported sitting correctly.

In total, 73.33% consume alcoholic beverages, with no significant differences in consumption before and during the pandemic. The same happened with the consumption of coffee and tobacco, which remained without significant differences before and during the pandemic period. Engagement in exercise, on the other hand, was higher before (64.38%) than during the pandemic (53.33%), but the amount of physical exercise performed daily did not show significant differences.

**Professors**

Among the 87 professors that participated in the research, 59.77% are female, and most of them are between 41 and 50 years of age. Among them, 86.21% are white. In addition, 73.56% reported having a previous diagnosis of a problem in their spine and 35.63% have a positive family history of spinal diseases. Only three participants were pregnant. There was an increase in the number of sitting hours per day during the pandemic period, rising from 14.94% to 63.22%. Only 17.24% reported sitting correctly during this period. Only 32.18% consume alcoholic beverages, with no significant differences in the amounts consumed before and during the pandemic. The same occurred with the consumption of coffee and tobacco, which remained without significant differences for the period before and during the pandemic. Engagement in exercise, on the other hand, was higher before (63.22%) than during the pandemic (51.72%), but the amount of physical exercise performed daily did not show significant differences.

**Prevalence of low back pain**

When asked about the presence of low back pain before and during the pandemic, the percentages of affirmative answers increased among professors and students from 1st to 4th year, and decreased among students from 5th to 6th year. Among the professors, 28.74% who did not have low back pain started to experience it during the pandemic (p < 0.001). Similarly, 20.10% of 1st to 4th year students who did not have low back pain before the pandemic began to complain of low back pain (p<0.001). During the pandemic, only for the group of 5th and 6th year students was there no increase in the prevalence of low back pain (p=1.000).

For 1st to 4th year students, the prevalence of low back pain increased from 54.75% before the pandemic to 71.48% during the pandemic (p<0.001). Among 5th and 6th year students, the prevalence did not change significantly, registering 66.67% before and 65% during the pandemic (p=1,000). Finally, among professors, the prevalence increased from 31.03% before to 58.62% during the pandemic (p<0.001). (Table 2).

**Associated risk factors**

Students from 1st to 4th year were significantly more likely to have low back pain when compared to professors (OR: 1.77, 95% CI: 1.12-2.77; p=0.013). Among survey participants who do not have back pain, 60.2% are female, while among those who do, this percentage rises to 79.97%, with men having significantly lower chances of having low back pain when compared to women (OR: 0.38, 95% CI: 0.28-0.51; p<0.001). It was also noted that those previously diagnosed with any spinal problems had significantly higher chances of low back pain when compared to those who did not (OR: 3.56, 95% CI: 2.4-5.43; p<0.001). In addition, individuals with a family history of spinal problems were also significantly more likely to experience low back pain (OR: 1.78, 95% CI: 1.35-2.36; p<0.001). Respondents from university 2 were less likely to have low back pain when compared to the other institutions (OR: 0.56, 95% CI: 0.4-0.77; p < 0.001).

Regarding posture when sitting, those who always sit correctly, those who sit correctly most of the time, and even those who sit correctly less often, had significantly lower chances of having low back pain when compared to those who never sit correctly (ORs of 0.11; 0.32 and 0.65 and ​​p<0.001; p<0.001 and p=0.012, respectively). Considering the consumption of tobacco, coffee and alcoholic beverages, none of them was statistically significant for the prevalence of low back pain among any of the groups (p=0.915; p=0.274 and p=0.255, respectively).

Sleeping hours also significantly affected the chances of experiencing low back pain. Those who slept 6 to 9 hours a day before the pandemic had a lower chance of low back pain when compared to those who slept less than that (OR: 0.61, 95% CI: 0.45-0.83; p=0.002). Similarly, individuals who sleep 6 to 9 hours a day during the pandemic also had a lower chance of low back pain (OR: 0.41, 95% CI: 0.26-0.63; p<0.001). Moreover, individuals who sleep more than 9 hours a day during the pandemic also had lower chances of experiencing low back pain (OR: 0.54, 95% CI: 0.3-0.96; p=0.038). Also, those who exercise during the pandemic had significantly lower odds of having low back pain when compared to those who do not (OR: 0.57, 95% CI: 0.42-0.76; p<0.001). For all the other variables, there is insufficient evidence that the odds of individuals with such characteristics were significantly different compared to the characteristics set as a baseline at 5% significance.

