POSTURAL CHANGES AND CHRONIC LUMBAR PAIN IN UNIVERSITY STUDENTS: ORIGINAL STUDY

ALTERAÇÕES POSTURAIS E DOR LOMBAR CRÔNICA EM UNIVERSITÁRIOS: ESTUDO ORIGINAL

CAMBIOS POSTURALES Y DOLOR LUMBAR CRÓNICO EN UNIVERSITARIOS: ESTUDIO ORIGINAL

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ABSTRACT

Objective: Evaluate the impacts of postural changes and low back pain in university students. Methodology: The research is configured as a cross-sectional observational study of the field study type. Fifty university students were recruited, with or without chronic low back pain. Subjects were assessed for pain level in the lumbar spine using a Likert scale, posture was assessed by photogrammetry, and functionality was assessed using the Roland-Morris disability questionnaire. Descriptive statistics and a Chi-square test ($p<0.05$) were performed using the SPSS 20.0 program. Results: The frequency of chronic low back pain was 62%. Of these, 48.28% reported moderate pain in the last week. The university students did not present physical disability with a mean of 3.42 ± 3.33; the most frequent postural dysfunction was scoliosis, with 84%. There was no statistically significant relationship ($p> 0.112$) between postural changes and chronic low back pain. Conclusion: There was a frequency of chronic low back pain and adult scoliosis in college students. However, there was no direct and significant relationship between postural biomechanical changes and chronic low back pain. ***Level of evidence II; A descriptive cross-sectional study with a quantitative approach.***

Keywords: Spinal Column; Posture; Functional Status.

RESUMO

*Objetivo: Avaliar os impactos das alterações posturais e dor a nível lombar nos universitários. Metodologia: A pesquisa se configura como um estudo observacional transversal do tipo estudo de campo. Foram recrutados 50 universitários, apresentando ou não dor lombar crônica. Os indivíduos foram avaliados quanto ao nível álgico em coluna lombar por meio de escala Likert, a postura foi avaliada por fotogrametria e a funcionalidade por meio do questionário de incapacidade de Roland-Morris. Realizou-se estatística descritiva e teste Qui-quadrado ($p<0,05$) no programa SPSS 20.0. Resultados: A frequência de dor lombar crônica foi de 62%. Destes, 48,28% referiram dor de intensidade moderada na última semana. Na sua totalidade, os universitários não apresentaram incapacidade física com média de $3,42 \pm 3,33$ e a disfunção postural mais frequente foi a escoliose com 84%. Não houve relação estatisticamente significante ($p> 0,112$) na associação de alterações posturais e dor lombar crônica. Conclusão: Houve uma frequência de dor lombar crônica e de escoliose do adulto nos universitários. No entanto, não ocorreu relação direta e significativa entre alterações posturais e dor lombar crônica. **Nível de evidência II; estudo descritivo transversal com abordagem quantitativa.***

Descritores: Coluna Vertebral; Postura; Estado Funcional.

RESUMEN

*Objetivo: Evaluar los impactos de los cambios posturales y el dolor lumbar en estudiantes universitarios. Metodología: La investigación se configura como un estudio observacional transversal del tipo estudio de campo. Se reclutaron 50 estudiantes universitarios, padecieran o no lumbalgia crónica. Se evaluó a los individuos el nivel de dolor en la columna lumbar mediante la escala de Likert, la postura se evaluó mediante fotogrametría y la funcionalidad mediante el cuestionario de discapacidad de Roland-Morris. La estadística descriptiva y la prueba de chi-cuadrado ($p<0,05$) se realizaron en el programa SPSS 20.0. Resultados: La frecuencia de dolor lumbar crónico fue del 62%. De estos, el 48,28% refirió dolor moderado en la última semana. En total los universitarios no presentaron discapacidad física con un promedio de $3,42 \pm 3,33$ y la disfunción postural más frecuente fue la escoliosis con un 84%. No hubo relación estadísticamente significativa ($p> 0.112$) en la asociación de cambios posturales y dolor lumbar crónico. Conclusión: Hubo frecuencia de lumbalgia crónica y escoliosis del adulto en estudiantes universitarios. Sin embargo, no hubo una relación directa y significativa entre los cambios biomecánicos posturales y el dolor lumbar crónico. **Nivel de Evidencia II; estudio descriptivo transversal con enfoque cuantitativo.***

Descriptores: Columna vertebral; Postura; Estado Funcional.

