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The Best-Worst Scale in Non-Oncologic Lower Limb Pain

A Escala Melhor-Pior na Dor Não Oncológica dos Membros Inferiores

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ABSTRACT

Non-oncologic lower limb pain is a complex condition that influences patients' quality of life and is challenging to manage due to its multifactorial nature. Traditional pain assessment methods focus on intensity, overlooking broader patient experiences. The Best-Worst Scale (BWS) is an approach that is increasingly used in healthcare, particularly in understanding patient preferences. The aim of this study is to map the existing research, identify key concepts, evidence types, and gaps in the literature on the management and implications of non-oncologic lower limb pain with the goal of enhancing patients' quality of life using BWS methodology. A narrative review was performed and conducted between October and November 2024, in PubMed and the *Revista Portuguesa de Medicina Geral e Familiar*. The search strategy focused on chronic non-oncologic pain of the lower limb and another one on BWS and its application to the topic under study. From 124 articles, 16 were included. Regarding BWS, the studies describe it as a promising tool for improving healthcare research, highlighting its various applications, advantages, and limitations. They address the main concerns of osteoarthritis patients and their preferences regarding available treatments. Integrating BWS into clinical practice can lead to improved perception of pain assessment and greater patient satisfaction, shaping the treatment strategy based on patient preferences. The analysis suggests that BWS is a superior approach to other forms of assessing non-oncologic pain in the lower limbs. It may allow us to identify a mismatch between the goals of clinicians and the patient's goals. Best-worst scales to be used in this area must be carefully adjusted when in general application, and their validity and effectiveness thoroughly evaluated. Future research should focus on the implementation and development of BWS in holistic approaches, ensuring both patient-centered and evidence-based treatment. Bridging these gaps will contribute to an improvement in the quality of life of individuals suffering from non-oncologic pain in the lower limbs.
Keywords: Chronic Pain; Lower Extremity; Osteoarthritis; Patient-Centered Care; Quality of Life; Surveys and Questionnaires

RESUMO

A dor não oncológica nos membros inferiores é uma condição complexa que influencia a qualidade de vida e é difícil de tratar pela sua natureza multifatorial. Os métodos tradicionais de avaliação da dor focam-se na intensidade, negligenciando as experiências das pessoas que sofrem. A Escala Melhor-Pior (BWS) é a abordagem cada vez mais utilizada na área da saúde, especialmente para entender as preferências dos doentes. O objetivo deste estudo é analisar a melhor abordagem para avaliar a dor crónica não oncológica nos membros inferiores para melhorar a qualidade de vida dos pacientes. Entre outubro e novembro de 2024 realizaram-se pesquisas bibliográficas nas bases de dados PubMed e na Revista Portuguesa de Medicina Geral e Familiar. Usou-se a estratégia de pesquisa centrada na dor crónica não oncológica dos membros inferiores com o uso da BWS. Foram extraídos 124 artigos, dos quais 16 foram incluídos. Em relação à BWS, os estudos referem-na como uma ferramenta promissora para melhorar a investigação em saúde, destacando as suas várias aplicações, vantagens e limitações na abordagem das principais preocupações dos doentes com a patologia e as suas preferências quanto aos tratamentos disponíveis. Integrar a BWS na prática clínica pode levar a uma melhor perceção da avaliação da dor e satisfação dos doentes, centrando o tratamento nas suas preferências. Esta revisão sugere que a BWS é a melhor abordagem, quando comparada a outras formas de avaliar a dor não oncológica nos membros inferiores. Dada a literatura limitada, são necessários mais estudos para validar sua eficácia e desenvolver abordagens holísticas e centradas no doente, melhorando assim a qualidade de vida.
Palavras-chave: Cuidados Centrados no Doente; Dor Crónica; Inquéritos e Questionários; Membro Inferior; Osteoartrose; Qualidade de Vida

INTRODUCTION

Chronic non-oncologic pain (CNOP) in the lower limbs is a public health issue affecting millions of people worldwide. Its high prevalence, profound impact on quality of life, and complexity in management make it a multifaceted challenge for healthcare systems and patients. Chronic pain is recognized as a complex experience that extends beyond physical discomfort, also involving emotional and psychological dimensions.[1-3] It impacts roughly 20% of adults in Europe, notably older adults, and has been highlighted as a major priority in global public health research.[1,4]

