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Depression and chronic pain: integrated therapeutic approaches for treatment

Abstract

Introduction: Depression and chronic pain are frequently interconnected conditions that significantly impair functionality, well-being, and quality of life. Their relationship is bidirectional, mediated by shared neurobiological mechanisms and psychosocial factors such as catastrophizing, social isolation, and hopelessness, demanding therapeutic approaches that transcend the traditional biomedical model.

Objective: To investigate, through an integrative literature review, the main therapeutic strategies used in the simultaneous management of chronic pain and depression, with emphasis on non-pharmacological interventions that foster functional recovery and overall patient well-being.

Methods: A systematic search was conducted in PubMed and SciELO for publications from 2019 to 2024; after applying inclusion and exclusion criteria, 18 articles were qualitatively analyzed.

Results: The most frequent therapies included Cognitive-Behavioral Therapy (CBT), Mindfulness-Based interventions, Acceptance and Commitment Therapy (ACT), as well as integrated programs combining physiotherapy and online modalities. Studies consistently reported reductions in pain intensity, functional interference, depressive and anxiety symptoms, and catastrophizing, along with increased pain acceptance and patient autonomy.

Discussion: Findings reinforce that integrated therapeutic strategies yield lasting benefits, particularly when tailored to the patient's psychological and social profile. Both face-to-face and virtual formats of CBT and mindfulness-based approaches proved effective, broadening access to care; personalization, cognitive restructuring, and active patient engagement emerged as key elements for therapeutic success.

Conclusion: Effective management of co-occurring depression and chronic pain requires an interdisciplinary, patient-centered approach. Non-pharmacological therapies, especially psychotherapeutic interventions — are essential to reduce suffering, restore function, and reclaim autonomy, supporting more integrative, humanized, and effective clinical practices in mental health and pain care.

Keywords: depression, chronic pain, cognitive-behavioral therapy, integrative therapies, mental health

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Layra Giovana Carvalho Camara, Ana Carolina Ribeiro de Araujo e Araujo, Hiago Sousa Bastos, Jacira do Nascimento Serra, Marcelly Amanda Lucena Ericeira, Almir José Guimaraes Gouveia, Otto Mauro dos Santos Rosa, Juliana Fonseca Cavalcante, Maria Aparecida Costa, Ana Luísa Penha Castro Marques, Aeriberto Carlos Lindoso de Souza, Consuelo Penha Castro Marques

Department of Medicine, Federal University of Maranhão, Brazil

Correspondence: Consuelo Penha Castro Marques, Department of Medicine, Federal University of Maranhão, Brazil

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Introduction

Depression is a complex psychological disorder characterized by a persistent feeling of sadness, loss of interest or pleasure in usual activities, and significant impairments in the individual's cognitive, emotional, and physical functioning. Its etiology is multifactorial, influenced by biological, psychological, and sociocultural aspects.[1] Among its main impacts is the difficulty in maintaining performance in daily activities: simple tasks become challenging, and there are impairments in interpersonal relationships, school or professional performance, and self-care. These factors, combined, intensify feelings of worthlessness and guilt, worsening the depressive state.

On the other hand, chronic pain is defined as persistent pain that lasts for more than three months and may have well-established causes, such as previous injuries, chronic diseases, or neurological conditions. Its repercussions go beyond physical impairment, intensely affecting emotional and mental well-being, leading to the appearance of depressive and anxious symptoms and mood swings.[2] Thus, continuous pain can trigger or intensify depressive symptoms, since prolonged suffering often generates feelings of helplessness, frustration, and loss of interest in daily activities—central elements in this condition.

Concomitantly, the presence of a depressive state can also intensify the perception of chronic pain, influencing increased pain sensitivity and compromising neurobiological and psychological coping mechanisms. From this perspective, it is observed that patients with chronic pain are more prone to developing depression,[3] just as depressed individuals tend to present alterations in pain modulation, favoring the emergence or chronicity of painful conditions.[4] Unlike acute pain, chronic pain is not associated with the tissue healing process, which means that its treatment requires long-term interventions aimed at controlling suffering and improving the patient's functionality.

