



# Low back pain in Brazilian medical students: a cross-sectional study in 629 individuals

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## Abstract

Low back pain (LBP) is a common problem in the general population. Medical students may be at risk of LBP because of demanding curricula. To study the prevalence of LBP in Brazilian medical students and the associated factors. Six hundred twenty-nine medical students (72.8% females, mean age of 23 years old) answered a questionnaire containing epidemiological data; data on presence and frequency of LBP, use of painkillers, and LBP interference in daily activities; number of sitting and exercising hours/day, posture habits. They also filled a VAS (or visual analogic scale) on the own perception of anxiety, depression, fatigue, and the Roland Morris functional questionnaire for LBP. In this sample, 81.7% had periods of recurrent LBP that was more common in females (77.6% vs 51.3%;  $p < 0.0001$ ) and associated with bad posture habits ( $p < 0.0001$ ). Number of sitting hours, exercising, and study period at school could not be associated with LBP. The mean Roland Morris result was 4.0; IQR = 2–7 and its value showed a modest correlation with VAS of anxiety ( $\rho = 0.21$ ) and depression ( $\rho = 0.33$ ). LBP interfered with social activities in 20.5%, with physical activities in 33.1%, and in school activities in 29.2%. There is a high prevalence of LBP in medical students, mainly females, associated with bad posture habits. Physical dysfunction for LBP showed correlation with anxiety and depression.

**Keywords** Low back pain · Medical students · Postural habits

## Introduction

Low back pain (LBP) is one of the most common health problems and may affect individuals of all ages, including young people [1]. It is estimated to affect 20–30% of general population during lifetime limiting their daily activities and bringing social and economic losses [1]. Habits linked to modern life style such as poor postures, physical inactivity or remaining in flexed spinal postures, carrying heavy loads, obesity, and smoking have been linked to LBP [1–3].

College students are subject to LBP and other forms of musculoskeletal pain [4–6]. According to Nawrocka et al.

[4], music school students have a prevalence of 38.2% of LBP; dental hygiene students have shown a prevalence of 57% of LBP in an Australian study [5]. Medical students, due to highly demanding curricula that facilitates a sedentary life style and short sleep hours, are also subjected to this problem [6]. A study in Indian medical students [1] showed a prevalence of 47.5% of LBP in the prior year; a Serbian survey showed a lifetime prevalence of 75.8% and that 12.4% of the medical students had chronic LBP [7]. This issue has received little attention in our country.

In the present study, we aimed to know the prevalence of LBP in Brazilian medical students and epidemiological and postural habits associated with its appearance. We also aimed to analyze the interference of LBP in daily living and its possible association with mental health status.

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## Methods

The local Committee of Ethics in Research approved this study and consent was obtained from all participants. Six hundred twenty-nine medical students answered a questionnaire.

In order to obtain as many participants as possible, the questionnaires were handled personally or through electronic social media (links to academic guilds homepages). This is a convenience sample that included students from all periods of medical school that agreed to answer the questionnaires, during a period of 6 months (from March 2016 to September 2016). Six hundred twenty-nine students were included. One hundred and twenty students, from two medical schools (one private and another one public), answered the questionnaire that was handled personally right after the class period. Five hundred and nine answered through electronic social media.

The questionnaire included data on:

- (A)- Epidemiological data such as gender, age, smoking habits, period of medical school;
- (B)- Presence of LBP, its frequency as well as painkillers requirement;
- (C)- Postural and exercise habits and number of sitting hours/day.

To be considered as having low back pain, the student should have painful symptom of any duration in the lumbar region, in his lifetime. The frequency of LBP was estimated in one to four times a year, one to four times per month, one to four times a week, and daily LBP. To be considered as physical active, exercise habits should encompass vigorous physical activity for at least 3 days a week for more than 20 min each time or moderate activity for at least 5 days a week for more than 30 min [8]. Students auto declared as smokers and ex-smokers were considered exposed to tobacco.

