Spine

HEALTH SERVICES RESEARCH

Profile of Patients With Acute Low Back Pain Who Sought Emergency Departments

A Cross-sectional Study

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Study Design. A cross-sectional study.
Objective. The aim of this study is to describe the profile of patients with acute low back pain (LBP) who sought emergency departments (EDs) in Brazilian public hospitals. We also described the profile of these patients according to the STarT Back Screening Tool (SBST).
Summary of Background Data. LBP is the most common musculoskeletal condition worldwide and is one of the main complaints in EDs. There is a lack of evidence describing the profile of these patients from low- to middle-income countries.
Methods. This is a cross-sectional study involving patients with a new episode of nonspecific acute LBP that was conducted between August 2014 and August 2016. Variables related to clinical, psychological, sociodemographic and work status characteristics were investigated through structured, in-person oral questionnaire.
Results. A total of 600 patients were included in the study. The majority of the patients were women (58%), with a median of eight points on pain intensity (measured on an 11-point scale) and 17 points on disability (measured on a 24-item questionnaire). With regards to the SBST evaluation, 295 (49.2%) patients were classified as being at high risk of developing an unfavorable prognosis with a median pain intensity of nine points on pain intensity, 20 points on disability, and seven points on depression (measured on an 11-point scale). Despite this, the majority of the patients (74%) continued working normally without interference from LBP.
Conclusion. Identifying the profile of patients seeking care in EDs can help to define effective management for LBP in low- and middle-income countries. Patients with nonspecific acute LBP who seek EDs in Brazil present high levels of pain intensity and disability. Most patients were classified as having a high risk of developing an unfavorable prognosis.
Key words: disability, emergency room, LBP, pain, profile, prognosis, STarT Back Screening Tool.
Level of Evidence: 2
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Low back pain (LBP) is the most common musculoskeletal condition and causes greater disability worldwide.[1–3] Moreover, LBP generates high costs with the management of symptoms, work absenteeism, and disability.[4] In addition, pain intensity and disability in patients with LBP may be associated with psychological, social, and physical factors, as well as changes in pain-processing mechanisms.[4] That is, some patients experiencing pain may present sensitization in the central pain-processing system, which is an increased neuronal responsiveness of nociceptive mechanisms leading to disproportional pain complaints.[5] The majority of patients with acute nonspecific pain improve within 6 weeks,[2,3] with the possibility of recurrence of symptoms in 1 year, and some chances of developing chronic LBP.[4]

It is expected that musculoskeletal conditions that present higher severity/mortality are the main target of the emergency departments (EDs).[6] However, these emergencies comprise

only 0.5% of all musculoskeletal conditions,[6] and LBP is one of the main complaints in the EDs in different countries.[6–9] It is interesting to note that in the majority of cases, LBP does not require emergency care[10]; however, about 4.4% of complaints at EDs are because of LBP. This estimate could be compared to the prevalence of shortness breath (4%), fever, and chills (4.4%).[9] Besides the overload of health system, patients may not benefit from emergency care as they will only receive medications to control symptoms in the short term and they will not have an adequate and integrated follow-up for their condition.[11] We do not know the reasons why patients with LBP seek EDs, and perhaps the first step to investigate this issue is to understand who are these patients. We hypothesized that these patients are more severe than patients who seek the expected path in both primary and secondary care settings.

Furthermore, there is some evidence on the profile of these patients only from high-income countries.[6,12] Briefly, the majority of patients seeking care in the ED from high-income countries are female, aged between 40 and 50 years, presenting acute LBP with moderate or severe pain, and reporting previous episode of LBP.[12–15] Recently, a series of articles from *The Lancet* highlights that patients from low-income countries frequently seek care in ED's and may spend days of hospitalization and resources.[16] However, there is a lack of evidence describing the profile of these patients from low- to middle-income countries.[12,17]

The primary objective of this study was to describe the profile of patients with acute LBP who sought emergency medical treatment in public hospitals in São Paulo, Brazil, a middle-income country, through clinical, psychological, sociodemographic, and work situation characteristics. In addition, we also aim to describe the profile of these patients according to the STarT Back Screening Tool (SBST), which predicts the risk of symptom chronicity and is used to stratify care for patients with LBP.[18,19]

MATERIALS AND METHODS

Study Design and Setting
A cross-sectional study was conducted in EDs of four Brazilian public hospitals from August 2014 to August 2016 as the baseline data from a large prospective inception cohort of patients with a new episode of acute nonspecific LBP. This study was approved for the Ethics and Research Committee from Universidade Cidade de São Paulo number 25315713.7.0000.0064.

