Original Article

Biopsychosocial assessment in patients with low back pain in an outpatient of a public hospital in Brazil: observation cross-section study

Avaliação biopsicossocial de pacientes com dor lombar de um hospital público no Brasil: estudo transversal observacional

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ABSTRACT

Objective: This study aimed to characterize within the biopsychosocial understanding, patients with low back pain who sought for the physiotherapy service of a public hospital. **Methods:** Cross-sectional study carried out to assess biopsychosocial aspects related to pain in a public service in an underdeveloped country. To characterize patients with low back pain, considering the biopsychosocial aspect, data were collected regarding socioeconomic condition and lifestyle habits, pain intensity, functionality, considering psychological aspects, kinesiophobia, pain catastrophizing, central sensitization, depression and anxiety, were assessed with specific scales and questionnaires. **Results:** The study included 300 patients with low back pain, 70% of the sample was composed of women, with a mean age of 54 years and with socioeconomic vulnerability. The sample was marked by the high prevalence of previous treatments and imaging exams, showed an average level of disability and scores on psychological scales that suggest the presence of limiting beliefs and behaviors regarding pain and movement, in addition to 47% present a high risk for persistent disability and poor prognosis. **Conclusion:** The main descriptive findings of this study were a sample with chronic low back pain, mostly represented by an unemployed population, with low income, low education level, with a high average time of exposure to symptoms, and an average level of disability. With regard to psychosocial factors, a large part of the sample had a high risk of poor prognosis and persistent disability, in addition to scores that suggest the presence of catastrophic thoughts, anxiety, fear of movement, and central sensitization.

Keywords: Low Back Pain, Self-Assessment, Physical Therapy Department, Hospital, Hospitals, Public

RESUMO

Objetivo: Este estudo teve como objetivo caracterizar, no entendimento biopsicossocial, pacientes com dor lombar que procuraram o serviço de fisioterapia de um hospital público. **Método:** Estudo transversal realizado para avaliar aspectos biopsicossociais relacionados à dor em um serviço público de um país subdesenvolvido. Para caracterizar os pacientes com dor lombar, considerando o aspecto biopsicossocial, foram coletados dados referentes à condição socioeconômica e hábitos de vida, intensidade da dor, funcionalidade, considerando aspectos psicológicos, cinesiofobia, catastrofização da dor, sensibilização central, depressão e ansiedade, foram avaliados com critérios específicos. escalas e questionários. **Resultados:** O estudo incluiu 300 pacientes com dor lombar, 70% da amostra era composta por mulheres, com idade média de 54 anos e com vulnerabilidade socioeconômica. A amostra foi marcada pela alta prevalência de tratamentos e exames de imagem anteriores, apresentou nível médio de incapacidade e pontuações em escalas psicológicas que sugerem a presença de crenças e comportamentos limitantes em relação à dor e ao movimento, além de 47% apresentarem alto risco para incapacidade persistente e mau prognóstico. **Conclusão:** Os principais achados descritivos deste estudo foram uma amostra com dor lombar crônica, representada majoritariamente por uma população desempregada, com baixa renda, baixa escolaridade, com tempo médio de exposição aos sintomas elevado e nível médio de incapacidade. No que diz respeito aos fatores psicossociais, grande parte da amostra apresentou alto risco de mau prognóstico e incapacidade persistente, além de escores que sugerem a presença de pensamentos catastróficos, ansiedade, medo de movimento e sensibilização central.

Palavras-chaves: Dor Lombar, Autoavaliação, Serviço Hospitalar de Fisioterapia, Hospitais Públicos

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INTRODUCTION

Low back pain (LBP) is one of the most common disabilities in Brazil, considered the most prevalent musculoskeletal complaint. Studies estimate that 84% of the world's population will experience an episode of back pain at least once during their lives, leading to a significant socioeconomic impact.[1-4]

Nearly 90% of LBP cases are classified as non-specific back pain, where there is no direct and unique relationship with patho-anatomical causes, as proposed by the biomedical model of pain comprehension, which attributes them as the cause of pain. The challenge of diagnosing and characterizing non-specific LBP, which represents the majority of these cases, is a possible explanation for the poor outcomes, with significant numbers related to disability and socioeconomic impact.[5,6]

It is estimated that around 71.4 million dollars are spent on vertebral spine disorders, representing 58% of health expenditures in Brazil.[7] This impact is not limited to the health system but also extends to a substantial number of work absences and early disability retirements, involving 58% of cases related to LBP, sciatic pain, and dorsalgia.[8] Furthermore, the survival time with disability has increased by approximately 54%, from 1990 to 2017, resulting in even greater spending on healthcare resources, including imaging exams, medications, outpatient care, and more.[9]