Managing chronic non-oncologic lower limb pain presents several challenges due to the complexity and multifactorial nature of this condition.[1] It is influenced by physical, psychological, familial and social factors, which can lead to inadequate treatment and patient dissatisfaction.[4-6] This issue is particularly important among the elderly, as a significant proportion experience moderate to severe chronic pain, highlighting the need for specialized geriatric care.[7] Furthermore, the fact that the guidelines are inconsistent makes it difficult for healthcare professionals to implement a holistic approach. The traditional biomedical model focuses solely on physical symptoms, while in the General Practice/Family Medicine environment, where the suffering person is the core of care provision and where most people with chronic non-oncologic lower limb pain are followed.[5,8]

Chronic non-oncologic pain in the lower limbs has multiple causes, osteoarthritis (OA) being one of the most prevalent and impactful conditions. Osteoarthritis is a progressive

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degenerative disease that affects the joints, primarily the knees and hips, and is a major contributor to chronic musculoskeletal pain.[3] The global increase in OA prevalence is driven by population aging and rising obesity rates, both of which are significant risk factors for disease development and progression.[1,3] Given the complex nature of OA pain, the most effective approach is a multidisciplinary and stepwise strategy, with pharmacological and non-pharmacological interventions. Patient education, physical activity and weight loss play an important role in this subject.[1,9] Several medications are available for this purpose, like paracetamol, nonsteroidal anti-inflammatory drugs (NSAIDs), topical NSAIDs, cyclooxygenase-2 (COX-2) inhibitors, and some other less commonly used therapies such as intra-articular corticosteroid injections, bone marrow concentrate injections, acupuncture, and transcutaneous electrical nerve stimulation (TENS).[2,7,9]

Standard pain measurement tools such as the Numerical Rating Scale (NRS) or the Visual Analog Scale (VAS) primarily quantify pain intensity but fail to capture other significant dimensions of the patient's experience, such as emotional distress, physical (dis)function, or the impact on daily activities.[9] Questionnaires like the McGill Pain Questionnaire[9] and the Western Ontario and McMaster Universities Osteoarthritis (WOMAC) Index[9,10] provide more comprehensive evaluations by including emotional and functional aspects of pain. However, they still may not fully address the individualized nature of chronic pain responses. Contextual factors, such as the patient's mental health, multimorbidity, and social support, imply a comprehensive approach to it, which falls mostly under general practice/family doctors' responsibilities.[11] Psychological assessments using tools like the General Anxiety Disorder-7 (GAD-7) and Patient Health Questionnaire-9 (PHQ-9) scales are essential to determine how much anxiety and depression contribute to the perception of pain.[9] However, integrating these assessments into routine practice can be too intensive.

Best-worst scaling (BWS), also known as maximum-difference scaling, is an approach for measuring preferences, regarding a set of attributes, their levels or alternatives. This method generates additional information by making respondents choose twice, indicating the best as well as the worst criteria.[12] It is a promising technique for health research, particularly when researchers aim to capture more detailed information about patient preferences and assess specific attributes of healthcare services.[13,14] There are three main variants of the best-worst scaling technique: object case BWS, profile case BWS and multi-profile case BWS.

The object case BWS is the original form of this method proposed by Finn and Louvière, that focuses on understanding the relative importance of attributes. In this approach, attributes have no distinct levels and scenarios are created by presenting different combinations of these attributes. Respondents are asked to identify their most and least preferred attributes within each set, with this variant intended as an alternative to conventional rating tools like Likert scales.[12]

The profile Case BWS involves attribute levels that are displayed, so the same attributes appear in each scenario, but with different levels. This setup allows respondents to evaluate particular levels of each attribute, providing more clarity and detail in choices. This method is simpler to design than traditional discrete choice experiments (DCEs). It may ease the cognitive demand on respondents, as they focus on just one profile per scenario rather than comparing several options at once.[12]

The multi-profile case BWS, also known as 'best-worst discrete choice experiments' (BWDCEs), allows respondents to choose both the best and worst options across multiple alternatives with varying levels of attributes in each set. These experiments are structured to gather additional preference data by asking respondents not only to select the best option but also to select the worst one consecutively. This will be followed by selecting the next best option from the remaining ones, and continuing the process until a full preference ranking of all alternatives in the set is obtained.[15] Best-worst scaling has advantages over the other known methodologies that make it an excellent choice to study dealing with chronic pain, allowing better discrimination between preferences, leading patients to establish clear priorities and providing a more precise hierarchy of attributes. It reduces cognitive bias, often observed in conventional methodologies such as Likert and DCE. It mitigates these problems by eliminating the possibility of neutral or ambivalent responses, leading to more reliable information.[15]

Therefore, this study aimed to map the existing research, identify key concepts, evidence types, and gaps in the literature on the management and implications of non-oncologic lower limb pain with the goal of enhancing patients' quality of life using BWS methodology.