INTRODUCTION

Many postural problems are rooted in the phase of body growth and development related to childhood and adolescence due to a lack of understanding of the main spine problems. Therefore, in this growth phase, there is a prevalence of risk behaviors for the spine, especially those linked to using backpacks and sitting posture.[1] In situations where some body component is altered from the standard considered normal, the human body performs an adaptive state to face better the situation to which it has been exposed, leading to postural changes.[1]

In standard posture, the spine shows normal curvatures, and the bones of the lower limbs are in an ideal position for weight bearing. The neutral position of the pelvis guides to good positioning of the abdomen, trunk, and lower limbs. The thorax and thoracic spine are arranged so that the optimal function of the respiratory organs is favored. The head remains erect and well balanced, reducing the burden on the cervical muscles.[1]

An ideal posture indicates the mechanical efficiency of the kinetic sense, muscular balance, and neuromuscular coordination. On the other hand, postural dysfunction is characterized by a malpositioning of the spine, where curvatures that are not physiological but rather adaptive are emphasized, resulting in stress on the joints, muscles, and vertebrae. This malposition for a prolonged time results in an increase of pressure on the surrounding structures.[2]

As bad posture is adopted in everyday life, an imbalance of forces is created on the spinal bones, especially the intervertebral discs.[3] A prolonged stay in an inappropriate posture can lead to a structural change in the spine since it will receive disproportionate forces and pressures and thus be remodeled incorrectly.[4]

When one remains seated for a long time, there is increased pressure on the intervertebral discs and increased back muscle tension, which can lead to shortening and weakness of these muscles. And, when one tries to compensate for this increased pressure and tension on the spine, improper posture when sitting arises.[4]

The thoracic spine, especially kyphotic posture (hyperkyphosis), has frequently been related as an origin of spinal disorders, this factor being explained by its thoracolumbar-pelvic relationship, which causes lower back pain and poor quality of life.[5] Scoliosis is another prevalent postural alteration, which may be accompanied by localized pain, numbness, burning, and altered gait, which may even evolve into more intense, more difficult to treat.[6]

Common risk factors for postural dysfunctions are lack of correct posture knowledge, sedentary lifestyle, occupational demands, stiff joints, muscle weakness, and poor ergonomic workstations. If not corrected early, bad posture can result in dyspnea, low back pain, tension-type headaches, and, depending on the severity, depression. The most common areas of pain are the lower back (63%), neck (53%), shoulders (38%), and wrists (33%).[2]

Among the causes of low back pain, 90% have no defined origin; for this reason, it is called nonspecific, and there may or may not be lower limb involvement. This pain usually worsens with increased physical exertion, or excessive load during daily activity decreases at rest and is usually aggravated by a sedentary lifestyle and poor posture. It can be classified according to the duration of symptoms as acute when the pain episode is less than six weeks, subacute when it lasts between 6 and 12 weeks, and chronic when it exceeds three months.[7]

Non-specific low back pain is a public health problem worldwide and generates personal, social, occupational, and economic impacts. Psychosocial signs such as inappropriate beliefs about pain, fear of movement, anxiety, stress, depression, and low job satisfaction are characteristic of individuals with low back pain. These clinical signs are mediators of chronic pain and disability.[7]

Thus, it is possible to note that the compromises brought about by postural dysfunctions, especially those linked to spinal disorders, are closely linked to compromises in the musculoskeletal system. Since such a relationship exists, can these changes possibly interfere with functionality in the same proportion?

Based on what was elucidated, field research was conducted to collect data through questionnaires and photogrammetry in college students. Several articles in the literature study low back pain related to postural and lifestyle habits. However, these studies are mainly concerned with children and adolescents.[4]

Therefore, the interest in this research topic arose due to the limited number of studies that relate postural alterations and functionality in university adults. Therefore, this study evaluates how postural changes and low back pain impact college students. Having as specific objectives: (1) verify the postural changes present in college students, (2) identify the presence of physical disability in college students with chronic low back pain, and (3) highlight the association(s) between postural changes and chronic low back pain in college students.

METHODOLOGY

The research was designed as a cross-sectional observational study of the field study type, conducted from August to September 2021. Academics from the health, exact and human areas of the UNIESP University Center who met the inclusion criteria were invited to participate in this research, with an estimated population of 50 academics randomly selected.

The eligibility criteria involved volunteer university students regularly enrolled at the UNIESP University Center, of both genders, in the penultimate or last year of their undergraduate studies and over 18 years of age. University students with other health problems associated with postural alterations and lower back pain, such as protrusions, hernias, and slippage between vertebral bodies, among others, were excluded from the study since this may interfere with the possible relationship between posture and functionality of the university student.