Sample Size Calculation
This study was conducted using the baseline data from a large prospective inception cohort investigating the prognosis of nonspecific acute low back. Therefore, the sample size was calculated based upon this cohort study.

To calculate the sample size we identified the largest study in the literature investigating the prognosis of nonspecific acute LBP with 973 patients.[20] This study found that approximately 60% of patients recovered completely following a follow-up of 3 months after the baseline. In the present study, if we recruited 500 patients with acute LBP and of these 60% recovered, the confidence interval would vary between 56% and 64%, which is considered sufficiently accurate for the calculations of recovery estimate. However, to assure the sample calculation, we performed a simulation for a total sample of 1000 patients, with 60% of recovery in a follow-up of 3 months. In this case the 95% confidence interval would range from 57% to 63%. That is, the estimative would not increase substantially even with a much larger sample. Therefore, we decided to recruit 600 patients with nonspecific acute back pain, as we expect a possible sample loss during follow-up of up to 20%. This sample estimate was calculated using the Confidence Interval Calculator from the PEDro database (http://www.pedro.org.au/english/downloads/confidence-interval-calculator/).

Selection of Participants
This study included 600 patients aged between 18 and 80 years, who visited EDs owing to a new episode of acute nonspecific LBP. We defined acute nonspecific LBP as pain in the lower back, with or without referred pain to the lower limbs, lasting between 24 hours and 6 weeks and preceded by a period of at least 1 month without pain.[21] Patients were excluded if they present serious spinal pathologies such as fractures, tumors, nerve root compromise, spinal infections, ankylosing spondylitis, and cauda equina syndrome. We also excluded patients who were unable to speak Portuguese, pregnant patients, had spinal stenosis, or kidney diseases. All recruitment procedures are presented in Figure 1.

Outcome Measures
Potential study participants were referred by their respective physicians to the study's researcher after the medical consultation or hospital procedures. The researcher determined whether the patient would be part of the study in accordance with the eligibility criteria described above. Patients received information about the research objectives and were directed to sign the consent form whether they agreed with the information received and were interested in participating in the study. We did not interfere in the routine of medical consultations or hospital procedures.