Given the demonstrated interrelationship between depression and chronic pain, it becomes evident that both conditions share a significant psychosocial basis, playing a central role in the clinical manifestation and intensity of symptoms. As individuals experience chronic pain, physiological and emotional responses associated with stress arise, such as irritability and restlessness, which increase susceptibility to the development of major depressive episodes.[3] The reverse is also observed: the presence of depressive symptoms can intensify the painful experience, due to the influence of somatic aspects and the negative modulation of pain, resulting in an amplified perception of physical suffering
.[5]

Thus, the interconnection between chronic pain and depression reveals not only a clinical overlap, but also a possible common origin, linked to neuroanatomical substrates that are still poorly understood.[6]

This complexity reinforces the need for therapeutic strategies that go beyond isolated pharmacological treatment, encompassing psychotherapeutic interventions aimed at significantly reducing suffering and improving the patient's overall well-being.[7] In this context, non-pharmacological therapies stand out for their multiple benefits: absence of adverse effects, low maintenance cost, and greater patient engagement in their therapeutic process.[1] Furthermore, they favor the development of greater awareness of dysfunctional thought and behavior patterns, frequently associated with pain maintenance and negative rumination.

In a comprehensive way, it is understood that the implementation of non- pharmacological approaches, even when associated with medication, plays a fundamental role in the functional rehabilitation of the patient. Practices such as self-awareness and mindfulness help the individual to resume an active life and respect their limits, breaking the dependence on strategies aimed only at suppressing immediate symptoms.[8] Therefore, the importance of integrated approaches capable of generating more lasting therapeutic responses and preventing relapses is highlighted. These benefits are more evident when such strategies are consistently incorporated into the patient's care plan.[9]

Thus, the main objective of this work is to analyze the main therapeutic strategies used in the concomitant management of chronic pain and depression, with an emphasis on non- pharmacological interventions that promote functional recovery and the overall well-being of the patient.

Methodology

This study is a systematic, descriptive, and analytical review of new therapies associated with the simultaneous treatment of depression and chronic pain. This methodology combines the incorporation of knowledge and the applicability of results through six steps: (1) development of the guiding question; (2) literature search; (3) data collection; (4) critical analysis of the included studies; (5) discussion of the results; and (6) presentation of the integrative review.[10] To address these steps, the theme was initially defined and the guiding question for this research was developed: *Which therapies can help in the treatment of depression associated with chronic pain, according to the literature?*

Data collection was performed in the following databases: Scientific Electronic Library Online (SCIELO) and PubMed, using the following descriptors and their combinations in Portuguese and English: "Depression," "Chronic Pain," "Psychotherapy," "Therapeutics," "Cognitive Behavioral Therapy," "Depression," "Chronic Pain," "Psychotherapy," "Therapeutics," and "Cognitive Behavioral Therapy," joined by the Boolean operator "AND." The inclusion criteria defined for the selection of articles were: articles published in Portuguese or English; addressing the topic of the integrative review in question; and having been published and indexed in the respective databases between 2019 and 2024. As for the exclusion criteria, duplicate articles and articles that were not fully available were excluded.

After searching for articles, we selected those that directly related to the guiding question and met the inclusion and exclusion criteria. Afterward, the selection process first analyzed the title, followed by the abstract, and finally the full text. The entire process followed the data flow diagram by Page et al. (2021), as shown in Figure 1 below.

The selected articles were subsequently placed in three tables (Tables 1-3) for further research and review, which are presented in the results. The selection of the available information and data, as well as their expansion, was conducted descriptively, allowing for observation, description, and classification of these data, aiming to consolidate the information throughout this process. This study does not require research ethics committee approval, as it is a secondary review study of anonymous data, according to the Ministry of Health, Resolution 466/12 of the National Health Council.