METHODS

A narrative review was performed, with the literature search being conducted between October 8th and November 4th, 2024, covering publications from 2004 to 2024 in either English or Portuguese**.** The search was conducted in the PubMed electronic database and in *Revista Portuguesa de Medicina Geral e Familiar,* the journal of the Portuguese scientific Association of General Practice/Family Medicine. This choice took into account the need to know what had been published in international journals and in the Portuguese journal of general practice/family medicine.

Due to the limited availability of articles connecting non-oncological pain in the lower limbs with the best-worst

scale, two distinct search strategies were employed, to enlarge the article's sample:

- First search strategy**:** Medical Subject Headings (MeSH) were used with the following search equation: ("chronic pain" OR "non-cancer pain" OR "non-oncological pain") AND ("lower limb" OR "lower extremity" OR "leg pain") AND ("assessment" OR "measurement" OR "evaluation"). Terms such as "amputees", "fracture", "back", and "lumbar" were excluded from this search.
- Second search strategy**:** Focus on identification of articles providing information regarding the best-worst scale demonstrating some relevance to the use of BWS, with the search equation: ("best-worst scale" OR "best-worst scaling" OR "BWS") AND ("lower limb pain" or "chronic pain").

In addition to database searches, articles were identified through automated suggestions provided by PubMed under the "similar articles" section and included based on their thematic relevance and adherence to the predefined inclusion criteria. Finally, a complementary search was performed examining the reference lists of the selected articles to identify additional relevant studies that were not captured in the initial searches. Two authors extracted information that was to be agreed consensually. In case of problems a third author should be called upon.

Inclusion criteria

- Articles published between 2004 and 2024 in either English or Portuguese;
- Adult patients (≥ 18 years) with non-oncologic chronic pain affecting the lower limbs;