Patients were interviewed through a structured, in-person oral questionnaire. The questionnaire included questions about prognostic factors that could influence the prognosis of patients with LBP. Characteristics related to general health, psychological factors and interferences of pain on work activities were assessed by using items one, six, eight, and 10 of the SF-36.[22] We have changed the original term from "bodily pain" to "low back pain" for the purpose of this study. Moreover, questions were adapted as follows: *How many days have your LBP forced you to cut down on the activities you usually do?* and *How many days have you been unable to work?* In addition, pain intensity, disability, and physical or psychosocial risk factors for symptoms
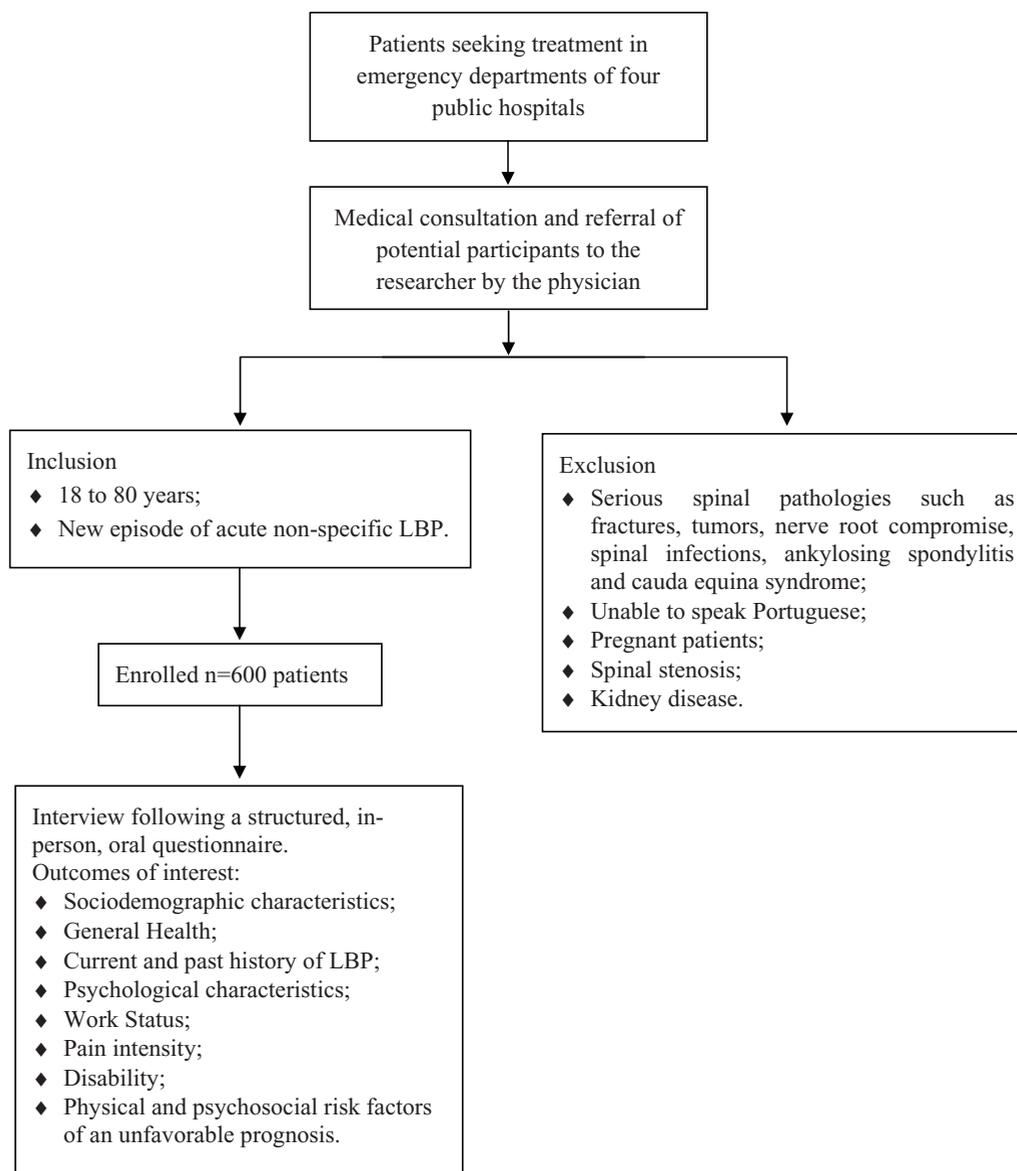
Figure 1. Flow Chart representing the study procedures.

related to persistent functional limitation in patients with LBP were addressed. The outcomes of interest were explained in Table 1.

Statistical Analysis

Descriptive statistics were used to report the characteristics of patients. Categorical variables were expressed in percentages and continuous variables were expressed as mean with standard deviation (SD) or median with interquartile range (IQR). For parametric variables, we used analysis of variance followed by pos-hoc of Tukey, statistical significance was set at $P < 0.05$. We choose Kruskal-Wallis test to perform comparisons between nonparametric variables and χ^2 test was used to measure differences for categorical variables. Finally, we analyzed differences on profile of the patients with LBP according to SBST subgroups (low, medium, high). All analyses were conducted using SPSS for Windows.

RESULTS

A total of 600 patients with nonspecific acute LBP agreed to participate. The majority of patients were women (n = 348, 58%) with a mean age of 43 years, predominantly married (42.7%), and overweight. The level of education in the majority was of high school level (44.7%), 22% of the patients performed physical activity regularly, and classified themselves as having a good health (53.3%).

