

ABORDAGENS TEÓRICAS E PRÁTICAS EM PESQUISA

ORGANIZADORA

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ISBN 978-85-7221-556-5

2026

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CHRONIC LOW BACK PAIN AND FUNCTIONALITY IN OLDER ADULTS:

A CROSS-SECTIONAL ANALYSIS OF PAIN INTENSITY,
DISABILITY, AND PHYSICAL PERFORMANCE

DOI: 10.31560/pimentacultural/978-85-7221-556-5.8

ABSTRACT:

Introduction: Population aging has contributed to an increase in chronic conditions, including low back pain, which affects the functionality and quality of life of the elderly. This condition represents one of the main causes of physical disability and limitations in activities of daily living. Objective: To analyze the relationship between pain intensity and functional parameters in elderly individuals with chronic low back pain. Methods: Quantitative, cross-sectional study was conducted. Fifty-four elderly individuals, aged 60 to 74 years, with persistent low back pain for more than three months participated. The Brief Pain Inventory (BPI), the Roland-Morris Disability Questionnaire (RMDQ), the Functional Reach Test (FRT), and the Timed Up and Go (TUG) test were applied. Data were analyzed using SPSS 23 and Pearson's correlation coefficient, with a significance level of $p < 0.05$. Results: The sample was predominantly composed of women (87.0%), with a mean age of 69 years and low educational attainment. Pain presented moderate to intense intensity (mean of 6.9 ± 3.0), with greater interference in walking, sleep, and work activities. A positive correlation was observed between pain and functional disability ($r = 0.304$; $p = 0.025$) and a negative correlation between pain and the FFT ($r = -0.424$; $p = 0.001$). There was also a positive correlation between functional disability and the TUG ($r = 0.428$; $p = 0.001$). Conclusion: Greater pain intensity was associated with reduced functionality, highlighting the need for interventions aimed at pain control and preserving the mobility and autonomy of older adults.

Keywords: Lower Back Pain; Elderly; Functionality; Disability.

INTRODUCTION

Population aging has become a prominent global trend in recent decades, and in Brazil, according to the Brazilian Institute of Geography and Statistics (IBGE), it is estimated that by 2043 individuals over 60 years old will represent one quarter of the population. This growth imposes challenges on the healthcare system that require adaptations in public policies to ensure healthy aging and quality of life (IBGE, 2019).

Although the expansion of basic sanitation and health education has contributed to the reduction of infectious diseases, the system currently faces difficulties in preventing and treating chronic conditions, such as pain and comorbidities, which develop slowly, are often irreversible, and have become increasingly frequent in this population (Escorsim, 2021).

The International Association for the Study of Pain (IASP) defines pain as “an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage” (Raja *et al.*, 2020). This definition broadened the understanding of pain in its different clinical manifestations and complexities, allowing for a more comprehensive and effective approach to the study and treatment of this phenomenon.

One of the most common types of pain is musculoskeletal pain, resulting from persistent inflammatory processes of infectious, autoimmune, or metabolic origin, as well as structural alterations affecting bones, tendons, and joints. These processes can lead to functional limitations and compromise quality of life (Treede *et al.*, 2015). Therefore, musculoskeletal pain is one of the most frequent complaints and one of the main causes of work absenteeism, reduced functionality, and early retirement. With increasing life expectancy, this condition tends to worsen, as population aging is

associated with a higher occurrence of comorbidities that affect quality of life, productivity, and burden the healthcare system (Braz; Ranzolin; Heymann, 2022).

Functionality, understood as an individual's ability to maintain independence, perform daily activities, and preserve well-being, is directly impacted by health conditions. Furthermore, the interaction of these conditions with contextual factors, such as personal aspects (aging, nutritional status, health behaviors) and environmental aspects (ergonomics, social support, home and work environments), may progressively worsen overall health, contributing to the aggravation of existing conditions as well as the emergence of new health issues (Brighenti *et al.*, 2023).

In this context, low back pain (LBP) stands out due to its significant functional impact. It is characterized by pain localized in the lumbar region resulting from nociceptive, neuropathic, or, in many cases, nociplastic mechanisms. LBP is a highly prevalent condition and is recognized as one of the leading causes of disability worldwide (GBD 2021 Low Back Pain Collaborators, 2023). Consequently, it generates physical, emotional, and social restrictions that affect functionality, social participation, and overall quality of life (Knezevic *et al.*, 2021).

