

Comprehension of coping attitudes and red flags of low back pain by students of the first and seventh semesters of health courses

Compreensão sobre atitudes de enfrentamento e sinais de alarme da lombalgia por estudantes de primeiro e sétimo semestres dos cursos da área da saúde

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ABSTRACT

BACKGROUND AND OBJECTIVES: Low back pain is a common complaint among the world's population. Students in the health sector are susceptible to it due to their routines with a heavy study load. The objective of this study was to analyze health students' understanding of coping attitudes and the red flags of low back pain.

METHODS: This is a cross-sectional, descriptive and analytical study carried out at a public university in northeastern Brazil. Between October 2022 and June 2023, a low back pain education training program was carried out, with the application of an online questionnaire through the Google Forms tool, in pre-test and post-test formats, containing six sections of questions from semi-structured questionnaires, interposed by the education program on the subject. The variables investigated were sociodemo-

graphic data, prevalence of low back pain, coping attitudes and red flags.

RESULTS: A total of 260 students participated in the research, most of whom were in the first semester (61.5%), aged 21 years or older (51.2%), and female (61.2%). The majority had no knowledge about coping attitudes (73.1%) and red flags for low back pain (94.2%) in the pre-test, but acquired it in the post-test (91.9% and 78.5%, respectively). The McNemar inferential test showed that the approach to the topic influenced the appropriate conduct required in the post-test ($p < 0.001$).

CONCLUSION: Understanding coping attitudes and red flags of low back pain contributed to the education of students and optimized the assessment practices for patients with low back pain.

Keywords: Health education, Health sciences students, Low back pain, Occupational health, Public health.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A lombalgia é uma queixa frequente na população mundial. Os estudantes da área da saúde são suscetíveis em decorrência de uma rotina com elevada carga horária de estudos. O objetivo deste estudo foi analisar a compreensão dos estudantes da área da saúde sobre as atitudes de enfrentamento e os sinais de alarme da lombalgia.

MÉTODOS: Trata-se de um estudo transversal, descritivo e analítico, realizado em uma universidade pública do nordeste brasileiro. Entre outubro de 2022 e junho de 2023, foi realizada uma capacitação de educação em dor lombar, com a aplicação de um questionário on-line por meio da ferramenta Google Forms, nos formatos de pré-teste e pós-teste, contendo seis seções de perguntas oriundas de questionários semiestruturados, interpostas pelo programa de educação acerca do tema. As variáveis investigadas foram referentes a dados sociodemográficos, prevalência de lombalgia, atitudes de enfrentamento e sinais de alarme.

RESULTADOS: 260 acadêmicos participaram da pesquisa, dos quais a maioria era do primeiro semestre (61,5%), com idade igual ou superior a 21 anos (51,2%), sexo feminino (61,2%), não teve conhecimento sobre as atitudes de enfrentamento (73,1%) e os sinais de alarme da lombalgia (94,2%) no pré-teste e passou a tê-lo no pós-teste (91,9% e 78,5%, respectivamente). O teste in-

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HIGHLIGHTS

- Low back pain is a chronic disease prevalent in the Brazilian population
- Knowing how to demystify and identify the red flags of low back pain is essential for health students
- The educational training given to the students significantly increased their knowledge of how to deal with low back pain

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ferencial de McNemar evidenciou que a abordagem sobre o tema influenciou a conduta adequada exigida no pós-teste ($p < 0,001$).

CONCLUSÃO: A compreensão de atitudes de enfrentamento e os sinais de alarme da lombalgia contribu[iram para a educação dos estudantes e otimizaram condutas de avaliação de pacientes com dor lombar.

Descritores: Dor lombar, Educação em saúde, Estudantes de Ciências da Saúde, Saúde ocupacional, Saúde Pública.

INTRODUCTION

Low back pain (LBP) is a term commonly used to report pain between the lower edge of the ribs and above the lower gluteal line, with symptoms of pain or discomfort that may or may not radiate to the lower limbs^{1,2}. LBP is closely linked to psychosocial elements and can fluctuate based on lifestyle patterns, such as heavy study loads and lack of physical exercise³. Low back pain is classified into three types: acute, up to two weeks; subacute, between six weeks and three months; and chronic, over a period of more than three months⁴.