The individuals were recruited through a public call for applications on social media in a convenience sampling to capture the total sample of 50 individuals chosen at random and willing to take the evaluation. The volunteers were evaluated in the Integrated Health Clinic (CIS) in the Physical Therapy sector, in a reserved and appropriate room only once. On that day, photogrammetry, pain assessment, and the application of the Roland Morris disability questionnaire were performed. It should be noted that this researcher carried out all methods.

Due to the Covid-19 pandemic and its power of transmissibility, the research followed the protocols in force by the Ministry of Health to maintain social distance, wear a mask from the beginning and end of data collection, and optionally add a *face shield* or goggles, and use alcohol gel. In addition to these measures, there were restrictions on the number of people in the evaluation room, where only the evaluee and the evaluator remained. A prior appointment was made to avoid crowding, and after each evaluation, all materials were properly sanitized. This is to reduce covid-19 contagion and to protect the evaluators and the present evaluator.

Photogrammetry

Photogrammetry was used to evaluate postural changes in university students. The individuals were directed to a reserved room, where they had an appropriate place for evaluation, with a camera 3 meters away from the voluntary, supported on a tripod at the height of about half the person's height.[8] The marking was done in the lateral and posterior views, with reference points: posterior superior iliac spine, inferior angle of the scapula, spinous process of C4-C7, spinous process of T7-T12, and spinous process of L3-L5,[9] as can be seen in Figure 1. After the photographic records were acquired, the images were stored in a computer for later analysis.

For the analysis of the photographs, the software for Postural Evaluation (SAPO) was used, a relatively simple and free program that provides angular values besides linear measurements. It is based on the digitization of spatially defined points, which provides several functions such as image calibration, zoom, free point marking, distance, and body angle measurements,[10] as seen in Figure 2.
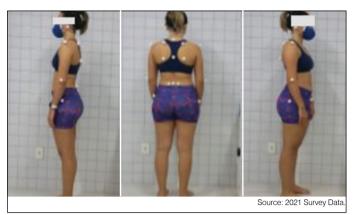
Figure 1. Anatomical points in view: lateral and posterior.

Figure 2. Angles analyzed in photogrammetry (1- Identification of hyperlordosis, 2- Identification of hypolordosis, 3- Identification of hyperkyphosis, 4- Identification of hypokyphosis, 5- Presence of scoliosis)

Roland-Morris Disability Questionnaire

The Roland-Morris disability questionnaire was used to evaluate functionality for participants who reported chronic low back pain for more than 12 weeks. It consists of 24 self-answer questions, which the examinees complete in less than five minutes. The questions have a dichotomous answer (yes or no), and the result represents the sum of the yes answers.[11] The score ranges from zero (no disability) to 24 (severe disability), values above 14 points show physical disability, and the minimum clinically important difference is 5 points.[12]

Pain Assessment

The subjects were asked about the presence of low back pain in the last week. If are reported pain, he/she was asked about pain intensity on a 5-point Likert scale where 5 corresponds to very severe pain, 4 to severe pain, 3 to moderate pain, 2 to mild pain, and 1 to very mild pain.

The sample was initially distributed into two groups: (1) low back pain and (2) no low back pain; after determining the number of each group, the low back pain group was allocated to be the independent variable of the study, and it was compared regarding the presence of postural alterations.

The data collected in the survey were initially tabulated using Excel® software, and then the data were analyzed using descriptive statistics and measures of central tendency. Statistical analysis was performed using SPSS software version 20.0; the Kolmogorov-Smirnov test was used to evaluate the normality of the data, which were presented by absolute and relative frequencies, mean, and standard deviation. The Chi-square test was used to investigate the possible association between postural biomechanical changes and chronic low back pain. The significance level adopted was p≤0.05.

The research was carried out after approval by the Research

Ethics Committee of UNIESP under the opinion number: 4,864,625 and CAAE: 49857521.4.0000.5184, following CNS Resolution No. 466/12. The volunteers were also instructed to sign the Informed Consent Form (ICF).