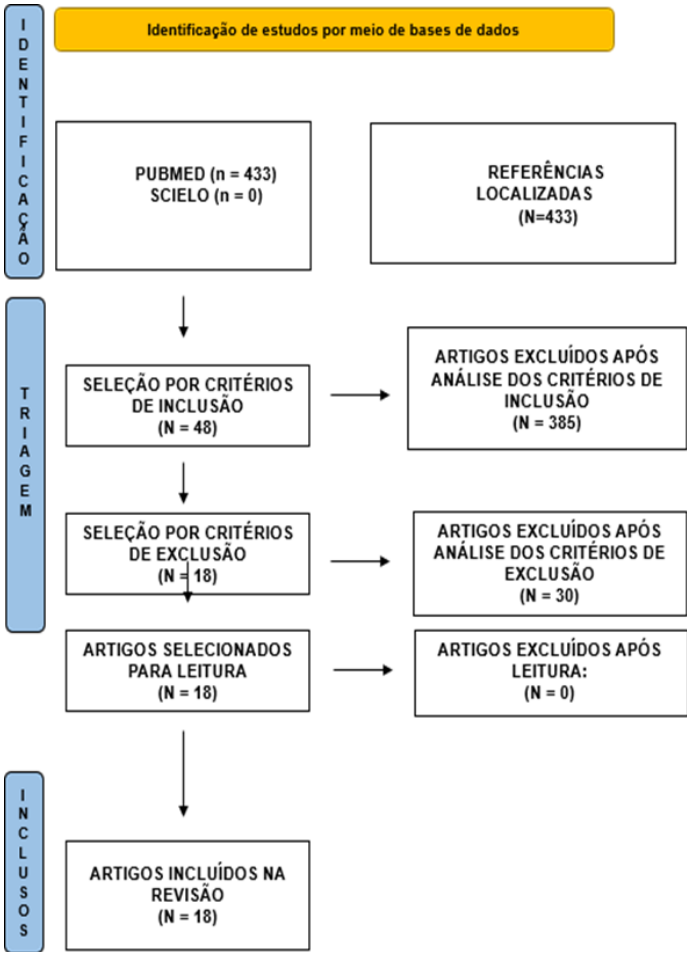

Figure 1- PRISMA Flowchart - Search and selection of scientific articles

Fonte: Adaptado pelo autor, com base em Diagrama Flow, segundo PAGE, M.J; MCKENZIE, J. E.; BOSSUYT, P.M.; BOUTRON, I.; HOFFMANN, T.C.; MULROW, C.D., et al. The Prisma 2020 statement: an updated guideline for reporting systematic reviews. BMJ, v.1; n. 71, p. 372, 2021.

Results

433 articles associated with the topic were found, arranged in the PUBMED and SCIELO databases, and guided by the 5 descriptors and their combinations in Portuguese and English: "Depression", "Chronic Pain", "Psychotherapy", "Therapeutics", "Cognitive Behavioral Therapy" / "Depression", "Chronic Pain", "Psychotherapy", "Therapeutics", "Cognitive Behavioral Therapy", using the Boolean operator "AND".

Of this total, 385 articles were excluded after analyzing the inclusion criteria (articles published in Portuguese or English; addressing the topic of the integrative review in question; and publications and indexing from 2019 to 2024), totaling 48 articles selected based on the inclusion criteria. After this initial selection, 30 articles were further excluded after analyzing the exclusion criteria (replica articles and articles that were not made available in full), resulting in 18 articles after selection based on the exclusion criteria. After reading the abstracts provided in the articles, all texts that indicated a direct relationship to the research topic were selected. No articles were excluded after reading, resulting in 18 articles included

in the review in question, as demonstrated in the Flow diagram included in the methodology.

Table 1 presents the 18 articles included in the final analysis, describing their authors and year of publication, type of study developed, objectives and main conclusions, being essential to support the subsequent discussions developed.

Table 1 Articles selected for the composition of this review.

