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ORIGINAL ARTICLE

Health locus of control and its relationship with kinesiophobia, disability, and prognosis in chronic low back pain

Lócus de controle da saúde e sua associação com cinesiofobia, incapacidade e prognóstico na dor lombar crônica

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ABSTRACT

BACKGROUND AND OBJECTIVES: Chronic nonspecific low back pain, defined as persistent pain lasting more than 12 weeks without a specific cause, can lead to disability and psychosocial distress. Health locus of control refers to an individuals perception of responsibility for their health condition and is classified as internal (self-responsibility) or external (attribution to external factors). This study analyzed the association between locus of control type, prognosis, level of disability, kinesiophobia, and psychosocial factors in patients with chronic nonspecific low back pain.

METHODS: This was a cross-sectional, observational study with 84 literate adults with chronic nonspecific low back pain. The instruments used were: a sociodemographic questionnaire; the Multidimensional Health Locus of Control Scale; the StartBack Screening Tool; the Oswestry Disability Index; the Tampa Kinesiophobia Scale; and a questionnaire with items on anxiety, social isolation, depression, catastrophizing, fear of movement, stress, and sleep. Multiple linear regression assessed associations between predictors and outcomes ($p<0.05$).

RESULTS: The mean age was 40.9 ±15.7 years. Participants with an internal locus (67%), low risk of poor prognosis (63%), and moderate kinesiophobia (56%) predominated. Internal locus of control showed a trend toward an inverse association with disability and risk of poor prognosis but did not reach statistical significance. The external locus was significantly associated with greater kinesiophobia ($p<0.01$).

CONCLUSION: The type of locus of control is associated with kinesiophobia and social isolation, being a relevant psychosocial factor in the management of chronic low back pain.

KEYWORDS: Chronic pain, Coping skills, Fear, Self-concept, Rehabilitation.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor lombar crônica inespecífica, definida como dor persistente por mais de 12 semanas sem causa específica, pode gerar incapacidade e sofrimento psicossocial. O lócus de controle da saúde refere-se à percepção do indivíduo sobre a responsabilidade por sua condição de saúde, sendo classificado como interno (autorresponsabilidade) ou externo (atribuição a fatores externos). Este estudo analisou a associação entre o tipo de lócus de controle, o prognóstico, o nível de incapacidade, a cinesiofobia e fatores psicossociais em pacientes com dor lombar crônica inespecífica.

MÉTODOS: Estudo observacional transversal com 84 adultos alfabetizados, com dor lombar crônica inespecífica. Os instrumentos utilizados foram: questionário sociodemográfico; Escala Multidimensional do Lócus de Controle da Saúde; *StartBack Screening Tool*; Índice de Incapacidade de Oswestry; Escala Tampa de Cinesiofobia; e questionário com itens sobre ansiedade, isolamento social, depressão, catastrofização, medo do movimento, estresse e sono. A regressão linear múltipla avaliou associações entre preditores e desfechos e o lócus ao acaso com menor isolamento social ($p=0,01$).

RESULTADOS: A média de idade foi 40,9 anos (±15,7). Predominaram participantes com lócus interno (67%), baixo risco de mau prognóstico (63%) e cinesiofobia moderada (56%). O lócus interno apresentou tendência de associação inversa com incapacidade e risco de mau prognóstico, sem alcançar significância estatística. O lócus externo apresentou associação significativa com maior cinesiofobia ($p<0,001$).

CONCLUSÃO: O tipo de lócus de controle está associado à cinesiofobia e ao isolamento social, sendo um fator psicossocial relevante na abordagem da dor lombar crônica.

DESCRITORES: Autoimagem, Capacidades de enfrentamento, Dor crônica, Medo, Reabilitação.

