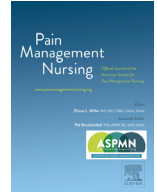


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Review Article

Mindful Breathing as an Adjunctive Approach to Chronic Low Back Pain Management: A Scoping Review

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ABSTRACT

Background: Chronic low back pain (CLBP) is a common and challenging condition. This scoping review explores the literature on mindful breathing's role in managing CLBP, either alone or alongside physiotherapy.

Methods: A thorough database search identified studies on mindful breathing and CLBP. Various study designs, from descriptive to randomized controlled trials, were included.

Results: Reviewed studies suggest that mindful breathing can improve body awareness and patients with CLBP. In a randomized controlled trial both mindful breathing and physiotherapy groups reported significant pain reduction (VAS: -2.7 mindful breathing, VAS: -2.4 physiotherapy) and improved quality of life (SF-36*: $+14.9$ mindful breathing, SF-36: $+21.0$ physiotherapy). Yu et al. found that combining mindful breathing with core stability exercises yielded superior outcomes (ORR* = 96.67%) compared to core exercises alone (ORR = 73.33%).

Conclusions: Mindful breathing holds promise for chronic low back pain management, with studies revealing pain reduction and improved quality of life. Combining it with core stability exercises enhances outcomes. However, standardized protocols are lacking, limiting clinical use. Future research should focus on precise guidelines for integration into practice. Mindful breathing offers a holistic approach to pain management.

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Introduction

Low back pain is a widely prevalent health issue worldwide, with significant social and economic implications. While it primarily affects adults, certain factors like alterations in muscle tone, as discussed (Casadei et al., 2023) and variations in posture, can influence its severity and management. However, it is essential to acknowledge that low back pain may not be as prevalent or significant in certain age groups, such as children.

This condition affects individuals of all ages and social classes, leading to a considerable reduction in the quality of life due to associated pain and disability (Casadei et al., 2023; Loney & Stratford, 1999; Tedeschi, 2023b). Its prevalence continues to rise, representing one of the leading causes of disability in many countries, with prospects of further increase in the coming decades (Fabbri et al., 2023; Hartvigsen et al., 2018). This phenomenon

poses a growing challenge to conventional medicine in finding effective management and treatment strategies. This review article aims to explore the role of mindful breathing techniques in the management of chronic low back pain, also considering the integration of such practices with traditional therapeutic approaches like physiotherapy. Chronic low back pain presents a challenge to conventional medicine as, despite the numerous therapeutic options available, there is no evidence of treatments that can eliminate the symptoms in the long term. Moreover, inadequate management of low back pain can lead to improper medication use and opioid abuse, resulting in additional public health issues (GBD 2021 Low Back Pain Collaborators, 2023). The article will also delve into the concept of mindful breathing, an ancient practice that is gaining increasing relevance as a potential tool in chronic pain management. Mindful breathing (Gholamrezaei et al., 2021; Jafari et al., 2017; Pratscher et al., 2023; Tedeschi, 2024) has been associated with increased body awareness and the ability to perceive and manage pain more effectively (Downie et al., 2016; Maher et al., 2017; Tedeschi, 2023a; Yelin et al., 2016). However, its effectiveness and role in managing chronic low back pain are still subjects of study and discussion. Throughout this review,

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recent studies and research exploring the effectiveness of mindful breathing practices in chronic low back pain management will be examined. Additionally, potential synergies between mindful breathing and traditional physiotherapy will be considered, assessing whether the integration of these two approaches can lead to improved outcomes in the management of chronic low back pain (Galvez-Sánchez & Montoro, 2022; Zidarov et al., 2020). Chronic low back pain management remains a complex challenge, with ongoing research efforts aimed at identifying effective therapeutic interventions. While our scoping review focuses on specific aspects of chronic low back pain management, such as the role of conscious breathing techniques, it is essential to acknowledge that there may be other gaps in the current understanding of this condition (I et al., 2023). Future research should aim to address these gaps comprehensively to provide a more holistic approach to chronic low back pain management. Additionally, exploring diverse therapeutic options beyond those covered in this review may further enhance the quality of life for individuals affected by chronic low back pain.