In recent times, it is well-established that biopsychosocial factors contribute to the emergence or persistence of symptoms, including psychological, social, genetic, and biological causes.[2,10,11]

This model encompasses all these factors and underscores the importance of comprehending each aspect and its impact on an individual's pain.[12-14] It emphasizes that factors associated with cognition, the environment, and social aspects can influence the intensity and chronicity of pain, as well as the disability of patients with LBP. Recognizing these elements is crucial in the evaluation and treatment of patients to enhance the effectiveness of their treatment.[4,15-17]

Therefore, a biopsychosocial understanding and assessment of patients with LBP become highly necessary, supplanting the exclusive reliance on physical evaluation. This approach is particularly important for comprehending which aspects are linked to the primary clinical outcomes, including pain and function.[18]

OBJECTIVE

This study aimed to characterize, within a biopsychosocial framework, patients with low back pain who sought the physiotherapy service of a public hospital.

METHOD

Cross-sectional study. The research project was approved by the Ethics Committee of Irmandade da Santa Casa de Misericordia de São Paulo (CAAE: 86630818.4.0000.5479). Informed consent forms were created for the research, and the decision to participate in the study was made freely and consciously.

To collect a representative sample, patients who sought treatment for lumbar region issues from May 2018 to May 2019 were evaluated, comprising a convenience sample. Patients were recruited from the physiotherapy service at the Santa Casa de São Paulo outpatient clinic. Those referred to the physiotherapy service due to back pain complaints were invited to participate in the study.

Therefore, all patients complaining of pain in the lumbar region were included, regardless of whether their pain had specific or non-specific causes. After one year of data collection in the outpatient clinic, 300 patients with LBP complaints were evaluated and characterized.

First, identification data, including name, date of birth, gender, address, contact information, weight, and height, were collected. Socioeconomic characteristics were assessed with three questions to obtain information about monthly income, categorized based on the number of minimum wages (1 minimum wage= R$1045.00), professional status, and education level, which was considered low for patients who reported incomplete high school education and high for patients with complete high school education up to a higher and technical level.

Pain intensity was assessed using the Numeric Pain Scale (0-10), and subjects were asked about the duration of pain in months, classifying it as acute (< 3 months) or chronic (> 3 months). The Roland Morris Disability Questionnaire was used to evaluate the impact of low back pain on a patient's ability to perform daily tasks. The scores ranged from 0 to 24, with zero indicating no complaints and the maximum value indicating severe limitations.[19] To assess functional capacity, the Time Up and Go Test was used. This functional test required patients to start in a seated position, stand up, walk for 3 meters, return by the same route, and sit down again. The test was not performed by patients who were unable to do so.

Kinesiophobia

The Tampa Scale for Kinesiophobia was used, which includes 17 questions about the intensity of symptoms related to the fear of movement. The final score could range from a minimum of 17 to a maximum of 68 points, with higher scores indicating a higher degree of kinesiophobia.[20-22]

Pain-related catastrophism

The Pain Catastrophizing Scale was used to identify those at risk of experiencing psychological consequences related to pain intensity. It consisted of 13 items, with information about the frequency and intensity of responses. Scores could range from 0 to 52 points, with higher scores indicating a higher degree of catastrophism.[23]

Central Sensitization

The Central Sensitization Inventory, consisting of 25 questions, was used to assess the level of sensitization. Scores ranged from 0 to 100 points, with higher scores indicating a higher degree of central sensitization. A cutoff score of 40 points indicated the presence of central sensitization.[24]

Aspects related to Depression and Anxiety

The Hospital Anxiety and Depression Scale (HADS) was used to identify factors that may indicate the presence of depression and anxiety. Patients were classified based on their scores on the two subscales. For anxiety, scores ranged from 0 to 8 (no anxiety) and ≥ 9 (anxiety), while for depression, scores ranged from 0 to 8 (no depression) and ≥ 9 (depression).[25]

Persistent disability and poor prognosis risk assessment

The StarT Back Screening Tool questionnaire was administered, which classified the risk of poor prognosis in patients with low

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back pain based on physical and psychosocial criteria.[26]

Lifestyle Aspects

Lifestyle habits were assessed through questions about cigarette and alcohol consumption, physical activity, and sleep quality. Sleep quality was rated on a scale from 0 to 4, with higher scores indicating better sleep quality.[27]

Descriptive analysis included the calculation of means and standard deviations. The Pearson's Chi-Square test was used to compare the distribution of categorical variables among the clusters, and the non-parametric Mann-Whitney test was used to compare quantitative variables among the clusters.