Those who had LBP were further analyzed with:

- (E)- Roland Morris Disability Questionnaire [9]—That is widely used as a health status measure for LBP. It has 24 questions on daily activities; its scores vary from 0 (best scenario) to 24 (worst scenario).
- (E)- A questionnaire with six questions. Three of these questions were about interference of LBP in physical, social, and school activities (answered as Yes/No) as follows:

- (1)- Does your LBP interfere with your physical activities?
- (2)- Does your LBP interfere with your social activities?
- (3)- Does your LBP interfere with your schools activities?

The other three questions were about the own perception of mental health (graded in a VAS or visual analogic scale from 0 to 10 where 0 = best result and 10 = worst scenario) taking into account the last 4 weeks, as follows:

- (4)- Do you consider yourself a nervous individual?

- (5)- Have you been so depressed that nothing seems to interest you?
- (6)- How tired have you been feeling?

Obtained data was collected in contingency and frequency tables. Frequency was expressed in percentage; central tendency was expressed in mean and standard deviation (SD) in parametric samples and median and interquartile rate (IQR) in non-parametric data. Comparison was done using chi-squared test (nominal data) and Mann Whitney or unpaired *t* test (numeric data). Correlation studies of the Rolland Morris questionnaire result with the result of the questions on physical and mental health were done by Spearman test. Tests were performed with help of the software Graph Pad Prism version 5.0. The adopted significance was of 5%.

## Results

In the studied sample, 458/629 (72.8%) were females and 171/629 (27.1%) were males with age from 17 to 41 years (median of 23.0; IQR = 21.0–24.0 years); 490/629 (77.9%) were in the first 8 semesters (pre-clinical years) and 139/629 (22.1%) were on the internship (from 9 to 12 semesters). In this sample, 25/629 (3.9%) were exposed to tobacco (smokers and ex-smokers) and 604/629 (96.0%) were not.

Recurrent LBP was present in 514/629 (81.7%). In 84/514 (16.3%), LBP was present from one to four times a year, 219/514 (42.6%) from one to four times per month, 172/514 (33.4%) from one to four times a week, and 39/514 (7.5%) of students had daily LBP. In those with LBP, 164/514 (31.9%) used painkillers: 92/164 (56.1%) sporadically and 72/164 (43.9%) from once a week to daily.

When questioned about posture, 554/629 (88.0%) admitted not having good posture habits; the most common was reading or using computer in bed (508/629 or 80.7%) and sleeping on the stomach (276/629 or 43.8%).

According to the students, the LBP interfered with social activities in 105/510 (20.5%), with physical activities in 169/510 (33.1%) and in school activities in 150/513 (29.2%).

Comparison of epidemiological and exercise habits data in students with and without LBP is at Table 1, that shows that female students and those with bad posture habits had more LBP.

The Roland Morris questionnaire scored from one to 23 (median of 4.0; IQR = 2–7). The correlation of Roland Morris results with VAS of anxiety; VAS of depression and VAS of fatigue showed the results in Table 2. There, it is possible to see that there was a modest correlation of functional status measured by the Roland Morris questionnaire and the person's own perception of anxiety, depression and with fatigue.

**Table 1** Comparison of epidemiological data and data on exercise habits in 629 medical students with and without LBP (low back pain)

	With LBP <i>N</i> = 514	Without LBP <i>N</i> = 115	<i>p</i>
Median age—years (IQR)	22.5 (21.0–24.0)	23.0 (21.0–25.0)	0.78
Gender (female)	399–77.6%	59/115—51.3%	< 0.0001 (*)
Exposed to tobacco (#)	17—3.3%	8—6.9%	0.10
At least one bad posture habit	489–95.1%	92–80%	< 0.0001 (**)
Pre-clinical years ( <i>n</i> = 490)/internship ( <i>n</i> = 139)	398/116	92/23	0.54
Number of individuals who exercise regularly	278–54.0%	63–54.7%	0.89
Exercise—median hours/week (IQR)	3 (2.0–4.0)	3 (2.0–4.0)	0.95
Median number of sitting hours/day (IQR)	8.0 (6.0–10.0)	8.0 (7.0–10.0)	0.28
Median study period (in semesters) at school (IQR)	6 (4–8)	6 (4–8)	0.35