Actions to deal with LBP focusing health students contribute to proper management of the condition and a consequent reduction in pain⁵. The integration of this theme into the academic environment promotes positive changes in the pain coping skills of health students, provided there is adequate training on the subject⁶. This contributes to significant changes in erroneous beliefs about the identification, management and prevention of LBP by students, leading them to pass on appropriate information about the myths surrounding this condition⁷.

The warning signs, or red flags, are indicators of serious illnesses and, in the case of lumbar complaints, are promising for suspecting critical spinal disorders, which, in association with the patient's history and physical examination, demand more incisive approaches⁸.

LBP is among the top 10 reasons for seeking emergency medical attention, a condition that is increasingly recurring in the lives of the global population, especially among students. Around 70% to 80% of people will experience some form of LBP in their lifetime⁹. Nationally, this disease has a 42% prevalence rate among patients with chronic pain, while in a group of 757 students, the rate was 18.9%^{1,10}. In Ceará, a study showed that 16 individuals (53.3%) among a group of 30 dentists in the Cariri region were affected by this condition¹¹. In Paranaguá, PR, in a study related to the use of public rehabilitation services, 91 individuals (6.2%) were followed up for low back pain¹².

Chronic low back pain, which negatively impacts work activities, especially those of a repetitive nature, favors the persistence of the painful sensation and the consequent decrease in productivity, which brings socioeconomic costs and increases absenteeism in the academic environment¹³. Over the years, costs related to LBP for the public health system have grown rapidly, with amounts close to 30 million reais between 2013 and 2018, probably increased by the high number of surgical procedures, with an average cost of 3290 Brazilian reais, which indicates greater severity in the approach to LBP¹⁴. The collective socio-economic repercussions are associated with personal costs for rehabilitation

and the purchase of painkillers, which aggravates the situation of those affected¹⁵.

The justification for this study is due to the fact that the subject is little covered in the academic environment and the need for adequate training on coping attitudes and the red flags of LBP¹⁶. Knowledge about this condition can lead to positive changes in academics' perception of LBP, resulting in proper management³ and reduction in the impact of this pain on the academic routine¹⁷. In Brazil, the approach of educational strategies focused on health students is not a reality, as it is in Saudi Arabia, so it is justified to explore this panorama with Brazilian students as well⁵. LBP is a potential aggravating factor in students' academic performance, and, for this reason, educational interventions should be strengthened, while the Trauma and Intensive Care Medicine League at the State University of Ceará (*Liga do Trauma e Medicina Intensiva da Universidade Estadual do Ceará*) will provide opportunities to broaden the academic debate on LBP. The aim of this study was to analyze the understanding of coping attitudes and warning signs of low back pain by students in the first and seventh semesters of health courses.

METHODS

This was a cross-sectional, descriptive and analytical study carried out at a public university in northeastern Brazil from October 2022 to June 2023.

The State University of Ceará (*Universidade Estadual do Ceará* - UECE) was chosen as the study site because it represents the largest public institution in the state, which provided greater potential in terms of the number of students taking part in the study, as well as being the researchers' study environment. The university is ranked 800th in the world for health sciences research (Times Higher Education, 2022), and this research is an important ally in increasing this position.

The population of this study was made up of 2,061 students effectively enrolled in the undergraduate courses that make up the Health Sciences Center: Medicine (359), Nursing (391), Nutrition (309), Occupational Therapy (139), Biological Sciences (504) and Physical Education (359); located on the Itaperi campus in Fortaleza, Ceará.

This population was chosen because of the high occupational risks, due to the exhaustive workload associated with stress in the routine of studies conciliated with internships and college classes, which occurs mainly in the final semesters of the course¹⁷⁻¹⁹.

In this group, educational actions are important to expand patient care through humanized care and the creation of bonds, conditions fostered by the protagonism adopted by health students²⁰. In addition to the research, the choice was based on the possibility of reverberating the knowledge shared during the students' academic and professional practice.