A significance level of $p < 0.05$ was adopted to establish statistically significant differences between the clusters. To find and segment patients into homogeneous groups based on their characteristics, a Hierarchical Cluster Analysis was performed using the Euclidean distance and Ward's agglomerative method.

For this study, we chose to use the Euclidean distance due to its wide acceptance and intuitive interpretation, and the Ward method because it minimizes the sum of squares of differences between variable values within each group. Before conducting the hierarchical cluster analysis, the data were pre-processed to ensure the quality and robustness of the results.

The selected variables to form the clusters were Pain assessed by the Numeric Pain Rating Scale (NPRS) and Function assessed by the Roland & Morris questionnaire. Initially, the variables were standardized so that they all had a mean of zero and a standard deviation of one. Standardization is important to ensure that all variables contribute equally to the distance calculations. The hierarchical cluster analysis with the Ward method was implemented in the R language for Mac iOS. The results were visualized through a dendrogram, which is a graphical representation of the cluster hierarchy. These dendrograms provide insights into the clustering structure of the data, allowing the identification of homogeneous and heterogeneous groups.

RESULTS

A total of 300 patients who sought the physiotherapy department with complaints of low back pain over the course of one year agreed to participate in the study. This sample consisted of 70% women, with a mean age of 54 years and an average BMI of 27.9 kg/m^2. In terms of socioeconomic aspects, 48% of the sample had a low level of education. Monthly income, assessed in terms of the minimum wage, averaged 1.3 (SD= 1), and only 35% reported being employed at the time of evaluation.

Regarding variables related to pain characteristics and function, Table 1 displays that the sample had an average pain intensity, assessed using the Numerical Pain Scale (0-10), of 6.4 points (SD= 2.6), with an average pain duration of 82 months (SD= 98). Only 17 subjects (%) had a pain duration of less than 3 months, which was considered acute or subacute low back pain. Most of the sample, 283 patients (%), had chronic low back pain lasting more than 3 months. To assess the patient's function, the Roland Morris Disability Questionnaire (0-24) was used, and it yielded an average of 13.7 (SD= 5.4), characterizing a sample with a moderate level of disability. The Time Up and Go test, used as a functional assessment tool, had an average completion time of 15.4 seconds (SD= 6.5).

To assess psychosocial aspects related to pain, the Tampa Scale for Kinesiophobia (17-68) showed an average of 45 points

(SD= 8.9), and the Pain Catastrophizing Scale (0-52) revealed an average of 33.2 (SD= 12.2). The Central Sensitization Inventory (0-100), used to assess the level of sensitization, had a cutoff score of 40 points. The sample had an average score of 47.9 points (SD= 17.2), indicating a high level of central sensitization. In the evaluation of aspects related to anxiety and depression, the Hospital Anxiety and Depression Scale (HADS) was used. Each domain had a cutoff score of 8 points. In the Depression domain, the sample had an average of 8.2 points (SD= 4.1), while in the Anxiety domain, the average was 10.3 points (SD= 4.1). To assess the prognosis of low back pain, the StarT Back Screening Tool (0-9) was used, with 11.6% of the sample considered to have a low risk of a poor prognosis, 41% having a medium risk, and 47.2% having a high risk. A total of 10 patients did not complete the entire assessment using the questionnaires due to difficulties in understanding the Portuguese language.

Regarding lifestyle, 14% declared themselves as smokers, 13% reported alcohol consumption, 25% reported regular exercise, and sleep quality had an average score of 2.4, characterizing the sample as having average sleep quality (Table 1).