*n* number, *IQR* interquartile rate, (#) exposed to tobacco = to smokers and ex-smokers

(\*)OR = 3.2; 95% CI = 2.16–5.01; (\*\*); OR = 4.8; 95% CI = 2.66–8.98

## Discussion

Our results have shown that LBP was highly prevalent in medical students, affecting 81.7% of them. Algarni et al. [6] found a prevalence of musculoskeletal pain in medical students at university hospital of 85.3%—that is very similar to ours, although they have studied musculoskeletal pain encompassing neck, shoulder, and LBP altogether. We also noted that this pain was more common in females but did not find any relationship with smoking. The higher prevalence of LBP in women has been previously noted [10]. A study comparing static and dynamic postural control between females and males did not find any difference that could explain this contrast [10]. Some authors credit this preference to women life style [10]. However, regarding tobacco use, most of the studies point to smoking as a LBP risk factor [11–14] contrary to the present findings. A systematic review of 40 studies has shown that current smokers have more LBP than ex-smokers and that ex-smokers have more LBP than never smokers [12]. Alkherayf et al. [13] found that smoking effect on LBP seems to be dose-dependent. It is believed that smoking causes LBP increasing disc herniation due to coughing [14] or reducing oxygenation to the discs [15]. The present sample had a small proportion of smokers; we also did not control time and intensity of this habit. This may have had affected our findings.

Our results did not show influence of the number of sitting and exercising hours in the occurrence of LBP but it did show the influence of posture habits. Although several studies have found beneficial effects of exercise in LBP, others [16–18], like ours, have also failed to show that sedentary lifestyle plays a role in the appearance of musculoskeletal pain. Moroder et al. [16] compared the prevalence of LBP between medical (53.4%) and physical education students (60.7%) and found no difference. In addition, a systematic review by Hartvigsen et al. [18] of 8 studies found that all but one of them failed to prove positive association between sitting position and LBP.

We also found a correlation of functional impairment due to LBP with anxiety, fatigue, and depression. The influence of multiple domains of psychosocial functioning in LBP have already been demonstrated [19, 20] but it is unclear why they are more common in these context than in general population [21]. Sagheer et al. [22] found a prevalence of anxiety and depression in 48.57% and 55% of individuals with chronic LBP respectively. Pain is an important factor for depression, anxiety, and disability; on the other side, anxiety and depression also have a relationship with pain [23, 24].

The main limitations of this study are inherent to its cross-sectional design. In addition, the fact that the questionnaires were self-reported they might suffer influenced by the

**Table 2** Median values of visual analogic scale (VAS) on perception of anxiety, depression, and fatigue and correlation of these variables with Roland Morris results in 514 medical students with low back pain (LBP)

	Median value (IQR)	Spearman Rho	95% CI	<i>p</i>
Do you consider yourself as a nervous individual? (VAS)	4.0 (2.0–6.0)	0.21	0.13–0.30	< 0.0001
Have been depressed that nothing seems to interest you? (VAS)	6.0 (4.0–8.0)	0.33	0.25–0.40	< 0.0001
How tired have you been feeling? (VAS)	6.0 (4.0–6.0)	0.20	0.11–0.28	< 0.0001

*IQR* interquartile rate

emotional status of the responder. Nevertheless, it does highlight a very high prevalence of LBP in a young population such as medical students and that this symptom affects their social, emotional, and physical as well as their academic performance. This should prompt the implementation of preventive strategies to minimize the problem.

Concluding we can state that the prevalence of LBP in medical students is very high being more common in females and associated with posture habits. Depression and anxiety are linked to the disability caused by LBP in this population. LBP decreases physical, social, and academic performance of medical students.

## Compliance with ethical standards

**Disclosures** None.

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