The sample included students from the first and seventh semesters, selected on the basis that students in more advanced semesters have fewer academic activities on campus. This led to an investigation into the prevalence and knowledge of coping attitudes and red flags, given that the progression of the semester is an exposure factor for LBP. Those with a history of trauma to

the lumbar region were excluded, due to the possible occurrence of bias when including students whose pain originated from trauma and not from the conditions relevant to the research. The sample calculation used a prevalence of 42%, a sampling error of 5% and a significance level of 5%, resulting in 328 students. The final sample ended up at 260 students, with losses in the sample corresponding to 68 students, which was due to the fact that only the first and seventh semesters were considered in this study, as the aim was to compare the knowledge of undergraduates on entering university with more advanced students. This was justified by the fact that students in the last few semesters, from the eighth onwards, do compulsory internships in hospitals in the city and do not attend university in person.

Study variables

The variables included in this study were sociodemographic data, prevalence of LBP, coping attitudes and red flags. For the purposes of statistical analysis, the variables were also arranged as dichotomous data, defined as exposed (0) and unexposed (1), in line with the literature: age (under 21: 0; equal to or over 21: 1), gender (male: 0; female: 1), ethnicity (brown or black: 0; white: 1), semester (7th: 0; 1st: 1), income (less than 1.5 minimum wage: 0; 1.5 or more minimum wage: 1), having another occupation (Yes: 0; No: 1); height and weight was related by BMI calculation (greater than 25: 0; less than 25: 1); do you know what LBP is (no: 0; yes: 1)?

The variables relating to knowledge about coping attitudes towards LBP before and after the test were dichotomized into exposed and unexposed, according to the answers in the corresponding section.

The score was calculated by inverting the individual Likert scale values (1,2,3,4,5) computed from questions 1, 2, 3, 6, 8, 10, 12, 13 and 14, and then adding up the nine statements. The other questions were not computed, following the methodology proposed for the questionnaire. The total score ranged from 9 to 45 points, so that a higher score indicated greater knowledge and fewer mistaken beliefs about low back pain. As a dichotomization criterion, the median term, 27, was chosen to represent the cut-off between exposed and unexposed (score below 27: 0; above 27: 1). In the section corresponding to knowledge of red flags, for the dichotomization process, exposed participants (0: who got less than 3 alarm signals right or marked more than 1 distractor) and unexposed participants (1: who marked three or four of the true alarm signals and marked at most one of the distractors, were thus considered proficient in this area) were catalogued.

The study's outcomes were: I) the correct perception of attitudes towards coping with LBP dichotomized into no (0) and yes (1); II) the correct marking of the majority of warning signs for LBP, dichotomized into no (0) and yes (1).

Data collection

The approach to data collection was carried out by the students responsible, through identification and explanation of the general aspects of the research, from filling in the Free and Informed Consent Term (FICT) to interventions and potential doubts that arose in the process.

As a data collection tool, a semi-structured, standardized, pre-tested and printed form was used before and after each class on the Itaperi *campus*.

The form was divided into a pre-test and a post-test. The pre-test consisted of four sections relating to data: sociodemographics (nine questions), prevalence of LBP (four questions); coping attitudes (14 questions) and red flags (one question).

The section on sociodemographic data was designed to identify students according to questions about course, semester, age, height, weight, family income, marital status, skin color and occupation (whether or not they have one), as well as being a student. Knowledge of the variables and their relationship with LBP is essential in developing preventive work with university students²¹.

With regard to the prevalence of low back pain, we used the questionnaire already validated in the literature, the Oswestry Disability Questionnaire (ODI), made up of 10 sessions of questions, answered on a Likert scale²². For the form, multiple selection questions were allocated so that the student could answer, in sequence, whether they knew what low back pain was; whether they had back pain and in what situation this pain occurred; according to the ODI questionnaire: personal care, lifting loads, walking, sitting, standing, sleeping, social life, sex life and travel. In the section on coping attitudes, the Modified Back Beliefs Questionnaire (MBBQ) was used in its entirety, adapted and translated into Portuguese, to assess myths about coping attitudes to LBP²³.

The section on knowledge of warning signs, drawn up in accordance with the scientific literature, indicated that fracture, infection, cancer and cauda equina syndrome are the four serious causes whose signs and symptoms, known as "red flags" or warning signs, urgently need to be identified when dealing with LBP^{8,24}. As the term "*cauda equina*" is more specific, this research decided to replace it with "herniated disc", which is more widespread and also represents a lumbar radiculopathy. Three distractors were listed: muscle strain, fatigue and poor posture.