Table 1. Demographics and pain characteristics of the participants

Variables	mean (SD)		mean (SD)
Age	54.6 (13,5)	NPS (0-10)	6.4 (2.6)
Sex female n (%)	210 (70)	**Onset of pain (months) mean (SD)**	
Marital status n (%)		< 3 months, n (%)	17 (5.6)
Single	127 (42)	> 3 months, n (%)	283 (94.3)
Married	140 (47)	RMDQ	13.7 (5.4)
Widowed	33 (11)	TAMPA	45.8 (8.9)
BMI	27.99 (5.1)	CSI	47.9 (17.2)
Level of Education n (%)		PCS	33.2 (12.2)
Low	143 (48)	HADS	8.2 (4.1)
High	157 (52)	HADS	10.3 (4.1)
Professional Status n (%)		**StarT Back Screening Tool n (%)**	
Employee	106 (35)	Low risk	34 (11.6)
Unemployed	85 (28)	Medium risk	120 (41)
Retired	86 (29)	High risk	138 (47.2)
Away from work	23 (8)	TAMPA	45.8 (8.9)
Income (minimum wage)	1.31 (1.0)	Time up and Go	15.4 (6.5)
Previous treatments		**n (%)**	
Pharmacological treatment		229 (76.3)	
Physical therapy		154 (51.3)	
Others		68 (22.6)	
Lumbar Imaging		294 (98)	
MRI		193 (64)	
Radiography		198 (66)	
Others		75 (25)	
Smokers		43 (14)	
Alcohol		39 (13)	
Physical Activity		75 (25)	
Sleep (1-4)		2.4 (1.0)	

BMI- Body Mass Index; MRI- Magnetic resonance imaging; NPS- Numeric Pain Scale; RMDQ- Roland Morris Disability Questionnaire; TAMPA- Scale of Kinesiophobia; CSI- Central Sensitization Inventory; PCS- Pain Catastrophizing Scale; HADS- Hospitalar Anxiety and Depression Scale

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After completing a cluster analysis, considering the dependent variables of pain (NPS) and function (RMDQ), it was possible to identify two distinct groups within the sample. Cluster 1 comprised patients who experienced more pain (p<0.001) and greater disability (p< 0.001) compared to patients in Cluster 2 (Table 2).

Table 2. Variables used to perform cluster analysis

	Total n= 275[1]	Cluster 1 n= 174[1]	Cluster 2 n= 101[1]	p value[2]
RMDQ	13.7 ± 5.5	16.9 ± 3.6	8.3 ± 3.6	<0.001
NPRS	6.5 ± 2.6	7.6 ± 1.8	4.6 ± 2.7	<0.001

[1]Mean SD; [2]Wilcoxon rank sum test; NPRS- Numeric Pain Rating Scale; RMDQ- Roland Morris Disability Questionnaire

Upon the creation of the clusters, an analysis of their profiles was conducted. Both groups displayed homogeneity in terms of age, gender distribution, weight, height, BMI, and marital status.

In consideration of the variables, including central sensitization (CSI), catastrophizing (PCS), time taken to perform the TUG, depression and anxiety (HADS), and pain duration, Cluster 1 exhibited higher levels in all these variables when compared to Cluster 2, which consisted of subjects with lower pain intensity and lower disability (Table 3).

Table 3. Characteristics of the Clusters 1 and 2

	Total n= 275[1]	Cluster 1 n= 174[1]	Cluster 2 n= 101[1]	p value[2]
Age	54 ± 13	55 ± 12	52 ± 16	0.068
Sex	Male 81 (29%)	Male 51 (29%)	Male 30 (30%)	<0,9
Onset of pain (months), mean (SD)	82 ± 99	87 ± 97	72 ± 103	0.021
CSI, mean (SD)	48 ± 17	53 ± 17	39 ± 15	<0.001
PCS, mean (SD)	33 ± 12	38 ± 10	26 ± 13	<0.001
HADS Depression, mean (SD)	8.3 ± 4.2	9.3 ± 4.1	6.5 ± 3.9	<0.001
HADS Anxiety, mean (SD)	10.3 ± 4.2	10.9 ± 3.9	9.4 ± 4.5	0.011
Time up and Go, mean (s), (SD)	15.5 ± 6.5	17.3 ± 7.2	12.3 ± 3.3	<0.001

[1]Mean SD; [2]Wilcoxon rank sum test; CSI – Central Sensitization Inventory; PCS – Pain Catastrophizing Scale; HADS – Hospitalar Anxiety and Depression Scale

DISCUSSION

Sociodemographic data that describe our population, such as low monthly income, low education level, and 65% being out of professional activity, are characteristics that differentiate our sample from the majority in the literature. Other studies assessing individuals with low back pain or proposing conservative treatment approaches were primarily conducted in European, developed countries with older populations, predominantly Caucasian individuals, and better socioeconomic conditions. This highlights the need for a better understanding of populations with greater socioeconomic vulnerability.

These factors, combined with the fact that most participants have already undergone previous treatments, with 76.3% using medication and 51.3% receiving physical therapy, and that 94% of the sample has chronic pain with an average pain duration of 82 months, suggest an ineffectiveness of the proposed approaches and a poor resolution of the problem.[1,3,8,28] We believe that these facts highlight the need for the implementation of actions guided by the recommendations of current studies, which include preventive measures for this population. This approach is based on pain education from the onset of painful conditions (acute phase) to attempt to reduce the duration of pain exposure. Additionally, it involves active conservative treatments, including therapeutic exercises and regular physical activity for chronic patients.