HIGHLIGHTS

- External locus of control is associated with higher levels of kinesiophobia in chronic low back pain patients
- Chance locus of control was inversely related to social isolation, suggesting possible compensatory coping strategies
- Identifying health locus of control may help personalize interdisciplinary care for patients with chronic nonspecific low back pain

INTRODUCTION

Low back pain is currently highly prevalent worldwide[1]. According to data from the Global Burden of Disease (GBD), in 2020, the global prevalence was estimated at 619 million individuals[2], and in 2021, chronic low back pain was the leading cause of years lived with disability[3]. Its clinical definition is based on discomfort in the posterior region of the back, extending from the lower margin of the 12th rib to the lower gluteal folds, with or without referred pain in one or both lower limbs[4,5].

Low back pain can be classified according to its duration. It is considered acute when it appears suddenly and persists for up to 12 weeks, and chronic when it persists beyond this period. From an etiological perspective, low back pain is classified as specific when it is associated with identifiable causes, such as vertebral fractures, and nonspecific in the absence of a well-defined causal factor. Therefore, to be considered chronic and nonspecific, the pain must persist for more than 12 weeks, with no clearly identifiable nociceptive sources, as is the case in more than 90% of cases[6-8].

Pain is a complex sensory and emotional experience, modulated by individual and contextual factors[9]. When it becomes chronic, it can compromise cognitive, emotional, and behavioral functions, placing the individual in a cycle in which fear of movement or physical activity intensifies the perception of pain, leading to hypervigilance and greater functional limitation[10-12]. This condition can affect sleep and appetite and contribute to the development of disorders such as depression and anxiety, in addition to increasing the use of painkillers. In the social and economic sphere, chronic pain can reduce productivity, result in absence from work and early retirement, significantly impacting personal finances, the community, and the health system[13-15].

In this sense, the locus of control emerges as a psychosocial variable possibly associated with low back pain. The health locus of control refers to the individual's perception of control over his or her life and health, and what or who can interfere in the way he or she deals with his or her problems. It can be classified as internal locus, where responsibility for the health condition is attributed to the person him or herself, which can bring significant benefits and improve the therapeutic relationship; and external locus, when the individual believes that his or her health condition is the result of the actions of other people or deities and chance, which can result in a more paternalistic therapeutic relationship[15-17].

Therefore, the type of locus of control can interfere with the prognosis of your condition. A negative prognosis is often associated with psychosocial factors, decreasing expectations, and acceptance of the intervention. On the other hand, a positive prognosis is due to the individual's ability to accept the intervention and collaborate towards improvement[18].

Given the high prevalence of low back pain, it is essential to outline the profile of individuals with chronic nonspecific low back pain, especially regarding the most prevalent type of health locus of control and its association with other variables. An individual's understanding of their life and the behaviors adopted about their health can influence the evolution of pain and the resulting level of disability. Despite evidence regarding the role of locus of control in chronic low back pain, studies investigating its relationship with prognosis, disability, kinesiophobia, and psychosocial factors in a Brazilian context are still scarce.

This study aimed to determine the association between health locus of control and clinical and psychosocial outcomes, including kinesiophobia, disability, and prognosis in individuals with chronic nonspecific low back pain.

METHODS

Study design

This observational cross-sectional study was conducted between September and December 2023 (Figure 1) in accordance with the guidelines set forth by the Research Ethics Committee (CEP) (CAAE 69483423.1.0000.5116 and 69477823.0.0000.5116). It involved individuals of both genders who presented nonspecific chronic low back pain. Aiming at a more accurate and complete presentation, the subdivision and description of the topics below are based on the items of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist[19].