LBP shows high prevalence among older adults and is frequently associated with degenerative processes that significantly contribute to its development. The main risk factors include structural alterations related to aging of the vertebral column, psychosocial factors, and inadequate lifestyle behaviors. The interaction of these factors negatively affects functional performance, reducing mobility, autonomy, and quality of life in older individuals (Knox *et al.*, 2023).

Additionally, factors such as poor overall health, mental health problems, and the absence of preventive behaviors significantly contribute to the development and worsening of LBP. The

main associated factors include female sex, obesity, sedentarism, smoking, exposure to repetitive movements, and excess body weight (Kaminski *et al.*, 2023).

Given this scenario, this study is relevant as it analyzes the relationship between aging, pain, and functionality. Understanding these aspects contributes to the development of more effective prevention, diagnostic, and treatment strategies. Moreover, it promotes improved quality of life and reduction of functional limitations, helping mitigate social impacts and functional decline. Therefore, this study aimed to analyze the relationship between pain intensity and functionality parameters in older adults with chronic low back pain.

METHODS

This is a quantitative, cross-sectional study derived from an umbrella project entitled "Effectiveness of a multimodal exercise program on the physical and mental health of older adults with chronic low back pain: a randomized clinical trial." The study was conducted at the Physiotherapy Department of the *Núcleo de Atenção Médica Integrada* (NAMI) at the University of Fortaleza (UNIFOR). Data collection took place between January and September 2025.

The study included 54 older adults aged 60 to 74 years, of both sexes, who had experienced low back pain for more than three months. Exclusion criteria included a history of degenerative neurological disease, stroke, severe heart disease, cancer, trauma and/or surgery in the lumbar spine region, any limitation preventing standing position, or moderate to severe sensory deficits (visual, auditory, or intellectual).

This sample corresponds to the first wave of data collection of the umbrella project and reflects its progressive inclusion design.

As a clinical research project, sample size is linked to effect size and the availability of eligible participants (Fontelles *et al.*, 2010).

Recruitment was carried out through public calls, using posters displayed in different sectors of the NAMI, containing information about the study location, days, and schedule. In addition, the study was advertised on the researchers' social media accounts and institutional profiles, providing the same information. Direct, in-person invitations were also conducted to broaden recruitment reach.

All participants were assessed by a previously trained team following a standardized data collection protocol. The assessment included three questionnaires and two functional tests. The first instrument collected demographic, socioeconomic, health condition, lifestyle, and pain-related information. Then, the Brief Pain Inventory (BPI) - Brazilian version (IBD) - and the Roland-Morris Disability Questionnaire (RMDQ) were administered to measure pain intensity and its impact on functionality. Finally, participants performed the Functional Reach Test (FRT) and the Timed Up and Go (TUG), used to assess mobility, balance, and risk of falls.

The BPI, is a validated instrument for evaluating chronic pain in different populations. It is brief, easy to understand, and self-administered. The questionnaire contains 15 items divided into two sections: the first measures pain intensity in different moments (current, average, worst, and least pain in the past 24 hours), while the second assesses pain interference with daily life aspects, such as walking, working, sleeping, social interactions, and enjoyment of life (Ferreira *et al.*, 2011).

The RMDQ, adapted and validated for Portuguese, is widely used to measure physical disability associated with low back pain. The instrument contains 24 statements related to limitations in daily activities, with dichotomous answers (yes or no). Total scores range from 0 to 24, with higher values indicating greater functional disability (Nusbaum *et al.*, 2001).

The FRT is a simple and reliable clinical method for assessing balance and fall risk in older adults. The test measures the maximum distance a participant can reach forward without moving their feet while maintaining balance. The result is expressed as the mean of three attempts, with distances shorter than 15 cm indicating instability and increased fall risk (Karuka; Silva; Navega, 2011).

The TUG test is used to assess functional mobility and dynamic balance. It records the time an individual takes to rise from a chair, walk three meters, return, and sit down again. Times greater than 12 seconds indicate impaired mobility and higher fall risk (Bischoff *et al.*, 2003).

Data were analyzed using IBM SPSS Statistics, version 23. Initially, the Shapiro–Wilk test was applied to verify variable normality and determine the use of parametric or nonparametric statistical tests. Analyses included descriptive statistics and Pearson correlations between pain intensity, functional disability, and physical performance parameters (TUG and FRT). The significance level adopted was 5% ($p < 0.05$).