Methods

The present scoping review was conducted following the JBI methodology (Peters: Joanna Briggs Institute Reviewer's Manual, JBI - Google Scholar, n.d.) for scoping reviews. The Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018) Checklist for reporting was used.

Review Question

We formulated the following research questions: “What is the role of mindful breathing techniques in the management of chronic low back pain?” and “Are there studies in the literature investigating the integration of physiotherapy techniques and mindful breathing techniques in the treatment of chronic back pain?”

Eligibility Criteria

Studies were eligible for inclusion if they met the following Population, Concept, and Context (PCC) criteria.

Population: Individuals diagnosed with chronic low back pain are included. The keywords used for the search are “chronic low back pain.”

Concept: Mindful breathing practices that involve focusing on the breath and bodily sensations are considered. The keywords used in the search are “breathing,” “pranayama,” “breath therapy,” “conscious breathing,” “breathing techniques,” “breathing practice,” and “slow deep breathing.”

Context: This article considers studies conducted in any context.

Exclusion Criteria

Studies that did not meet the specific PCC criteria were excluded.

Search Strategy

The search for relevant articles was conducted up to December 23, 2023, without any date limitations. The inclusion criteria were applied to identify articles published in English prior to that date. Various databases, including MEDLINE, Cochrane Central, Scopus, and PEDro, were searched using a comprehensive search strategy developed from index terms and keywords identified during

the initial limited search on PubMed. Additionally, grey literature sources such as Google Scholar and direct contacts with experts in the field were consulted, along with the reference lists of relevant studies, to ensure a thorough search for pertinent literature.

(“chronic low back pain” OR “chronic lumbago”) AND (breathing OR pranayama OR “conscious breathing” OR “breathing techniques” OR “breath therapy” OR “breathing practice”) NOT “inspiratory muscle training”

Study Selection

The process described involves a systematic approach to selecting studies for a scoping review. Initially, search results were collected and refined using EndNote, with duplicates removed. Initially, titles and abstracts of identified articles were reviewed independently by two authors. Subsequently, the full texts of potentially relevant articles were assessed independently by the same two authors. Any discrepancies or disagreements between the reviewers were resolved through discussion, and if consensus could not be reached, a third independent reviewer was consulted to make the final decision regarding article inclusion. The selection adhered to the PRISMA 2020 guidelines, ensuring transparency and reliability. This rigorous methodology aimed to identify relevant articles that directly address the research question, maintaining a comprehensive and systematic approach in the review process.

Data Extraction and Data Synthesis

Data extraction for the scoping review was done using a form based on the JBI tool, capturing crucial details like authorship, publication country and year, study design, patient characteristics, outcomes, interventions, procedures, and other relevant data. Descriptive analyses of this data were conducted, with results presented numerically to show study distribution. The review process was clearly mapped for transparency, and data were summarized in tables for easy comparison and understanding of the studies' key aspects and findings.

Results

As presented in the PRISMA 2020-flow diagram (Fig. 1), from 209 records identified by the initial literature searches, 206 were excluded and 3 articles were included (Table 1).

In 2001, Mehling WE conducted a study using a closed-ended questionnaire to gather information on Breath Therapy's use in Germany. The therapy aims to help patients connect with their breath, observe it without alteration, and focus on painful areas to increase bodily awareness. Results suggest its potential effectiveness in managing chronic low back pain, highlighting the need for further clinical research.

In 2005, Mehling WE conducted a study where participants were randomly divided into a study group and a comparison group. Both groups received a 60-minute introductory session and 12 individual sessions lasting 45 minutes each over 6-8 weeks. The study group practiced conscious breathing under certified guidance, focusing on natural breathing and sensations in painful areas of chronic low back pain. The comparison group followed a specific physiotherapy protocol for chronic low back pain management. Both groups were instructed to perform exercises at home. Results showed significant improvements in both groups, especially in pain reduction (VAS: -2.7 for the study group, VAS: -2.4 for the comparison group) and quality of life (SF-36: +14.9 for the study group, SF-36: +21.0 for the comparison group) at the end of the study. However, there were no significant differences between the two groups. At 8 weeks, the study group seemed more effective,