Between completing the pre-test and post-test, there was a brief period of training and health education provided by the researchers on coping attitudes and warning signs of LBP, based on the scientific literature. The training consisted of showing a 10-minute video on the main topic "low back pain", given by the authors of this study. The guidelines provided in the video were aimed at health students, with the intention of demystifying concepts and alerting them to the alarming signs of LBP. After the video was shown, a period was opened for questions and doubts from the participants, in which each author had to answer them before the post-test was taken.

The post-test consisted of two sessions, identical to those for coping attitudes and red flags, to analyze the impact of the training on learning about both of the study's outcomes.

Ethical aspects

This research followed Resolution 466/2012 and all those who refused to take part in the research or did not sign the FICT were excluded and not included in the sample. All participants had

access to the FICT, the definitions and conditions of which were explained by the researchers to ensure that people understood that they had to sign the document in order to take part. After a brief introduction and reading of the FICT, the candidates were asked if they were interested in collaborating with the research; if so, the FICT was signed, and the interview began. The project was approved by the Research Ethics Committee of the State University of Ceará, Itaperi *Campus*, under opinion number 5.626.162.

Statistical analysis

The data collected was stored in Google Sheets to make it easier for the researchers to fill in and then exported to Microsoft Office Excel 2019 software. To carry out the statistical analysis, the data was transferred to the Statistical Package for the Social Sciences (SPSS) version 24.0.

Absolute and percentage frequencies were used to describe the categorical variables. Next, the possible associations between the outcomes (knowledge of coping attitudes and warning signs) and the categorical variables were analyzed inferentially, considering the unadjusted model, using the Wald chi-square test, considering the descriptive level $p < 0.20$. In the adjusted model, only the significant variables were considered ($p < 0.05$) and the model was adjusted using the Omnibus Test. Characteristics measured before and after the test were compared using McNemar's test.

RESULTS

This study was carried out with a final sample of 260 students from health courses, predominantly Nursing (59, 22.7%), followed by Physical Education (53, 20.4%), Medicine (47, 18.1%), Nutrition (40, 15.4%), Biological Sciences (33, 12.7%) and Occupational Therapy (28, 10.8%). At the time of the pre-test, it was found that the majority were not aware of coping attitudes (190, 73.1%) and were not aware of the warning signs of low back pain (245, 94.2%). In the post-approach, the majority were aware of coping attitudes (239, 91.9%) and of the warning signs of low back pain (204, 78.5% - table 1).

Socio-economic characteristics showed that the majority of students were in their first semester (160, 61.5%), aged 21 or over (133, 51.2%), female (159, 61.2%), brown (177, 68.1%) and with an income of 1.5 minimum wages or more (150, 57.7% - table 2).

McNemar's test revealed that the approaches to LBP influenced opinions on knowledge of "attitudes to coping with low back pain" and "warning signs of low back pain" ($p < 0.001$). Before the training (pre-test), 26.9% had knowledge of "coping attitudes to low back pain" and 5.1% had knowledge of "warning signs of low back pain". After the intervention, knowledge of "coping attitudes to low back pain" rose to 91.9% (25.0%+66.9%) and of "warning signs of low back pain" to 78.3% (4.3%+74.0% - table 3).

When checking for an association between sociodemographic characteristics and knowledge of coping attitudes for low back pain, there was a significant association, with $p < 0.20$, bet-

Table 1. Number and percentage of first and seventh semester students, by course and by pre-test and post-test performance

Variables	n	%
Courses		
Biological Sciences	33	12.7
Physical Education	53	20.4
Nursing	59	22.7
Medicine	47	18.1
Nutrition	40	15.4
Occupational therapy	28	10.8
Knowledge of coping attitudes at pre-test		
No	190	73.1
Yes	70	26.9
Knowledge of coping attitudes at post-test		
No	21	8.1
Yes	239	91.9
Knowledge of red flags for LBP at pre-test		
No	245	94.2
Yes	13	5.0
Knowledge of red flags for LBP at post-test		
No	56	21.5
Yes	204	78.5