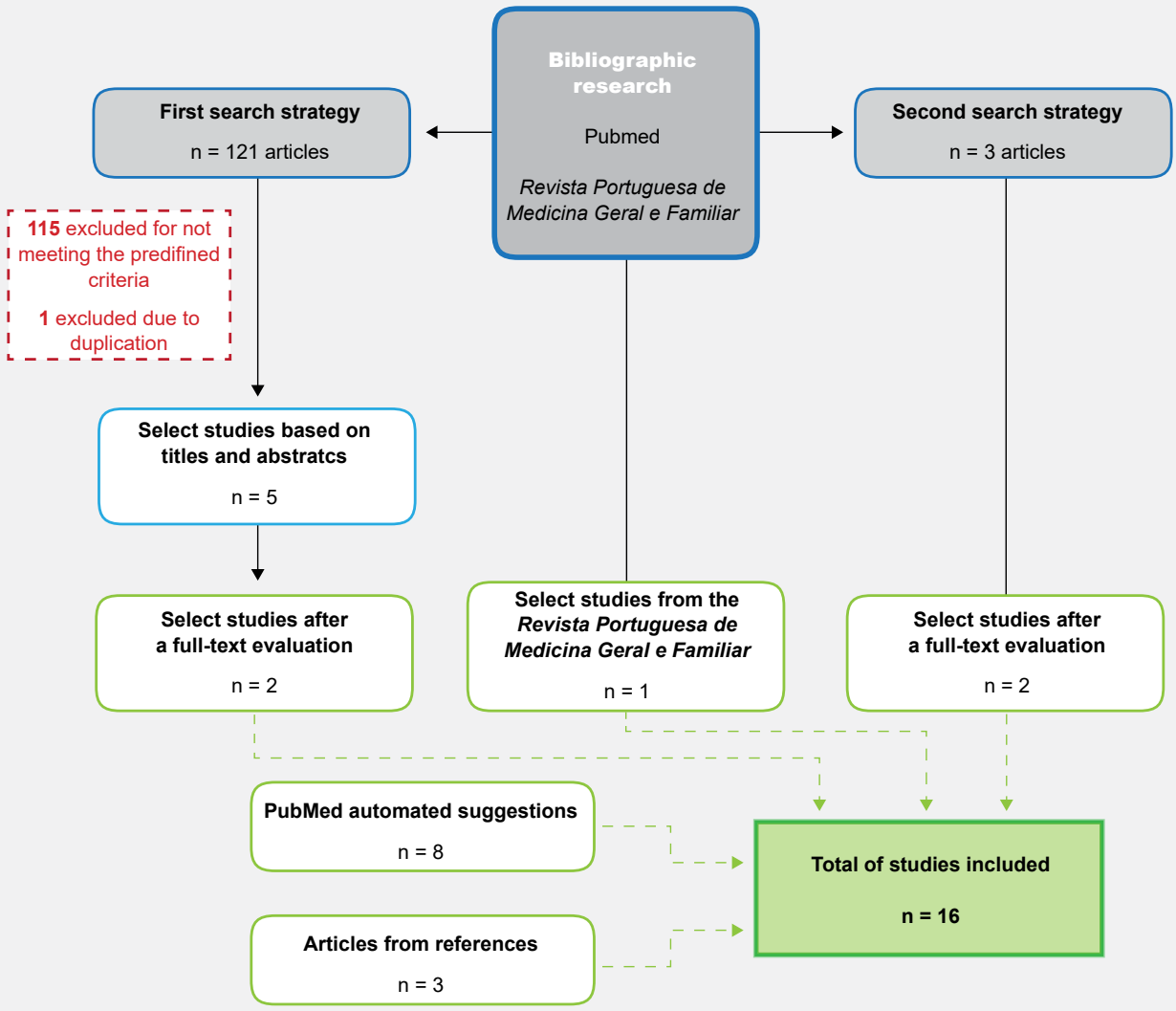

Figure 1 – Flowchart illustrating the study selection process

- Articles analyzing the impact of chronic pain on multidimensional aspects such as quality of life, daily activities, and psychological well-being;
- Studies evaluating the BWS in healthcare contexts or pain management.

Exclusion criteria

- Studies focused on cancer-related pain;
- Studies with pediatric populations;
- Acute or transient conditions of lower limb pain;
- Pain related to post-surgical or inflammatory states.

RESULTS

The first search strategy identified 121 articles, five of which were selected based on the title and abstract reading. Among the remainder, 115 were excluded for not meeting the predefined criteria, and one was removed due to duplication. After a full-text review, two articles were considered relevant for inclusion.

The second search yielded three articles, of which two were selected based on titles and abstracts reading and confirmed for inclusion after full-text evaluation.

Additionally, eight articles were identified through automated suggestions from the PubMed database, and three articles were included from the reference lists of the selected studies.

From *Revista Portuguesa de Medicina Geral e Familiar,* one article was selected.

In total, 16 articles were selected and included in this narrative review (Fig. 1).

Appendix 1 (Appendix 1: https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/23240/15970) presents the key concepts from all the articles used in this review, providing information on chronic musculoskeletal pain, particularly osteoarthritis, its impact on patients and approaches to management. All papers were read, and information was retrieved from them for: objectives, methods, main results and suggestions.

The research findings highlight the need for a structured, hierarchical approach to pain management, how chronic pain and, especially, knee osteoarthritis affect quality of life,[1,4] and the psychological impact of musculoskeletal pain.[2,16] The importance of integrating psychological assessments and functional evaluations into clinical practice[9] and the identification of the barriers to effective pain management[5] were emphasized, as well as pain treatment strategies[7] and limitations of current treatment approaches.[3]

Regarding best-worst scaling, the selected articles discuss it as a tool for improving healthcare research and its applications,[12,13,15] its validity and limitations.[17] The context of chronic pain management by medical professionals,[8] patients' concerns in osteoarthritis[18] and their preferences for osteoarthritis treatments were also matter of study and discussion.[19]

DISCUSSION

Chronic non-oncologic pain in the lower limbs is a challenge in clinical practice, both in terms of clinical assessment and in treatment decision-making. Due to its multidimensional nature, the complexity of this condition requires a patient-centered and integrative approach to arrive at a strategy that is in line with the patient's individual priorities and preferences. Best-worst scaling is a methodology that is gaining importance in the healthcare field and is increasingly being addressed. It is a quantitative preference elicitation technique that allows for a systematic ranking of, for example, treatment attributes, patient priorities and health decision-making factors.[13]

Due to the lack of articles, a scoping review was not conducted, and a narrative review was carried out instead.

A biopsychosocial model is widely recommended, emphasizing the integration of pharmacological treatments with psychological support, self-management, and lifestyle modifications. Such an interdisciplinary strategy has shown potential to improve patients' quality of life.[13,18] No information was found on the description of a patient-centered assessment method for non-oncologic pain in the lower limbs, specifically related to osteoarthritis.

The CNOP approach involves several tools to enable a comprehensive assessment, but no articles were found in which all these parameters were studied in relation to this set of conditions – especially osteoarthritis – with the main aim of improving patients' quality of life by understanding which factors most influence pain perception and treatment outcomes.