Setting and participants

The 84 participants were randomly selected from the population through an advertisement carried out through social networks. Interested individuals considered eligible according to the established inclusion criteria were interviewed in person. All participants previously signed the Free and Informed Consent Term (FICT), being duly informed about the objectives of the research, the voluntary nature of participation, and the guarantee of confidentiality of the information provided. The inclusion criteria comprised individuals of both genders, aged 18 years or older, who presented nonspecific chronic low back pain (more than three months), as well as the ability to read, understand and write. Volunteers whose main pain complaint was not in the lumbar region, such as in cases of radicular pain resulting from disc herniation or nerve root compression, lateral or central stenosis, as well as those diagnosed with inflammatory rheumatological diseases, progressive neurological conditions, viral diseases as the primary etiology of pain, scoliosis as the specific cause of pain, presence of warning signs such as neoplasms, acute trauma with less than six months of evolution, infections or clinical evidence of spinal cord or *cauda equina* compression were excluded. Participants with a self-reported history of severe or uncontrolled psychiatric disorders, or with cognitive impairment that could interfere with the understanding and completion of the questionnaires, were also excluded.

Variables and data collection

Data collection was conducted through validated, self-administered, and easy-to-understand questionnaires. Each interview lasting an average of thirty minutes.

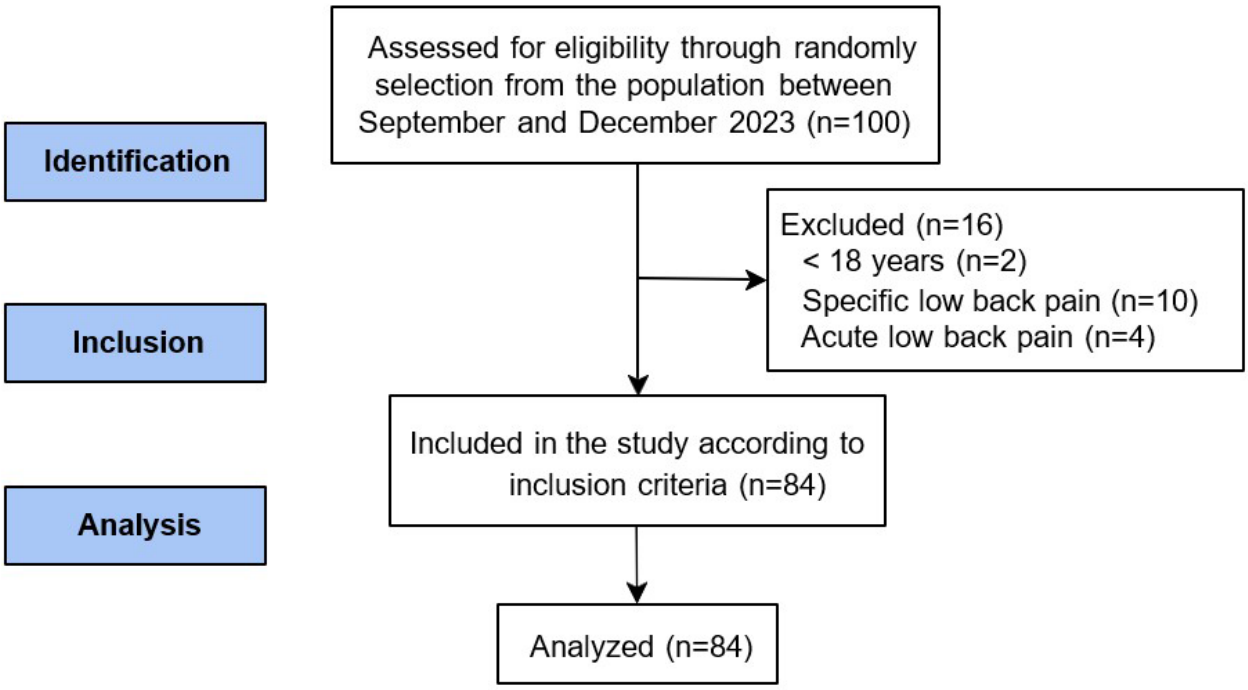

Figure 1. Flowchart study.