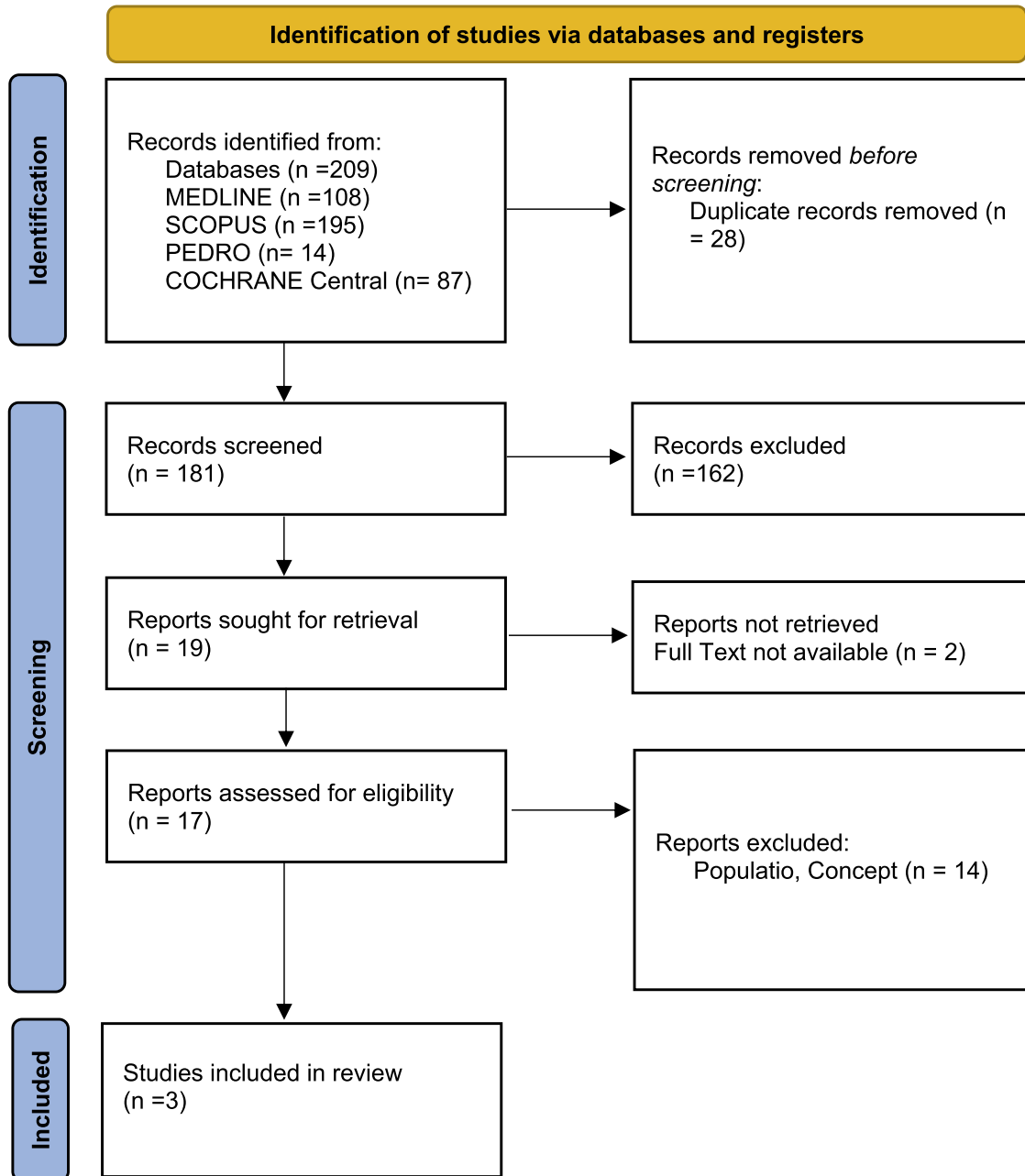


Figure 1. Preferred reporting items for systematic reviews and meta-analyses 2020 (PRISMA) flow-diagram.