According to the SBST, 127 (21.2%) patients were classified as low risk, 178 (29.6%) as medium risk, and 295 patients (49.2%) were classified as high risk of developing an unfavorable prognosis. There were statistically significant differences between SBST subgroups in the most outcomes, with exception of sex and body mass index (Table 2).

Table 3 shows the characteristics about clinical features of patients with nonspecific acute LBP (n = 600) and stratified

TABLE 1. Outcomes of Interest and Variables Related to Each Outcome

Outcome	Variables
Sociodemographic characteristics	Age, sex, body mass index, marital status, education level.
General Health	Physical activity levels, smoking, bodily pain and general health perceptions. Question for this outcome: ''In general, would you say your health is excellent, very good, good, fair or poor?'' from the SF-36[22].
Current and history of LBP	Previous episodes of LBP, previous surgeries due to LBP, if LBP appeared suddenly, referred pain to the lower limbs, medication use without medical prescription and duration of symptoms.
Psychological characteristics	Specific items selected from the SF-36[22] and from *Örebro Musculoskeletal Pain Screening Questionnaire (ÖMPSQ)*[23]. Psychological interference on social activities and feeling about the symptoms of LBP: measured by a 5-point scale ranging between 1 to 5. Stress, anxiety, depression and risk of LBP become persistent: measured by a 11-point scale ranging between 0 and 10 points.
Pain intensity	Numerical Pain Rating Scale, ranging from 0 (no pain) to 10 (worst pain possible). Participants reported the level of pain intensity perceived based on the last 7 days.[22,24]
Disability	Roland Morris Disability Questionnaire. 24-items (yes/no) related to common activities that patients might have difficult to perform because of LBP.[22,24,25] Total score determined by the sum of all positive answers. The higher the score, the higher the disability[22,25]
Work Status	Scale previously used by Kenny,[26] Henschke[20] and Costa.[24] Patients not seeking work (*e.g.* retirees) were not included in analysis.
Physical or psychosocial risk factors of an unfavorable prognosis.	Start Back Screening Tool—nine items that classifies patients with LBP into three categories, low, medium, and high risk, of unfavorable prognosis in terms of disability[18]. items from 1 to 4: physical aspects; items from 5 to 9: psychosocial aspects. The higher the score, the higher risk of an unfavorable prognosis for LBP.

LBP indicates low back pain.

TABLE 2. Sociodemographic Characteristics and General Health Status of All Patients and For Each SBST Subgroup

Variables	All patients (N = 600)	Low risk (N = 127)	Medium risk (N = 178)	High risk (N = 295)	*P*
Age (mean/SD)	43.2 (13.71)	39.5 (14.13)	41.8 (12.88)	45.7 (13.60)	0.00
Sex (%):					0.42
Female	348 (58)	68 (53.5)	102 (57.3)	178 (60.3)	
Male	252 (42)	59 (46.5)	76 (42.7)	117 (39.7)	
Marital Status (%):					0.00
Single	249 (41.5)	70 (55.1)	73 (41)	106 (35.9)	
Married	256 (42.7)	42 (33.1)	83 (46.6)	131 (44.4)	
Divorced	63 (10.5)	7 (5.5)	17 (9.6)	39 (13.2)	
Widow	22 (3.7)	6 (4.7)	2 (1.1)	14 (4.7)	
Other	10 (1.7)	2 (1.6)	3 (1.7)	5 (1.7)	
Body mass index, kg/m², (mean/SD)	26.9 (5.04)	26.3 (4.18)	27.3 (5.88)	26.9 (4.81)	0.22
Education Level (%):					0.00
Illiterate	13 (2.2)	1 (0.8)	6 (3.4)	6 (2)	
Elementary/middle school	179 (29.8)	23 (18.1)	40 (22.5)	116 (39.3)	
High school	268 (44.7)	56 (44.1)	82 (46.1)	130 (44.1)	
Graduate	120 (20)	38 (29.9)	43 (24.2)	39 (13.2)	
Post-graduate	20 (3.4)	9 (7.1)	7 (4)	4 (1.4)	
Smoking (%)	123 (20.5)	20 (15.7)	32 (18)	71 (24.1)	0.09
Health Status (%):					0.00
Excellent	74 (12.3)	25 (19.7)	25 (14)	24 (8.1)	
Very good	92 (15.3)	30 (23.6)	37 (20.8)	25 (8.5)	
Good	320 (53.3)	67 (52.8)	93 (52.2)	160 (54.2)	
Fair	88 (14.7)	5 (3.9)	19 (10.7)	64 (21.7)	
Poor	26 (4.3)	-	4 (2.2)	22 (7.5)	
Bodily pain (%)					
Neck	135 (22.5)	16 (12.6)	43 (24.2)	76 (25.8)	0.01
Shoulder	144 (24)	19 (15)	41 (23)	84 (28.5)	0.01
Thoracic Spine	120 (20)	14 (11)	30 (16.9)	76 (25.8)	0.00
Leg	304 (50.7)	38 (29.9)	102 (57.3)	164 (55.6)	0.00
Exercising regularly (%)	133 (22.2)	38 (29.9)	38 (21.3)	57 (19.3)	0.05