The study was approved by the Research Ethics Committee of the University of Fortaleza under opinion number 6.675.361, in accordance with the ethical principles of Resolution No. 466/12. All older adults included in the sample were informed about the risks and benefits of the study and provided their consent by signing the informed consent form.

RESULTS

The sample consisted of 54 participants, with a mean age of 69 years (± 5.5). There was a predominance of females (87.0%), married individuals (53.7%), and those self-identified as brown (64.8%). Regarding educational level, incomplete elementary education

was the most common (51.9%). In the socioeconomic aspect, most participants were classified as belonging to class E (87.0%). The presence of comorbidities was reported, with hypertension (74.1%) being the most frequent (**Table 1**).

Table 1 - Sociodemographic profile and comorbidities of older adults with low back pain participating in a therapeutic exercise program. Fortaleza-CE, 2025.

Sociodemographic profile	N (%)
Age in years (mean ± standard deviation)	69,27 ± 5,5
Female sex	47 (87,0)
Marital status	
Married	29 (53,7)
Single	12 (22,2)
Divorced	3 (5,6)
Widowed	9 (16,7)
Separated	1 (1,9)
Skin color	
White	9 (16,7)
Mixed race	35 (64,8)
Black	7 (13,0)
Yellow	3 (5,6)
Educational level	
Complete higher education	2 (3,7)
Incomplete higher education	2 (3,7)
Complete secondary education	14 (25,9)
Incomplete secondary education	7 (13,0)
Complete primary education	1 (1,9)
Incomplete primary education	28 (51,9)
Social class	
C (4 to 10 minimum wages)	2 (3,7)
D (2 to 4 minimum wages)	5 (9,3)
E (up to 2 minimum wages)	47 (87,0)

Comorbidities	
Hypertension	40 (74,1)
Diabetes	17 (31,5)
Asthma	2 (3,7)
Depression	3 (5,6)
Anxiety	2 (3,7)

The mean scores of the BPI indicated pain intensity classified as moderate to severe (6.9 ± 3.0 for the worst pain in the past 24 hours), with a marked impact on walking (5.0 ± 3.4), sleep (4.8 ± 3.3), work (4.7 ± 3.4), and mood (4.2 ± 3.3). The average performance on the TUG test was 12.3 ± 3.3 , indicating reduced mobility in part of the older adults. In the FRT, participants had a mean score of 21.9 ± 5.3 , suggesting an intermediate risk of falls (**Table 2**).

Table 2 - Analysis of pain characteristics and functionality in older adults with low back pain participating in a therapeutic exercise program. Fortaleza-CE, 2025.

Pain characteristics	Mean $\pm$ SD
Pain intensity ^a	
Worst pain (24 h)	6.9 ± 3.0
Least pain	3.4 ± 2.5
Average pain	5.4 ± 2.4
Interference in life aspects ^a	
Mood	4.2 ± 3.3
Walking	5.0 ± 3.4
Work	4.7 ± 3.4
Interpersonal relationships	3.3 ± 2.9
Sleep	4.8 ± 3.3
Enjoyment of life	3.6 ± 3.0
Functionality	
Functional disability	3.6 ± 3.0
Timed up and go (TUG)	12.3 ± 3.3
Functional Reach Test (FRT)	21.9 ± 5.3

^aValue assigned on a scale from 0 (no pain/no interference) to 10 (maximum pain/interference). SD: standard deviation.

In addition to low back pain (87.0%), a predominance of pain was observed in the thoracic spine (53.7%), shoulder (46.3%), neck (40.7%), and knee and legs/feet (40.7%). The least affected regions were the head (20.4%), thighs (14.8%), and abdomen (9.3%) (**Table 3**).

Table 3 - Distribution of pain areas in older adults with low back pain participating in a therapeutic exercise program. Fortaleza-CE, 2025.