while at 6 months, the trend favored the comparison group. In conclusion, the study demonstrated significant improvements with breath therapy, suggesting its safety and the potential for combining these practices in rehabilitation. Further research in this area is needed. In Yu et al. (2023) included a total of 60 participants diagnosed with chronic low back pain, randomly and equally divided into a study group and a control group. The control group underwent sessions focusing on core stability muscle strengthening once a day for 4 days a week. The study group followed the same exercise protocol as the control group, with the addition of diaphragmatic breathing sessions twice a day for 5 days a week. The study lasted for a total of 8 weeks, and both groups were supervised by a physiotherapist during exercise execution. Both groups showed significant improvements in predefined outcomes. Particularly, the study group achieved a higher percentage of progress

(ORR = 96.67%) compared to the control group (ORR = 73.33%) in terms of pain, disability, quality of life, and levels of endurance of the lumbar muscles in both static and dynamic conditions.

Discussion

As previously described, the main objective of this scoping review was to provide a comprehensive overview of the existing literature regarding the use and effectiveness of mindful breathing practices (Mehling, 2001; Mehling et al., 2005; Tedeschi, 2024; Yu et al., 2023), applied either as a standalone treatment or in combination with physiotherapy, in managing chronic pain in individuals with low back pain. Another aim is to raise awareness among physiotherapists regarding the potential therapeutic benefits of this practice (I et al., 2023; Turolla et al., 2023), even though

Table 1
Main Characteristics of Included Studies.

Author, Year of Publication	Study Design	Objectives	Population	Type of Intervention	Outcome Measures
Mehling (2001)	Descriptive Study	The objective was to assess the utilization and efficacy of Breath Therapy in Germany, focusing on therapeutic principles and its effectiveness in patients with chronic low back pain.	614 members of the national association of breath therapists; out of these, only 357 completed the questionnaire.	Administration of a closed-ended questionnaire about the use of Breath Therapy, developed by the Berlin Free University Medical Center in collaboration with the national association of breath therapists. This questionnaire was administered to 614 association members, and out of these, only 357 completed it.	Prevalence of responses given in the questionnaire.
Mehling et al. (2005)	Randomized Controlled Clinical Trial	Determine the effectiveness of "Breath Therapy" in patients with a diagnosis of chronic low back pain, which includes practices of conscious breathing and body awareness.	24 participants: Adults aged 20 to 70 years with a diagnosis of chronic low back pain.	Both groups received an introductory session lasting 60 minutes and 12 individual sessions lasting 45 minutes each, over a period of 6–8 weeks. The study group conducted sessions of conscious breathing under the guidance of a certified operator, while the control group followed a specific physiotherapy protocol for managing chronic low back pain. Both groups were instructed to perform exercises independently at home.	- Pain (VAS scale) - Disability (Roland Morris Disability Questionnaire) - Health-related quality of life (SF-36) before starting the study, at 6–8 weeks, and 6 months from the beginning of the study. - Balance assessed at the beginning and end of the study as an indirect measure of proprioception and body awareness.
Yu et al. (2023)	Retrospective Study	Determine the therapeutic effectiveness of respiratory practices combined with core stability reinforcement in the management of nonspecific chronic low back pain.	60 patients diagnosed with nonspecific chronic low back pain, equally and randomly divided into a study group and a control group.	The control group underwent core stability muscle reinforcement sessions, while the study group followed the same exercise protocol as the control group, with the addition of diaphragmatic breathing sessions, to be performed twice a day, 5 days a week. The study lasted for 8 weeks, and both groups were supervised by a physiotherapist during exercise execution.	- Pain (VAS scale) - Health-related quality of life (SF-36) - SCODI (Spinal Cord Injury Functional Ambulation Inventory) - Endurance of lumbar muscles in static and dynamic condition

SF-36 = Short Form-36 Health Survey; SCODI = spinal cord injury functional ambulation inventory; Vas = Visual Analog Scale.