RESULT

Fifty university students regularly enrolled in the UNIESP University Center participated in the present study. Females had a higher frequency in the total sample (n=40; 80%). Regarding the marital status of the university students, the sample was composed of singles (n=46; 92%). Age ranged from 18 to 30 years, averaging 23.04 ± 2.83 years. The course for most participants was Physical Therapy, with (n=38; 76%) above the others. The night shift was the most frequent in the evaluation (n=31; 62%), and they were in their last year (n=28; 56%). Most of the sample was not working (n=31; 62%), and did not self-medicate (n=26; 52%). The university students in this study said they practice some physical activity (n=28; 56%) and have chronic low back pain (n=31; 62%), as seen in Table 1.

In the analysis of chronic low back pain presence through the Roland-Morris disability questionnaire, most of the 31 university students who reported this clinical condition were women (n=27; 87.10%). The total score obtained in this questionnaire was an average of 3.42 ± 3.33, i.e., the students had no physical disability.

As for the presence of chronic low back pain, the majority of the sample (n=29; 58%) said they had had an episode of chronic low back pain at least once in the last week, and females were the most affected (n=25; 50%). Regarding pain intensity, (n=14;

Table 1. Sociodemographic characteristics of university students linked to the UNIESP University Center, (n=50).

Variables	n = 50	%
Sex		
Male	10	20%
Female	40	80%
Age		
18-25	43	86%
26-30	5	10%
>30	2	4%
Course		
Physiotherapy	38	76%
Dentistry	7	14%
Psychology	4	8%
Interior Design	1	2%
Shift		
Morning	19	38%
Night	31	62%
Graduation year		
Penultimate	22	44%
Latest	28	56%
Marital Status		
Single	46	92%
Married	4	8%
Works		
Yes	19	38%
No	31	62%
Practices activity physics		
Yes	28	56%
No	22	44%
Self-Medication		
Yes	24	48%
No	26	52%
Has lower back pain chronicle		
Yes	31	62%
No	19	38%

Source: 2021 Survey Data.

48.28%) reported moderate pain according to the Likert scale, as seen in Table 2.

Regarding the frequency of postural alterations, scoliosis proved to have a high frequency, with 84% of the sample, followed by hyperlordosis with 18%, as seen in Table 3.

Table 4 shows the association between chronic low back pain and postural changes identified in university students and their level of significance.

DISCUSSION

The results obtained in the research revealed a high frequency of postural biomechanical alterations, specifically scoliosis. However, by associating postural biomechanical changes with chronic low back pain, it is possible to see that chronic low back pain occurs regardless of postural problems.

In response to the research objectives, a high frequency of university students with chronic low back pain was identified, most of them being young, single, in their last year of undergraduate studies, enrolled in the evening shift, physiotherapy students, practicing some physical activity, not working, and not self-medicating.

Much research is being done on postural changes' influence on lifestyle and functionality. However, there are few studies conducted with university students as the target public.[1,4,13] Through this research, we observed a frequency of female participation of 80% of the total sample, corroborating the research of Gomes-Neto; Sampaio; Santos,[14] where 200 university students in the health area participated in the study, with 81% being female.

Confronting this finding, a study with 69 Physical Education students showed a prevalence of males with 85.5% of the total sample[15], and this result was verified with another study conducted with 180 Physical Education students where there was a prevalence of males with 65.5% of the total sample.[16] Thus, it is observed that the female public has been conquering a growing space in universities, health courses, and other areas of knowledge. However, this can often be explained by the course attracting more women than men.

Regarding age, university students aged 18 to 30 were evaluated, with a mean of 23.04 ± 2.83 years, with the 18-25 age group being the most frequent in the study. Although low back pain is more prevalent in people older than the age analyzed in this study, there are already studies showing that more and more young adults aged 18-30 years are reporting chronic pain, especially low back pain.[18-20]

As in the study by Morais, Silva, and Silva[21] of the total respondents, 72.9% were female, 43.2% were in an age range of 21-24 years, with a mean age of 22.8 ± 5.0 years. In the study by Lima et al.,[22] participants aged 17 to 30 years, with an average of 20.7 ± 2.2 years. The studies presented show that the people who attend universities are young adults, and this population is becoming increasingly affected by low back pain at an early age.

Regarding the practice of physical activity, a study found that 62.28% of the undergraduates do not perform any physical activity or practice some type of physical activity, which may be related to the high prevalence of back pain, and a sedentary lifestyle is considered a risk factor for the onset of spinal pain.[23] The present study brought an unusual but positive finding; 56% of the voluntaries in this study said they engaged in some physical activity. This finding was divergent in the study by Rodrigues[24] where 56 physiotherapy students from the 1st to the 4th year of the course were included, and 69.6% of the volunteers said they did not practice physical activity.