Pain region	N (%)
Head	11 (20,4)
Neck	22 (40,7)
Thoracic spine	29 (53,7)
Lumbar spine	47 (87,0)
Thorax (anterior)	13 (24,1)
Abdomen	5 (9,3)
Shoulders	25 (46,3)
Arms	19 (35,2)
Forearms/Hand	14 (25,9)
Hip	15 (27,8)
Thighs	8 (14,8)
Knees	22 (40,7)
Legs/Feet	22 (40,7)

The analysis revealed positive and significant correlations between pain intensity and functional disability, indicating that older adults who reported higher levels of pain also exhibited greater limitations in daily activities. Significant correlations were found between worst pain and functional disability ($r = 0.304$; $p = 0.025$), average pain and functional disability ($r = 0.292$; $p = 0.032$), and least pain and functional disability ($r = 0.326$; $p = 0.016$). In addition, a significant negative correlation was observed between average pain and

the FRT ($r = -0.424$; $p = 0.001$). A positive and significant correlation was also identified between functional disability and performance on the TUG test ($r = 0.428$; $p = 0.001$).

DISCUSSION

The sample consisted of younger older adults, with a predominance of females, which is consistent with the literature indicating a higher prevalence of low back pain in this group. This pattern may be explained by biomechanical differences and greater exposure to domestic activities that overload the lumbar spine. Additionally, women tend to show greater adherence to rehabilitation programs and seek health care more frequently, which may justify their predominance in the sample (Malta *et al.*, 2022).

Most participants had low educational levels, predominantly incomplete elementary education. These findings reflect a common reality among Brazilian older adults, marked by educational limitations that may hinder the understanding and management of pain. Studies indicate that educational level and social class directly influence access to health services and pain management practices, reinforcing the importance of considering the social context when developing prevention and rehabilitation strategies (Oliveira-Figueiredo, 2025).

A large proportion of the participants belonged to socioeconomic class E. This social vulnerability may contribute to greater pain impact and reduced access to therapeutic resources, as economic conditions directly influence both pain experience and management. Supporting this perspective, research has demonstrated that countries with lower sociodemographic indices show higher prevalence and disability associated with low back pain (Cheng *et al.*, 2025).

Another relevant finding was the high frequency of comorbidities among participants, particularly hypertension (74.1%) and diabetes mellitus (31.5%), conditions commonly associated with population aging and capable of exacerbating the impact of low back pain on functionality and quality of life. These results highlight the need for a multidimensional approach that integrates clinical and social factors in the care of older adults with chronic low back pain.

Participants presented moderate to severe pain levels that directly affected their daily living activities. These findings align with evidence linking chronic low back pain in older adults to functional limitations and reduced quality of life. A 2023 systematic review showed that chronic low back pain in older adults is associated with impaired mobility, increased disability, and decreased quality of life, reducing functional independence (Zhang *et al.*, 2023). Additionally, a study conducted in 2024 with older adults from Brazil and the Netherlands reported that pain intensity and related disability negatively impact health-related quality of life, underscoring the importance of adequate management strategies for this age group (Estela *et al.*, 2024).

The mean performance on the TUG test of 12.3 seconds suggests functional limitation that, although not severe, is associated with increased risk of falls and functional decline. A systematic review published in 2025 found that older adults experiencing severe or disabling low back pain are more likely to present increased frailty (Bayartai *et al.*, 2025). These findings reinforce the importance of monitoring mobility and functionality in older adults with low back pain to prevent complications such as falls.

In addition to lumbar pain, participants reported pain in other regions, including the thoracic spine, shoulder, neck, knee, and legs/feet. These findings are consistent with studies indicating a high prevalence of musculoskeletal pain among Brazilian older adults. Data show that 36.9% of Brazilians over 50 years old suffer from chronic

pain, with back pain being especially common among women, individuals with low income, and those diagnosed with arthritis or depressive symptoms (Santiago *et al.*, 2023). This scenario reinforces the need for public health strategies and targeted therapeutic interventions for musculoskeletal pain management in older adults, given its high prevalence and functional impact.

As strengths, this study highlights the use of validated instruments appropriate for the Brazilian geriatric population and a comprehensive assessment encompassing mobility, pain sensitivity, and balance-key components of clinical management. However, limitations include the relatively small sample size, the cross-sectional design that precludes causal inference, and the use of self-reported measures, which may be subject to bias.

CONCLUSION

The results demonstrated that higher pain intensity was associated with greater functional disability and poorer performance on mobility and balance tests. This relationship highlights the direct impact of chronic low back pain on the functionality of older adults, compromising their autonomy and participation in daily activities. These findings reinforce the need for targeted intervention and prevention strategies aimed at controlling pain and preserving functional capacity, thereby promoting safer, more active aging with an improved quality of life.

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