Table 2. Number and percentage of students in the first and seventh semesters of health courses by sociodemographic characteristics

Variables	n	%
Semester		
7°	100	38.5
1°	160	61.5
Age (years)		
<21	127	48.8
=> 21	133	51.2
Gender		
Male	101	38.8
Female	159	61.2
Color		
Brown	177	68.1
Not brown	83	31.9
Income (in minimum wages)		
<1.5	110	42.3
=>1.5	150	57.7

ween the following characteristics: course ($p < 0.001$), semester ($p = 0.157$), age ($p = 0.029$) and color ($p = 0.022$ - table 4).

When checking the association between sociodemographic characteristics and knowledge of pre-test warning signs of low back pain, it was observed that only the characteristics course ($p = 0.004$) and gender ($p = 0.09$) had a significant association with $p < 0.20$ (Table 5).

Table 3. Number and percentage of students by knowledge of coping attitudes, left; by knowledge of LBP red flags, right; and pre-test and post-test

	Post-test				Post-test			
	Yes		No		Yes		No	
	n	%	n	%	n	%	n	%
Pre-test								
Yes	65	25	5	1.9	11	4.3	2	0.8
No	174	66.9	16	6.2	191	74.0	54	20.9

Table 4. Number and percentage of students by socioeconomic variables and knowledge of coping attitudes pre-test

	Knowledge of coping attitudes towards LBP at pre-test				OR	CI 95%	p-value		
	Yes		No						
	n	%	n	%					
Courses							<0.001	a	
Biological Sciences	32	97.0	1	3.0	1.01	0.92	1.10		
Physical Education	41	77.4	12	22.6	0.80	0.68	0.94		
Nursing	29	49.2	30	50.8	0.51	0.39	0.67		
Medicine	26	55.3	21	44.7	0.57	0.44	0.75		
Nutrition	35	87.5	5	12.5	0.91	0.79	1.04		
Occupational therapy	27	96.4	1	3.6	1.00				
Semester								0.157	a
7°	78	78.0	22	22.0	1.1	1.0	1.3		
1°	112	70.0	48	30.0					
Age (years)								0.029	a
<21	85	66.9	42	33.1	0.8	0.7	0.9		
=> 21	105	78.9	28	21.1					
Gender								0.275	a
Male	70	69.3	31	30.7	0.9	0.8	1.1		
Female	120	75.5	39	24.5					
Color								0.022	a
Brown	137	77.4	40	22.6	1.21	1.01	1.45		
Not brown	53	63.9	30	36.1					
Income (in minimum wages)								0.459	a
<1.5	83	75.5	27	24.5	1.1	0.9	1.2		
=>1.5	107	71.3	43	28.7					

a = Wald chi-squared test.

Table 5. Number and percentage of students by socio-economic variables and knowledge of coping attitudes towards LBP at post-test

	Knowledge of coping attitudes towards LBP at post-test				OR	CI 95%	p-value	
	Yes		No					
	n	%	n	%				
Courses							0.004	b
Biological Sciences	32	97.0	1	3.0	0.97	0.91	1.03	
Physical Education	51	96.2	2	3.8	0.96	0.91	1.01	
Nursing	53	93.0	4	7.0	0.93	0.87	1.00	
Medicine	42	89.4	5	10.6	0.89	0.81	0.99	
Nutrition	39	97.5	1	2.5	0.98	0.93	1.03	
Occupational Therapy	28	100.0	0	0.0	1.00			

Continue...

Table 5. Number and percentage of students by socio-economic variables and knowledge of coping attitudes towards LBP at post-test – continued

	Knowledge of coping attitudes towards LBP at post-test				OR	CI 95%	p-value	
	Yes		No					
	n	%	n	%				
Semester								
7 th	92	93.9	6	6.1	0.98	0.92	1.04	b
1 st	153	95.6	7	4.4				
Age (years)								0.732
<21	120	94.5	7	5.5	0.99	0.94	1.05	a
=> 21	125	95.4	6	4.6				
Gender								0.090
Male	93	92.1	8	7.9	0.95	0.89	1.01	a
Female	152	96.8	5	3.2				
Color								0.580
Brown	169	95.5	8	4.5	1.02	0.95	1.09	b
Not brown	76	93.8	5	6.2				
Income (in minimum wages)								0.390
<1.5	105	96.3	4	3.7	1.03	0.97	1.08	a
=>1.5	140	94.0	9	6.0				

a = Chi-squared test; b = Likelihood-ratio test.