However, the study by Cavalcanti, Cruz, and Santos[16] counted on the participation of 180 physical education undergraduate students and showed that 85.7% of the participants had a satisfactory level of physical activity. In addition, this study further observed that with advancing age, social class and shift are related to the level of physical activity. Thus, this study reinforces the finding that university students increasingly engage in physical activity despite the higher result than the present research.

In theory, people with a higher level of education should present a greater capacity for pain self-management and, consequently, less chronification of their symptoms.[13] Regarding chronic low back pain, 62% of university students reported having chronic low back pain, and 58% reinforced having felt it during the last week, being this more frequent in students in their last year (54%). This fact was also found in the study by Morais; Silva; Silva,[21] who evaluated 410 physical therapy students about the factors associated with low back pain and obtained a result that the prevalence of low back pain in the last year was 56.3% (95%CI:51.5-61.2), and in the last week it was 27.1% (95%CI:22.8-31.4).

This finding can be explained by the students, who are in the last year of their course, a period in which there is supervised internship and course completion work (TCC), which require more effort, more time in front of the computer, and a tendency to adopt anti-ergonomic postures, and a tendency to neglect their health.[25-26] Differently from this finding, Dias et al.,[27] in their study with 340 students, verified a higher prevalence of low back pain in the first periods compared to the last ones, in which 9.41% of the volunteers had pain. In comparison, the students in the last year had a lower prevalence of low back pain.

Table 2. Pain intensity in the last week in university students at the UNIESP University Center according to gender, (n=50).

Variables	Female n (%)	Male n (%)	Total n (%)
Chronic low back pain in the last 7 days (n = 50)			
Yes	25 (50%)	4 (8%)	29 (58%)
No	15 (30%)	6 (12%)	21 (42%)
Pain intensity (Likert Scale)ª (n = 29)			
Very mild pain	2 (6,90%)	2 (6,90%)	4 (13,79%)
Mild pain	7 (24,14%)	-	7 (24,14%)
Moderate pain	12 (41,38%)	2 (6,90%)	14 (48,28%)
Intense Pain	4 (13,79%)	-	4 (13,79%)
Very Intense Pain	-	-	-

ªOnly for academics with pain in the last week. **Source:** 2021 Survey Data

Table 3. Frequency of postural alterations in university students at the UNIESP University Center, (n=50).

Variables	n = 50	%
Thoracic Kyphosis		
Physiological	41	82%
Increased	4	8%
Decreased	5	10%
Lumbar lordosis		
Physiological	33	66%
Increased	9	18%
Decreased	8	16%
Scoliosis		
Present	42	84%
Absent	8	16%

Source: 2021 Survey Data.

Table 4. Association between postural alterations and chronic low back pain in undergraduate students at the UNIESP University Center, (n=50).

	Chronic Low Back Pain	
Variables	Coefficient	Test
Kyphosis - Physiological	1,436	p=0,231
Kyphosis - Increased	2,526	p=0,112
Kyphosis - Decreased	0,009	p=0,923
Lordosis - Physiological	0,008	p=0,777
Lordosis - Increased	0,101	p=0,750
Lordosis - Decreased	0,001	p=0,975
Scoliosis	0,683	p=0,409

Chi-square test; *significant association (p<0.05). Source: 2021 Survey Data.

Another factor that favors low back pain in females is the fact that they present some anatomical and functional characteristics (smaller stature, less muscle mass, less bone mass, more fragile joints and less adequate to strenuous physical effort, more fat) and characteristics related to the modulation of the nervous system, which can collaborate to the appearance and greater intensity of pain.[21] Studies have also highlighted the influence of constitutional, endocrine, and cultural factors and those related to life habits in the predominance of pain in women, pointing out the variation in the occurrence of some types of pain during the menstrual period.[28]

Regarding pain intensity, of the 29 participants who responded to the Likert scale, 24.14% reported feeling pain of mild intensity, and 48.28% reported feeling pain of moderate intensity in the last week. As the Likert scale is a neutral scale that fits the research objective, it was impossible to find research that obtained similar results to the present research using this instrument. Perhaps the result could be better discussed if the visual analog scale (VAS) were used because it is a more sensitive and common scale for pain assessment.

Regarding the level of physical disability, a mean score of 3.42 ± 3.33 was obtained, which according to the total score of the Roland-Morris questionnaire, represents: no disability. Silva et al.'s[29] study with 47 physiotherapy undergraduates evaluated by the Roland-Morris questionnaire verified that 61.71% of the interviewees obtained a score >= 16 points, presenting minimal disability, and 38.29% obtained a score <16, resulting in no disability.