The collection began with the sociodemographic questionnaire, which aimed to characterize the sample (age, gender, education, monthly income, marital status, duration of low back pain, practice of physical activity, and smoking). Clinical and psychosocial characteristics were then assessed using validated instruments. Health locus of control was measured with the Multidimensional Health Locus of Control Scale (MHLC)[17], which has demonstrated adequate reliability and validity in individuals with chronic low back pain. Prognosis risk was assessed using the STarT Back Screening Tool (SBST)[20], a reliable and culturally adapted instrument for the Brazilian population. Disability related to low back pain was evaluated using the Oswestry Disability Index (ODI)[21], which presents good psychometric properties for assessing functional disability. Fear of movement was assessed using the Tampa Kinesiophobia Scale[22], validated for the Brazilian population with satisfactory reliability.

Psychosocial factors (anxiety, depression, catastrophizing, fear-avoidance beliefs, stress, social isolation, and sleep quality) were assessed using a Psychosocial Questionnaire based on validated domains, including the Brazilian version of the Fear-Avoidance Beliefs Questionnaire (FABQ)[23] which demonstrates adequate psychometric properties for evaluating psychosocial aspects related to musculoskeletal pain.

Study bias

A key limitation lies in the cross-sectional design, which captures data at a single moment and may not reflect changes over time. This approach can limit the representativeness of participants' experiences by overlooking their potential variability across different time points.

Statistical analysis

To examine the relationships between health locus of control and clinical and psychosocial outcomes, multiple linear regression models were used. Sample size calculation was performed using G*Power software, assuming a medium effect size (0.3), a significance level of 5%, and a statistical power of 80%, resulting in a minimum required sample of 84 participants. Descriptive analyses were conducted using absolute and relative frequencies for categorical variables, and measures of central tendency (means or medians) and dispersion (standard deviations or interquartile ranges) for continuous variables, according to data distribution. Regression results were presented as coefficients with their respective 95% confidence intervals. Model fit was assessed using the coefficient of determination (R^2) and adjusted R^2. All statistical analyses were performed using *Jamovi* software, version 2.5.

RESULTS

84 individuals with chronic nonspecific low back pain participated in this study. Table 1 contains the results regarding sociodemographic variables. The mean age of the participants was 40.9 ±15.7 years, and average pain time of 42 months (±12.96). The majority were women (70%), single (49%), with higher education (62%), with monthly income of up to two minimum wages (56%), practitioners of regular physical activity (71%) and non-smokers (88%).

According to the outcome variables (Table 2), most presented an internal locus of control (67%), a low risk of poor prognosis (63%), a moderate disability (30%), and a moderate level of kinesiophobia (30%).

The associations between health locus of control and clinical and psychosocial outcomes were examined using multiple linear regression models (Tables 3, 4 and 5). External locus of control was significantly associated with higher levels of kinesiophobia ($p<0.001$). In addition, chance locus of control was associated with lower social isolation ($p=0.01$). No statistically significant associations were observed for internal locus of control.

DISCUSSION

This study aimed to investigate whether the type of health locus of control is associated with prognosis, level of disability, kinesiophobia, and psychosocial factors in patients with chronic low back pain. Although the internal locus of control showed an inverse relationship with higher levels of disability and poor prognosis, there was no statistical significance. The external locus of control is associated with higher levels of kinesiophobia, and the chance locus of control with less social isolation.

Regarding the study sample, there was a predominance of females, corroborating the findings of a higher prevalence of chronic pain in women due to hormonal and sociocultural factors[24]. The low risk of poor prognosis may have been influenced by age (younger individuals). Physical activity was observed in the vast majority of participants, as was a low prevalence of smoking, factors associated with the prevention, control, and treatment of low back pain[25,26].

Although internal locus of control did not show statistically significant associations with disability or prognosis, this finding should not be interpreted as the absence of a potential influence. It is possible that the effect of internal locus of control on clinical outcomes is modest and mediated by other psychological or behavioral variables not directly assessed in this study, such as self-efficacy, coping strategies, or adherence to treatment[15,27-29].