Categorical variables are expressed in percentage and continuous variables are expressed in mean with standard deviation (SD); SBST indicates STarT Back Screening Tool.

TABLE 3. Characteristics About Current and Previous History of Health of All Patients and For Each SBST Subgroup

Variables	All (N = 600)	Low risk (N = 127)	Medium risk (N = 178)	High risk (N = 295)	P
Previous episode (%)	415 (69.3)	80 (63)	119 (67.2)	216 (73.2)	0.08
Previous surgery (%)	3 (0.5)	—	2 (1.1)	1 (0.3)	0.33
Sudden onset (%)	512 (85.6)	99 (78)	159 (89.3)	254 (86.7)	0.01
Leg pain (%)	346 (57.9)	48 (37.8)	108 (61)	190 (64.6)	0.00
Previous medication intake (%)	327 (54.5)	49 (38.6)	96 (53.9)	182 (61.7)	0.00
Days of forced reduction of usual activities (median/IQR)	2 (5)	1 (2)	2 (4)	3 (7)	0.00
Duration of symptoms, wk, (median/IQR)	1 (0)	1 (0)	1 (0)	1 (1)	0.02
Pain intensity (0–10) (median/IQR)	8 (3)	7 (3)	8 (3)	9 (2)	0.00
Disability (0–24) (median/IQR)	17 (9)	9 (8)	17 (7)	20 (5)	0.00

Categorical variables are expressed in number (percentage) and continuous variables are expressed in median (interquartile range). SBST indicates STarT Back Screening Tool.

according to the SBST. A large proportion of patients (69%) reported previous episodes of LBP. There were statistically significant differences in most categories and patients classified as high risk of developing an unfavorable prognosis by SBST presented higher severity in all outcomes. Of the total, 85% (n = 512) of the patients presented a sudden onset of LBP, 57% of the patients reported leg pain and 54% took medications previously. Most patients who presented leg pain and took medications for LBP were classified as having a high risk of unfavorable prognosis. Patients presented high levels of pain and disability. The duration of the episodes was about 1 week.

Table 4 shows psychological characteristics of the patients with acute nonspecific LBP stratified according to the SBST. Patients presented low levels of psychological interference on social activities (2 points in a 5-point scale), high levels of stress and anxiety (8 points in a 11-points scale), moderate levels of depression (5 points in a 11-points scale), and high perception about the risk of pain becoming

persistent (7 points in a 11-points scale). Once more, patients classified as having a high risk of developing an unfavorable prognosis by SBST presented higher severity in most investigated outcomes.

The characteristics about work status of all patients with LBP and for each SBST subgroup are listed in Table 5. Among them, 15% of the patients presented previous sick leave owing to LBP. Patients reduced their daily activities in about 2 days, but the majority (74%) continue working normally without interference from LBP in their work duties.