Regarding lifestyle habits, our population showed a low number of smokers and alcohol consumers. The literature associates these factors with the chronicity and intensity of pain, but despite the sample having a long duration of pain exposure, these factors were not present. As for physical activity, the majority of our population was sedentary, a factor that aligns with the literature, which indicates a prevalence of pain and disability in sedentary individuals. Sleep quality also appeared to be moderate, which, according to the literature, could contribute to the chronicity of pain.

Regarding the characteristics that may be related to disability, the scores obtained on the Roland Morris Disability Questionnaire (RMDQ) and the time taken to perform the Timed Up and Go Test (TUG), when compared to previous studies, suggest a moderate level of disability among the participants.[29] The literature is clear about the factors that can influence the onset and persistence of disability.[17,30-36] In our sample, for instance, when using the Start Back Screening Tool (SBST), which is employed in chronic patients to assess the risk of a poor prognosis and persistent disability, it indicated that 47% of the sample is at a high risk.

This finding may be related to the presence of catastrophic thoughts, aligning with the literature, which demonstrates that the presence of pain can trigger various cognitive, emotional, and behavioral responses that may either exacerbate or mitigate pain and disability. In this context, the presence of catastrophic thoughts related to pain plays a decisive role in the evolution and persistence of disability.[37-40]

Currently, the literature emphasizes the importance of investigating biopsychosocial factors in patients with low back pain, particularly in chronic cases.[2,4,41] However, data about these factors in this specific population are scarce in the literature, as well as their actual impact on key outcomes like pain and function. In our sample, we observed the presence of limiting beliefs related to pain and movement, including fear of movement (mean 45.8, SD 8.9) and catastrophizing (mean 33.2, SD 12.2).

We also identified aspects related to anxiety (Hospital Anxiety and Depression Scale - Anxiety subscale, HADS-A, 10.3, SD 4.1) and depression (HADS-D, mean 8.2, SD 4.1), as well as features suggestive of central sensitization (mean 47.9, SD 17.2). These findings are consistent with the existing literature, even in samples with different characteristics, underscoring the need to consider them in our service to make better decisions about the treatment approach.[27,28,31]

Given this scenario and the presence of these factors in the studied population, we recommend the implementation of multidisciplinary approaches for improved patient management. When it comes to physiotherapeutic treatment, it is advisable to incorporate educational approaches addressing pain and movement. Additionally, using resources that enable gradual exposure to movement can progressively reduce the impact of these factors on an individual's perception of pain.

We understand that low back pain typically has a favorable prognosis for symptom improvement within six weeks, and in the case of chronic patients, around 41% may experience improvements in pain and disability within 12 months.[42] However, the present study focuses on a specific population characterized by greater socioeconomic vulnerability, a prevalence of chronic

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cases, a moderate degree of disability, and the presence of psychological factors related to pain. Consequently, characterizing and understanding this population with low back pain is essential to establish more consistent approaches and enhance the resolution of the problem.

This study successfully fulfills its objective to characterize patients with low back pain seeking physical therapy in a public healthcare setting. It highlights a significant presence of psychological factors related to pain, suggesting a future approach aimed at not only identifying these factors but also challenging limiting beliefs regarding pain and movement. However, we acknowledge that like all studies, this one has its limitations, and we must exercise caution when extrapolating the presented data since the study's design does not permit establishing cause-effect relationships.

Additionally, the number of participants may not be fully representative of the entire population with low back pain. Nevertheless, the data was collected over a specific time period, justifying the characterization of this particular population. A notable observation is the limited number of patients with acute low back pain, potentially due to the absence of protocols in emergency services, where medication prescription still prevails over referrals to physical therapy. A similar study,[28] which explored the profile of patients with acute low back pain seeking emergency services in a comparable population, reported that 69% of the sample had previously experienced other episodes of low back pain, and 54% had received drug treatment.

CONCLUSION

The key descriptive findings of this study revealed a sample primarily consisting of individuals with chronic low back pain, predominantly from an unemployed population with low income and low education levels. They also exhibited a lengthy average duration of symptoms and a moderate level of disability. In terms of psychosocial factors, a significant portion of the sample presented a high risk of poor prognosis and persistent disability. Moreover, their scores indicated the presence of catastrophic thoughts, anxiety, fear of movement, and central sensitization.

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