Moreover, the cross-sectional design may have limited the detection of associations that develop over time. Previous studies suggest that internal locus of control is more strongly related to long-term behavioral engagement and self-management rather than immediate clinical outcomes[15,30,31], which may explain the lack of statistical significance observed in the present analysis.

The association between an external locus of control and higher levels of kinesiophobia suggests that perceiving health outcomes as being controlled by third parties, such as health professionals, may promote avoidance behaviors toward movement, thereby perpetuating pain and dysfunction, in line with the fear-avoidance model and contemporary evidence[32-34]. Individuals with this belief profile may also experience greater feelings of powerlessness, which can intensify fear of injury, functional disability, and negatively affect treatment outcomes[35,36]. Recent findings further support that externalized control beliefs are associated with maladaptive pain-related behaviors and poorer psychosocial adjustment in chronic pain populations, reinforcing the clinical relevance of interventions aimed at enhancing patients' sense of personal control, such as patient-centered educational strategies and active self-management approaches[37].

The finding that a chance locus of control is associated with less social isolation is unexpected and suggests possible

Table 1. Sample characterization (n=84).

Variables	Results
Age (mean, SD)	40.9 ± 15.7
Pain time (mean in months, SD)	42 ± 12.96
Gender (%)	
Female	70
Male	30
Marital status (%)	
Single	49
Married	39
Divorced	8.3
Widowed	3.6
Education (%)	
Completed higher education	62
Completed high school	31
Completed elementary school	7
Monthly income (%)	
Up to 2 minimum wages	56
2 to 6 minimum wages	35
Above 6 minimum wages	9
Practice of physical activity (%)	
Yes	71
No	29
Smoker (%)	
Yes	88
No	12

Table 2. Type of locus of control, risk of poor prognosis, level of disability and kinesiophobia from the study sample (n=84).

Variables	Results
Multidimensional Health Locus of Control Scale (%)	
Internal locus of control	67
External locus of control	31.8
Chance locus of control	1.2
Start Back Screening Tool (%)	
Low risk of poor prognosis	63
Average risk of poor prognosis	18
High of poor prognosis	19
Oswestry Disability Index (%)	
Minimal disability	23
Moderate disability	30
Severe disability	23
Crippled	12
Bedridden or exaggerating symptoms	13
TAMPA scale of kinesiophobia (%)	
Mild level	23
Moderate level	30
Severe level	23

Table 3. Analysis of the correlation between the internal locus of control with prognosis, disability, kinesiophobia and psychosocial factors.

Variables	Estimate	Standard error	CI 95%		p-value
			Lower limit	Upper limit	
Risk of poor prognosis	-0.09308	0.3322	-0.7547	0.5686	0.78
Level of disability	-0.07219	0.15103	-0.373	0.2286	0.634
Kinesiophobia	0.01683	0.09608	-0.1748	0.2085	0.861
Anxiety	0.26090	0.24362	-0.2147	0.9430	0.214
Social isolation	0.36412	0.29024	-0.296	0.86219	0.334
Catastrophizing	-0.12083	0.13720	-0.3945	0.1528	0.382
Depression	-0.26	0.150001	-0.5592	0.0392	0.087
Fear of movement	-0.10662	0.11155	-0.3291	0.1159	0.342
Stress	-0.16537	0.28604	-0.7359	0.4051	0.565
Sleep quality	0.83339	0.76251	-0.6874	2.3542	0.278

Multiple linear regression analysis; CI = confidence interval (95%).

Table 4. Analysis of the correlation between the external locus of control with prognosis, disability, kinesiophobia and psychosocial factors.