DISCUSSION

This study aimed to provide information about the profile of patients with nonspecific acute LBP seeking treatment at EDs in hospitals from a middle-income country. We identified clinical, psychological, sociodemographic, and work status characteristics of these patients. We also described the profile of these patients according to SBST. In general, we

TABLE 4. Psychological Characteristics of All Patients and For Each SBST Subgroup

Variables	All (N = 600)	Low risk (N = 127)	Medium risk (N = 178)	High risk (N = 295)	P
Psychological interference in social activities (1–5) (median/IQR)	2 (2)	1 (1)	1 (2)	3 (3)	0.00
Stress and anxiety levels (0–10) (median/IQR)	8 (5)	5 (6)	7 (6)	9 (4)	0.00
Level of depression (0–10) (median/IQR)	5 (8)	1 (5)	3.5 (7)	7 (7)	0.00
Feeling about the symptoms of LBP (1–5) (median/IQR)	1 (0)	1 (1)	1 (0)	1 (0)	0.00
Risk of persistent LBP (0–10) (median/IQR)	7 (6)	5 (6)	6 (6)	8 (5)	0.00

Continuous variables are expressed in median (interquartile range).

SBST indicates STarT Back Screening Tool.

TABLE 5. Characteristics About Work Status of All Patients and For Each SBST Subgroup.

Variables	All (N = 600)	Low risk (N = 127)	Medium risk (N = 178)	High risk (N = 295)	P
Previous sick leave (%)	94 (15.7)	15 (11.8)	25 (14)	54 (18.3)	0.18
Work leave (%)	43 (7.2)	4 (3.1)	14 (7.9)	25 (8.5)	0.13
Income after leave (%)	17 (2.8)	4 (3.1)	5 (2.8)	8 (2.7)	0.96
Reduction of activities due pain, days, (median/IQR)	2 (5)	1 (2)	2 (4)	3 (7)	0.00
Unable to work because of low back pain, days, (median/IQR)	0 (1)	0 (1)	0 (1)	1 (2)	0.00
Work status (%):					
No change	445 (74.2)	116 (91.3)	128 (71.9)	201 (68.1)	
Restriction of work activities	74 (12.3)	6 (4.7)	21 (11.8)	47 (15.9)	
Reduction of work activities	6 (1)	-	3 (1.7)	3 (1)	
Reduction and Restriction of work activity	15 (2.5)	2 (1.6)	2 (1.1)	11 (3.7)	
Medical leave with compensation	33 (5.5)	3 (2.4)	15 (8.4)	15 (5.1)	
Medical leave without compensation	27 (4.5)	—	9 (5.1)	18 (6.1)	

Categorical variables are expressed in percentage and continuous variables in median (interquartile range). SBST indicates STarT Back Screening Tool.

identified predominance of acute nonspecific LBP in women, with a mean age of 43 years. Most patients were married, overweighted, with low levels of physical activity, and they self-classified their general health status as "good." Furthermore, the majority of patients presented sudden LBP associated to leg pain, with high intensity of pain and disability lasting approximately 1 week. According to the SBST, most patients were classified as having high risk of persistent pain. Finally, our data showed interference of psychological factors, such as stress, anxiety, and depression in pain intensity, without change in work status.

The strengths of our study are that we enrolled an inception cohort involving patients with acute nonspecific LBP from EDs of four Brazilian public hospitals. To our knowledge, this is the first study that investigated the profile of patients with acute nonspecific LBP in a representative sample from EDs from a middle-income country. In addition, this study brings important information about the profile of patients according to the classification in the SBST subgroups. The SBST has been recommended in recent clinical practice guidelines and may influence the medical decisions and orientate the best intervention to obtain favorable outcomes in the future.[18] Another strength of this study was to get data from a country with a different health system, as well as cultural, socioeconomic, and political diversity[17,27–29] compared to most developed countries. However, we could not explore the population in a single study, as Brazil is a country with continental dimensions. Even if São Paulo is the most multicultural city in Brazil, we cannot affirm that the profile of the patient follows the same pattern across the whole country.