DISCUSSION

LBP is a chronic disease prevalent in the Brazilian population, which has beliefs about coping with it. In addition, this pain is related to the affected person's lifestyle, such as repetitive movements, physical inactivity, psychosocial factors and others. In view of this, sub-themes were defined for the discussion: sociodemographic aspects; previous knowledge and coping attitudes; and warning signs and post-test interference.

Some sociodemographic variables are reflected in the findings of this study. Social aspects are a determining factor in the onset of LBP, given that health course students have exhausting periods of study and extracurricular activities. In addition, more advanced semesters have greater complaints of LBP, due to neglect of health with physical overload and inadequate posture, generating incapacity for work²⁵. It is also true that income can contribute to prolonged pain, as it often hinders access to specialists and pain relief methods^{26,27}. Therefore, students should be more aware of self-care in order to care for others, because professional qualification is not just about study, but is also, and especially, related to mental and physical health. From the point of view of economic power, managers could create methodologies for relieving LBP related to greater training of health professionals in basic health units on LBP red flags and seek better treatment for patients.

This study found that most students had prior knowledge of the subject, but did not act correctly when faced with pain. That said, many believe that the physical limitation caused by low back pain means that they cannot exercise. However, the

best therapy for this chronic pain is regular physical activity, which is more important than physiotherapy without exercise and the use of pain-relieving drugs. However, when health professionals look for the etiology of the disease only in relation to the patient's physical condition, this hinders the initiation of therapy. Psychosocial bias is one of the causes of the disease^{28,29}. This illustrates the importance of health professionals treating patients with psychosocial and humanized questions, moving away from the biomedical model. At the same time, health promotion linked to knowledge and a coping attitude towards low back pain will help to dissolve beliefs and improve adherence to treatment.

The results of this study showed that the majority of those surveyed got the alarm signs right after taking part in educational training on the main serious etiologies that can lead to LBP. At the same time, a study which included doctors from Jazan, Saudi Arabia, found that the majority of the population surveyed were able to recognize the main warning signs, which led to patients identified with these symptoms being better referred for specialist assessment³⁰. In another study in Saudi Arabia, this time in the Riyadh region, 85% of the participants knew how to recognize the red flags, but only 30% actively asked their patients about the warning signs of LBP during consultations³¹. Thus, having knowledge of these signs and making an early diagnosis actively directs the use of specialized health service resources, such as consultations with specialists and imaging tests, which are essential for better professional conduct and management of health system resources. In this sense, it is essential that during their undergraduate studies future health professionals have knowledge

of the warning signs of LBP, because with the proper evaluation by students from the various health areas, it is possible to manage this complaint, which is prevalent in Brazil.

This research was successful in reaching the academic population with the support of training carried out by members of the UECE Trauma and Intensive Care Medicine League (*Liga do Trauma e Medicina Intensiva da UECE*). Most of the students surveyed did not know about coping attitudes or the red flags of LBP before the intervention. This indicates the effectiveness of this educational activity as a method of prevention and health promotion, to improve the professional qualifications of health students. In addition, there were no studies in the literature, according to the databases visited, that included training associated with academic research, which makes it possible to expand education on the subject.

STUDY LIMITATIONS

This study had some limitations, such as the non-probabilistic sampling process, obtained by convenience, plus the provision of anthropometric data, such as weight and height, which were reported by the students and not measured, at the risk of underestimating the data. In addition, the sample was not stratified by course or semester, so there is a possibility that the courses presented differ in terms of the compression of coping attitudes and warning signs.

CONCLUSION

The understanding of coping attitudes and warning signs of low back pain by students in their first and seventh semesters of health courses may be relevant to the students' educational contribution, insofar as the training offered an improvement in knowledge and favored the necessary conduct for dealing with low back pain.

AUTHORS' CONTRIBUTIONS

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