Variables	Estimate	Standard error	CI 95%		p-value
			Lower limit	Upper limit	
Risk of poor prognosis	0.11586	0.34029	-0.5619	0.7936	0.734
Level of disability	-0.05904	0.15471	-0.3672	0.2491	0.704
Kinesiophobia	0.33387	0.09287	0.14864	0.5191	<.001*
Anxiety	-0.2629	0.23548	-0.73255	0.2068	0.268
Social isolation	-0.0396	0.28054	-0.59912	0.5199	0.888
Catastrophizing	-0.16031	0.13262	-0.42480	0.1042	0.231
Depression	-0.23986	0.14500	-0.52906	0.0493	0.103
Fear of movement	-0.0612	0.10782	-0.27624	0.1538	0.572
Stress	0.54173	0.27648	-0.0097	1.0932	0.054
Sleep quality	0.77168	0.73703	-0.69827	2.2416	0.299

Multiple linear regression analysis; CI = confidence interval (95%); *: p significant (<0.05).

Table 5. Analysis of the correlation between the chance locus of control with prognosis, disability, kinesiophobia and psychosocial factors.

Variables	Estimate	Standard error	CI 95%		p-value
			Lower limit	Upper limit	
Risk of poor prognosis	0.37895	0.28294	-0.1846	0.9425	0.184
Level of disability	-0.17333	0.12864	-0.4295	0.0829	0.182
Kinesiophobia	0.06587	0.07364	-0.08099	0.21274	0.374
Anxiety	0.21665	0.18671	-0.15573	0.58903	0.250
Social isolation	-0.57976	0.22243	-0.02339	-0.13613	0.011*
Catastrophizing	0.17127	0.10515	-0.03845	0.38098	0.108
Depression	0.09544	0.11497	-0.13386	0.32474	0.409
Fear of movement	0.04387	0.08549	-0.12664	0.21437	0.609
Stress	0.43035	0.21922	0.00687	0.86757	0.054
Sleep quality	0.19008	0.58438	-0.97543	1.35559	0.746

Multiple linear regression analysis; CI = confidence interval (95%); *: p significant (<0.05).

compensatory or acceptance mechanisms among individuals who attribute their health to luck or fate. Even when perceiving little internal control over their health, individuals may seek greater social interaction as a form of emotional support and pain management. Previous studies indicate that patients with a chance locus of control report greater psychological distress, use

of passive coping strategies, and a feeling of helplessness in the face of pain, which may motivate the search for social support as a form of compensation[36,38]. Furthermore, social validation plays an essential role in the psychosocial adjustment of chronic pain[39].

The association between chance locus of control and lower social isolation should be interpreted with caution due to the extremely small size of this subgroup. Although this finding may suggest compensatory or acceptance-related mechanisms, further studies with adequate representation of this locus type are needed to clarify its psychosocial implications.

The results indicate that the type of health locus of control can influence relevant psychosocial variables in patients with chronic low back pain. Identifying the control belief profile can help personalize interventions and optimize clinical outcomes, especially in an interdisciplinary context[15,40].

Among the limitations of this study is the marked imbalance in the distribution of health locus of control types, particularly the extremely small representation of the chance locus of control, which precludes robust inference. In addition, the cross-sectional design prevents causal inferences, and the recruitment of participants from rehabilitation services may limit generalizability. Longitudinal studies are recommended to assess the influence of health locus of control on the clinical progression of chronic low back pain.

CONCLUSION

The findings of this study reinforce the importance of considering health locus of control as a relevant psychosocial variable in the context of chronic nonspecific low back pain. The association between external locus of control and greater kinesiophobia highlights that perceptions of less personal control over health can negatively impact pain coping. Chance locus of control showed a lower association with social isolation, suggesting that individuals with this perception may have a less pessimistic view of pain and its consequences on social life.

Although no statistically significant associations were observed between internal locus of control, disability, and prognosis, the identified trends suggest promising avenues for future research. Incorporating locus of control assessment into clinical practice can help personalize therapeutic strategies, fostering patient engagement, and improving functional and psychosocial outcomes in the treatment of chronic low back pain.

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AUTHORS' CONTRIBUTIONS

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