However, in the study by Sousa, Leal, and Carvalho,[18] 171 physical therapy and psychology students answered the Roland-Morris questionnaire and the Oswestry Index; the results of the study revealed that 98.6% of the participants had minimal disability according to the Oswestry Index; the results of the Roland-Morris questionnaire, however, did not show disability of the students studied with an average score of 1.5 ± 1.4. Therefore, these studies show that the belief in self-efficacy influences disability; individuals with high self-efficacy can maintain most of their activities, despite the pain.[30] The lack of physical disability verified in the present study can also be explained by the fact that most of the sample practices some type of physical activity, which in the literature is considered a habit to alleviate chronic low back pain.[31]

Scoliosis is a spine deviation due to a lateral curvature in the frontal plane, related or not to the rotation of the vertebral bodies in the axial and sagittal planes. Therefore, it is seen as pathological as soon as the curvature is greater than 10°. Its categorization is described by its severity, being: mild (between 10° and 20°); moderate (between 20° and 40°), and severe (greater than 40° or 50°).[32] On the other hand, lumbar hyperlordosis is understood as an increase in lumbar curvature above the angles considered normal for physiological lordosis, which is about 50° and is commonly related to weak abdominal muscles.[33]

In light of this, computerized photogrammetry has been recommended for postural evaluations because it is a valuable resource for recording postural changes and because it is capable of recording slight changes interrelating different parts of the body that are difficult to measure. It can be described as a qualitative assessment tool with low cost, high precision, and faithful presentation of results. It is performed through imaging, with great advantages and effectiveness in clinical assessment.[34]

Regarding the frequency of postural alterations found in the participants of this research through photogrammetry, scoliosis was the most frequent, with a percentage of 84%, followed by hyperlordosis with 18%. In their study, Morales, Altamar, and Jauregui[15] evaluated 69 university students in the Physical Culture, Recreation, and Sports degree program. When analyzing the alterations in the spine of the volunteers through the postural evaluation format, it was identified that 17.3% of the students presented hypokyphosis, 25% "s" scoliosis, and 44.2% "c" scoliosis. The present research highlights the high frequency of adult scoliosis in the young university students participating in the survey.

Regarding the association between postural alterations and low back pain, no statistically significant value was found (p> 0.112) to establish a direct relationship that postural alterations aggravate low back pain symptoms, which can occur independently of a postural problem. According to Fischer[35] in his study with 40 university women, in which they were divided into a group with lower back pain and a control group, the result of the research suggested that there is no direct and significant relationship between postural alterations in young university students with and without lower back pain complaints, thus corroborating the present study. However, Cervantes-Soto et al.,[36] in their study with 90 Nutrition and Physiotherapy students in the penultimate semester, found that posture was a determining factor for these students to suffer lower back pain besides having a painful perception due to anti-ergonomic measures of the furniture in the university.

Although the association result was not significant, the literature regarding the quality of life in undergraduate students has shown that several aspects of university life (workload in different periods and the relationship between class time and work/internship) are associated with postural deviations, the incidence of lower back pain, and other conditions that affect the many components of quality of life.[14,21,37,38]

Therefore, low back pain is related to a public health problem due to the multiple factors associated with daily life affecting a large part of the population. In the academic environment, it is possible to observe that university students may be much more vulnerable to such an affliction due to the environment to which they are exposed, experiencing intense routine changes.[38]

In this research, the sample size was not large enough to establish a relationship between the type of postural change and chronic low back pain. In addition, it was noticed that most university students presented physiological kyphosis and lordosis, making the global association of postural disorders and chronic low back pain difficult. Another limitation was the heterogeneity of the participants per course. Although the study has some limitations and the cross-sectional study design does not allow for causal inference, the observed relationships provide valuable evidence for future research and public policy formulation.

CONCLUSION

Given this, it can be concluded that health students, especially those in physical therapy, had a high frequency of chronic low back pain, with moderate pain being the most commonly reported, a significant frequency of adult scoliosis, and no physical disability. Despite this, when postural alterations and chronic low back pain were associated, it was verified that there was no relationship between postural problems and chronic low back pain.

Finally, it is hoped that the information in this research can be useful for further studies on the health of university students. Thus, although the population studied were mostly health area students, the findings apply to all undergraduates who present the risk factors mentioned in the article and are applicable in preventing inappropriate postures, both within and outside the university.

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