The largest amount of evidence about LBP management comes from high-income countries.[12] In Brazil, we have few researches on LBP[17] and LBP is one of the main causes of years lived with disability in both 1990 and 2016.[29] We found that our study population is similar to that from EDs from high-income countries, with the majority being women with middle-age presenting moderate or severe pain.[13,30,31] Moreover, most patients reported having previous episodes of LBP, similarly to a previous study performed in primary care in Australia.[32] Brazil is the world's leaders in income inequalities, presenting also a high inequality in health.[33] The entire Brazilian population has access to a public health, named Unified Health System (SUS, in Portuguese). This system provide health care at all levels (primary, secondary, and tertiary care), free of charge and financed by taxes and social contributions from federal, state, and city budgets.[27,28] The first contact on public health is usually with a general practitioner that can assist the patient or refer the patient to a specialist service if necessary.[17] SUS was created to decentralize health and increase the access to primary care in a universal preventive and curative care.[27,28] However, SUS is relatively new and has room from improvement as problems still exists, such as long waiting lists, for example. In spite of an increase in the proportion of the Brazilian population that uses primary care in recent years, only 35% of the population affirm that primary care is the gateway to health.[17] Besides SUS, the Brazil health system is also composed by private sectors that are distinct and they are interconnected with the public sector.[28] People with private health insurance or are willing to pay to a private consultation tend to have better quality of care and access to preventive services, increasing inequality in care among people of different socioeconomic status.[17,27,28]

Moreover, it is known that socioeconomic inequality can generate negative emotions such as depression and anxiety.[33] These emotions lead to different perceptions of pain and disability and may be associated to poor

outcomes.[17,20,34] People living in adverse conditions tend to present higher levels of disability and pain, which can also be associated with cultural characteristics.[33] Our data were collected from public hospitals in Brazil and the LBP symptoms showed strong interference of psychological factors, as stress, anxiety, and depression on pain intensity, corroborating with recent findings.[35] However, data from high-income countries did not find correlation between anxiety and depression with poor prognosis of LBP.[6,32] Therefore, we cannot affirm that it is the same patient's profile of the private system, presumably in a more favorable social condition.

In this study, we were able to classify patients according to the risk of chronicity according to the SBST. Most patients who were classified as high risk by the SBST, also presented high levels of intensity of pain and disability, as well as strong interference of psychological factors. These findings are in line with a previous study that investigated the clinical utility of the SBST in EDs.[18] The SBST approach showed benefits in the management of LBP in the UK, in terms of reduced disability, early return to work, and cost savings.[19] Currently, the SBST has been recommended by the NICE guidelines for the management of LBP.[19] In Brazil, the SBST approach demonstrated poor predictive value in EDs[18] as well as in physiotherapy care.[36] Additionally, these studies observed that the most patients changed the subgroup of the SBST after 6 weeks from baseline.[18,36] In this study we are unable to answer whether it would be any change in subgroup of SBST in the future. However, we could outline the profile of the patient to future implementation studies to improve the management of LBP in Brazil.

With regard to work status, 74% of the patients did not change their work status despite the high levels of pain and disability. Although these patients had a median of 2 workdays of reduced activity, only a minority of working patients changed their work status because of an episode of LBP. These data corroborate with previous studies showing no associations between aspects of work and LBP.[37] Additionally, the current version of NICE guidelines recommends no rest and encouragement to continue with normal activities of daily living, facilitating early return to work when necessary.[38]

Identifying the profile of patients seeking care in ED's can help to define effective interventions for LBP into socioeconomic, political, and cultural context in low and middle-income countries. These results are useful for a future implementation of strategies to manage EDs and become the system efficient, avoiding expenditure of resources with low-value care. For this, funding for increasing and improving LBP research is necessary to assure the optimal evidence-based management in low-resource settings and different health systems.[12,17] Further studies are needed to identify whether the profile of patients in the private sector is similar to the public sector. Moreover, studies are needed to investigate whether the implementation of SBST in the EDs is feasible and effective in the perspective of the Brazilian health system. There is a need for high-quality data in Brazil to reduce the burden of LBP.[17]

> ## ➤ Key Points

- ❏ This is the first study investigating the profile of patients with LBP in a middle-income country.
- ❏ Most patients were women, about 43 years, overweight, with low levels of physical activity.
- ❏ LBP was associated to leg pain, with high intensity of pain and disability.
- ❏ LBP showed strong interference of psychological factors.
- ❏ According to SBST, most patients were classified as high risk of persistent pain.

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