In the multiple logistic model, only being male (adjusted OR: 0.47, 95% CI: 0.33-0.66; p<0.001), always sitting correctly (adjusted OR: 0.11, 95% CI: 0.04-0.3; p<0.001), sitting correctly most of the time (adjusted OR: 0.31, 95% CI: 0.19-0.49; p<0.001), sitting correctly less often (adjusted OR: 0.59, 95% CI: 0.4-0.86; p=0.006), being from the university 2 (adjusted OR: 0.54, 95% CI: 0.35-0.83; p=0.005), studying/working between 1 to 4 hours per day during the pandemic (adjusted OR: 0.49, 95% CI: 0.24-0.97; p=0.046) and sleeping 6 to 9 hours per day during the pandemic (adjusted OR: 0.4, 95% CI: 0.23-0.66; p<0.001) stood out as protective factors for low back pain. On the other hand, still in the multiple logistic model, only having previously diagnosed spinal problems (adjusted OR: 3.79, 95% CI: 2.42-6.14; p<0.001) and a positive family history of spinal problems (adjusted OR: 1.82, 95% CI: 1.32-2.52; p<0.001) stood out as risk factors. Table 3 sumarizes important factors and their association with low back pain.

Moreover, when asked about the consequences of their pain, 41.2% of the participants who had low back pain reported that their pain affects their performance in college related activities. Besides that, 52.3% of the participants who reported having low back pain indicated that it impairs their concentration. Also, 59.6% of them reported that the pain altered their humor significantly, causing anxiety, sadness or anger. Other than that, 37.9% of those who reported low back pain also reported that the pain makes it difficult to remain sited for more than 30 minutes. Thus, it is evident that low back pain in these individuals is certainly able to impair their academic and daily life.

When asked about the intensity of their low back pain in a scale of 1-10, before the pandemic, the most common reported pain intensities were between 4 and 5. During the pandemic, however, the most common reported pain intensities were between 6 and 7. Although there was only a slight increase in pain intensity, due to a higher exposure to risk factors, the pandemic could have had worsen these individuals low back intensity.

**DISCUSSION**

The aim of this study was to investigate the presence of low back pain in medical students and professors in three universities located in different regions of Brazil.

There was a significant increase in the prevalence of low back pain in all studied groups, except in 5th and 6th year students. This probably occurred because these students continued their normal schedule, even with the pandemic, because at this stage of the medical course, they basically only go to hospitals. The overall prevalence of low back pain, considering all participants, increased from 53.37% before the pandemic to 69.94% during the pandemic. Considering only 1st to 4th year students, the prevalence of low back pain was 54.75% before and 71.48% during the pandemic. It is evident that, during the pandemic, the academic routine of 5th and 6th year students was altered as much when compared to the routine of 1st to 4th year students and professors, which may explain the unaltered prevalence of low back pain in this group, as there was no increased exposure to risk factors related to low back pain.

Also, the prevalence of low back pain is higher among women than among men, corroborating findings by other authors.17-19 Furthermore, in our study, the existence of a family history of spinal problems was related to the prevalence of low back pain. The same result was obtained by Alshagga et al.20 and Ilic et al.,21 who found a positive relationship between family history of musculoskeletal disorders and the prevalence of low back pain.

Regarding tobacco use, several studies indicate that smoking could be a risk factor for low back pain.22-24 However, in our study, it was not possible to determine this association, as in another study carried out in Brazil with 629 students of medicine during a non-pandemic period.11 Furthermore, engagement in physical exercise proved to be protective against the onset of low back pain, corroborating the study by Sihawong et al.25

Having good quality sleep, in our study, was also a protective factor against the onset of low back pain, in line with another study that found a trend of worse low back pain in individuals with poor quality sleep.26 On the other hand, although sitting correctly was found to be a protective factor against low back pain, De Carvalho et al.,27 in their meta-analysis, did not find a significant relationship between sitting positions and the presence of low back pain compared to standing positions, concluding that more studies are needed to better elucidate this issue.

Respondents from institution number 2 were less likely to have low back pain when compared to the other institutions. Comparing the exposure to risk factors among individuals from the three participating universities, individuals from institution number 2 reported greater engagement in exercise during the pandemic (77.96% reported practicing, compared to 65.88% and 48.17% in the other two institutions) and better quality sleep (92.54% reported sleeping more than 6 hours per night, compared to 75.5% in institution number 1, for example). This may reflect lower exposure to risk factors related to low back pain.

Considering the high rate of individuals who reported impairment in their college activities due to the presence of low back pain (28.83%), it is evident that this condition could impact the academic performance of these professors and students.

The main limitations of this study are inherent to the retrospective cohort model. In addition, data related to professors should be analyzed with caution, as the number of participants in this group was below the expected number, except for professors from university 1. However, there is a very high prevalence of low back pain in medical students and professors, indicating the need to implement preventive strategies to minimize the problem, as well as new studies on the subject, aiming to further improve our understanding about it.

**CONCLUSION**

 The prevalence of low back pain is high among medical students and professors, further increasing during the pandemic period, except among 5th and 6th year students. Family and personal history of spinal problems, female gender and poor posture when sitting were found to be risk factors, while physical exercise and good quality sleep were protective factors against the onset of low back pain. Furthermore, considering the paucity of data on the real impacts of this high prevalence of low back pain in these groups, more specific studies on the subject are still needed.

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**Credit Author Statement**

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