Even though the use of BWS for health decision-making has been increasingly explored in different domains, little information exists on this scale in CNOP of the lower limbs. A study focused on OA examined treatment preferences using both DCEs and BWS, concluding that patients prioritized symptom control while avoiding risks such as physical dependence, simultaneously being less concerned about the annual increased risk of heart attack and serious joint problems associated with medication.[19] Oral medications were preferred to injections, and some risks were considered acceptable for better pain relief, with patients preferring alternative pain treatments over opioids, and considering nerve growth factor inhibitors acceptable if they would offer efficacy comparable to NSAIDs and opioids.[19] Another study explored the main concerns of patients with knee and hip osteoarthritis and the differences in how healthcare professionals perceived these needs.

The BWS model was used and concluded that both patients and healthcare professionals considered the question

"What can I do to reduce symptoms and prevent OA from worsening?" to be the most important.[18] However, patients prioritized questions about new treatments, while professionals focused more on questions about self-management. This study emphasizes the importance of better communication and consistent information for improving patient education and treatment.[18]

Another study using BWS in chronic pain analyzed the factors that could influence chronic pain management comparing medical students and general practitioners (GPs) in Sweden and Australia.[8] Students prioritized past pain description, treatment history, and pain rating, while social support and adherence to treatment were devalued. The GPs put more emphasis on pain ratings, reflecting a greater tendency to ignore subjective evaluations.[8] This study highlighted a gap in understanding patient preferences and the need to integrate psychosocial factors into pain management to achieve better treatment outcomes so patients' preferences, improved doctor-patient communication and integration of psychosocial factors in pain management being needed uploads.[8]

Traditional pain assessment methods often fail to capture the more expansive patient experience, including treatment preferences, functional limitations and quality of life concerns. Best-worst scaling allows a deeper exploration of the patient's priorities by asking them to identify the most and least important aspects, for example, of their pain experience and treatment options, allowing the patient to be actively involved in the decision-making process, thus ensuring that their preferences and values are considered. Several studies have shown that when patients express their priorities regarding treatment, higher levels of satisfaction and better adherence to recommended therapies are reported, especially important for non-oncologic pain of the lower limb, where patients' expectations vary significantly regarding pain relief, mobility and medication side effects.[8]

Despite the many advantages of BWS, it is not without its limitations. When applying this scale, it should be kept in mind that despite the reduction in cognitive bias, BWS can increase the cognitive load for specific populations. This is explained by this scale's requirement of direct comparisons and evaluation of multiple attributes simultaneously, making it challenging for the elderly or people with cognitive deficits to evaluate the best and worst of several options repeatedly. This can lead to less consistent responses.[12] Another disadvantage to consider is the fact that there is variability in the choice of the worst option, i.e., participants are more consistent in selecting the best option than the worst one.[17]

Therefore, although BWS is superior for understanding patient preferences, its use in more vulnerable populations must be meticulously adjusted to ensure reliable data that can be applied in future clinical practice. Therefore, a solid and robust validation process is needed.

As for the potential of Best-Worst Scale in non-oncologic lower limb pain particularly in osteoarthritis, highly relevant information regarding the patient's treatment priorities and the best approach to pain relief and improved quality of life are hallmarks.[8,19] Due to the complexity of managing lower limb pain, which benefits from a balance between symptom relief, functional rehabilitation and minimizing side effects, BWS can offer an approach to optimizing patient-centered care.[8,19]

Possible applications of this scale in this field are the identification of treatment outcomes most important to patients, such as pain relief, recovery of mobility or psychological well-being, understanding patients' conflicts between pharmacological and non-pharmacological interventions, such as multidisciplinary rehabilitation protocols, lifestyle changes or surgical options.[2]

Best-worst scaling can also be used to improve clinical guidelines for this condition incorporating patients' real-world perspectives, improving treatment adherence and satisfaction rates.

A multi-stage research approach is proposed to explore how BWS can optimize treatment strategies in lower limb CNOP. The use of this type of scale is advisable for future observational studies. Best-worst scaling is an important paradigm to the understanding that treatment strategies are no longer only dictated by healthcare professionals, based on protocols, but also based on the patient's perspective, leading to a more efficient approach to pain, once it relates to multiple simultaneous questions.[1,5,8,11,20,21]

There remains a lack of information regarding the use of BWS in studying non-oncologic lower limb pain, highlighting the need for future research given its clinical significance.

CONCLUSION

BWS may be a superior approach to other forms of assessing non-oncologic pain in the lower limb. Best-worst scaling may allow us to identify a mismatch between the goals of clinicians and those of patients. Future research should focus on the implementation and development of BWS in holistic approaches, ensuring both patient-centered and evidence-based treatment. Bridging these gaps will contribute to an improvement in the quality of life of individuals suffering from non-oncologic pain in the lower limbs.

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