the current literature lacks sufficient studies to formulate a clinical practice protocol and prescribe exercises for patients to perform independently at home. The studies analyzed in this scoping review identify mindful breathing as a fundamental tool that can assist patients suffering from chronic low back pain in increasing their level of body awareness and proprioception, aspects that are often deficient in these patients (Koppelaar et al., 2023). Specifically, the practice of mindful breathing, through perception and mindful observation, enables individuals to connect with their pain, whereas the natural inclination is to reject and avoid it, often through the use of pharmacological therapies. In the experimental study examined, Mehling et al. (2005) investigated the therapeutic effectiveness of mindful breathing techniques and traditional physiotherapy separately on two distinct groups, a study group and a control group, comprising individuals with chronic low back pain. At the study's conclusion, both groups reported similar outcomes, especially concerning pain reduction (VAS: -2.7 for the study group, VAS: -2.4 for the control group) and improvements in quality of life (SF-36*: $+14.9$ for the study group; SF-36: $+21.0$ for the control group). A more recent study in the literature, conducted by Yu et al. (2023), explored the combined efficacy of both techniques, highlighting how the combination of mindful breathing practices and core stability muscle reinforcement results in superior outcomes compared to solely focusing on muscle strengthening. The study group achieved a higher percentage of progress (ORR* = 96.67%) compared to the control group (ORR = 73.33%). The emerging results encourage the inclusion of mindful breathing practices by physiotherapists in their treatment approaches. How-

ever, as discussed earlier, the absence of a precise protocol limits its application in clinical practice and the identification of specific breathing exercises that patients can perform independently at home. Integrating simple techniques like breath therapy into nursing practice offers a noninvasive means to mitigate the effects of prolonged bed rest and alleviate associated pain. By incorporating breath awareness and mindful breathing exercises into patient care routines, nurses can empower individuals to proactively manage their pain and improve their comfort levels, even during extended periods of bed rest. This proactive approach aligns with the holistic principles of pain management nursing, emphasizing the role of self-care and non-pharmacological interventions in promoting overall well-being and reducing the burden of chronic low back pain.

Strengths

This scoping review provides an examination of the existing literature on the use of mindful breathing techniques in managing chronic low back pain, offering an overview of the current state of knowledge in this area.

The review encompasses a series of studies with both experimental and retrospective designs, broadening insights and perspectives on the topic. However, given the limited number of studies reviewed, such as those by Mehling et al. (2005) and Yu et al. (2023), it is important to acknowledge the scope of the analysis and the need for further research to validate findings and explore recent advancements in the field.

The review evaluates the effectiveness of mindful breathing techniques both as standalone interventions and in combination with physiotherapy, allowing for a valuable comparison of these approaches.

The discussion section addresses the potential clinical implications of the findings, highlighting the need for further research and the possible integration of mindful breathing practices into physiotherapy treatments.

Limitations

The main limitation is the scarcity of studies specifically investigating the use of mindful breathing in chronic low back pain management. This scarcity restricts the ability to draw definitive conclusions or formulate precise clinical guidelines.

Heterogeneity of study designs: The review encompasses a variety of study designs, making it challenging to directly compare the results and draw consistent conclusions across all studies.

Lack of standardized protocols: The absence of standardized protocols for mindful breathing interventions in the included studies makes it difficult to establish uniformity in treatment approaches.

Small sample sizes: Some studies analyzed in the review had relatively small sample sizes, which may limit the generalizability of their findings.

Variation in outcome measures: The diversity of outcome measures used across studies could pose challenges when attempting to synthesize the results comprehensively.

Publication bias: There is a possibility of publication bias, where studies with positive results are more likely to be published, potentially skewing the overall findings.

Lack of long-term follow-up: Some of the included studies may not have provided long-term follow-up data, limiting the assessment of the durability of the observed effects.

Varied definitions of mindful breathing: The definition and implementation of mindful breathing techniques may have varied across studies, which could affect the consistency of the interventions.

Generalizability: The generalizability of the findings to different populations or cultural contexts may be limited, given the specific patient groups and settings of the included studies.

Conclusions

In conclusion, the studies reviewed suggest that mindful breathing, either as a standalone approach or in combination with physiotherapy, can enhance body awareness and proprioception in individuals with chronic low back pain. This awareness may help patients better cope with their pain. While the results are encouraging, the absence of standardized protocols limits its widespread clinical application. Further research is needed to develop specific guidelines for integrating mindful breathing into clinical practice and to identify home-based breathing exercises for patients. This approach has the potential to offer a holistic approach to managing chronic low back pain, addressing both physical and psychological aspects.

Ethical Approval

This article does not contain any studies with human participants performed by any of the authors.

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Declaration of Patient Consent

Patient's consent is not required as there are no patients in this study.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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