Author/Year	Study characteristics (type of study and objectives)	Conclusion
Andersen TE et al.[11] 2022	Randomized clinical trial. To evaluate whether a values-based cognitive behavioral therapy (V- CBT) program prevented the development of disability and psychological distress after whiplash injury.	There was a significantly greater reduction in disability in the group that experienced V-CBT.
Bicego A. et al.[12] 2021	Randomized longitudinal study. To evaluate the effectiveness of self-hypnosis combined with self- care (i.e., a type of CBT) compared to music/self-care, self-care, and psychoeducation/CBT, and to evaluate its long-term effects in patients with chronic pain.	The study showed the beneficial effect of self- hypnosis and cognitive behavioral approaches on the quality of life of patients with chronic pain, noted through a significant decrease in pain intensity and insomnia severity.
Brünahl CA. et al.[13] 2021	Non-randomized controlled pilot study. To explore the feasibility of providing and evaluating a combination of physical therapy and psychotherapy for patients with chronic pelvic pain syndrome.	The combination of physical therapy and psychotherapy for patients with Chronic Pelvic Pain Syndrome appears to be feasible and promising in terms of effect.
Bushey MA et al.[14] 2022	Randomized clinical trial. Compare medication treatment versus CBT on pain intensity, interference, and other pain-related outcomes.	U.S. veterans with low back pain who were prescribed long-term opioid therapy were modestly more effective than CBT in reducing pain impact during the 12-month study. However, this difference may not be clinically meaningful or generalizable to non- veteran populations.
Chen JA et al.[15] 2023	Randomized clinical trial. To analyze which patient profile would benefit most from mindfulness-based stress reduction (MBSR) and cognitive behavioral therapy (CBT) in cases of chronic low back pain.	Regardless of the patient's baseline characteristics, there are clear benefits to both CBT and MBSR. Participants with greater depressive symptoms at baseline showed greater improvement in depressive symptoms with CBT.
Cooperman NA.[16] et al. 2021	Randomized clinical trial. To analyze whether MORE (Mindfulness-Oriented Recovery Enhancement), which integrates mindfulness training and cognitive reappraisal skills, helps reduce illicit drug use, improving mental and physical health, and enhancing well-being.	MORE was associated with significantly less illicit drug use, craving, physical pain, and emotional distress over 16 weeks compared to TAU.
Darnall BD et al.[17] 2021	Randomized clinical trial. To determine whether a single pain management skills class can improve pain catastrophizing, pain intensity and interference, and other secondary outcomes.	Among adults with CLBP, a pain management class has resulted in clinically significant improvements in pain catastrophizing, intensity, and interference. The results were non-inferior to eight-session CBT over three months.
Day MA. et al.[18] 2020	Secondary analysis of a randomized controlled trial. To evaluate the results of a study comparing cognitive therapy (CT), mindfulness meditation (MM), and mindfulness-based cognitive therapy (MBCT) for the treatment of chronic low back pain (CLBP).	The model used in the study suggests that different individuals are more or less suited to these therapies, depending on the characteristics of their cases a priori, as noted in more "active" brains, which may respond better to the set of analytical and didactic style skills associated with cognitive restructuring in CT.
Hadjistavropoulos HD et al.[19] 2022	Randomized longitudinal study. To examine the effectiveness of an internet-delivered cognitive- behavioral pain management program (CMP) as part of routine care over a 5-year period.	The overall sample showed significant improvements in depression and anxiety at post-treatment and at 3- month follow-up. Significant improvements were also found in pain severity, fear of movement and reinjury, and acceptance of chronic pain.
Jensen MP et al.[20] 2023	Secondary analysis of a randomized controlled trial. To evaluate the results of a study comparing cognitive therapy (CT), mindfulness meditation (MM), and mindfulness-based cognitive therapy (MBCT) for the treatment of chronic low back pain (CLBP). To evaluate data from a randomized controlled trial that compared the effects of four sessions of cognitive therapy (CT), hypnosis focused on pain reduction (HYP), hypnosis focused on changing pain-related cognitions and beliefs (HYP-CT), and a control condition of pain education (PE) in patients with chronic pain and depressive symptoms.	Personal factors assessed prior to psychological pain management help predict responses to these treatments, as noted in the data that individuals with higher baseline catastrophizing respond more to mindfulness meditation training, while individuals with lower baseline catastrophizing respond better to mindfulness- based cognitive therapy (MBCT).
Malfliet A et al.[21] 2024	Randomized clinical trial. To evaluate the effectiveness of cognitive behavioral therapy for insomnia, integrated with pain management for patients with chronic nonspecific spinal pain.	The combination of the two therapies led to significant changes in insomnia severity and sleep quality, although it did not cause a decrease in pain intensity.

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Table 1 Continued....

Palermo TM et al.[22] 2021	Randomized clinical trial. To determine whether an 8-week online course applying CBT (pain coping skills) would impact the pain of patients with chronic pancreatitis.	Regarding pain INTERFERENCE, the group receiving online CBT classes reported significantly greater reductions compared to the control group. Participants in the CBT group reported greater reductions in pain INTENSITY than the control group at post- treatment and follow-up.
Reilly ED. et al.[23] 2024	Randomized clinical trial. To evaluate the feasibility of acceptance and commitment therapy (ACT) for veterans with chronic pain and its impact on pain and mental health.	There was a positive response to the program's usability, content adaptation, veteran- centeredness, and perceived impact on pain management. The ACT group experienced significant increases in chronic pain acceptance and decreases in depressive symptoms.
Sanabria-Mazo JP et al.[24] 2023	Randomized clinical trial. To examine the effectiveness of remote acceptance and commitment therapy (ACT) or behavioral activation therapy for depression (BATD) in patients with chronic low back pain and comorbid depressive symptoms.	ACT produced improvements in pain interference at post-treatment and follow-up, and BATD produced improvements at follow- up. Improvements were also identified in pain catastrophizing (a secondary outcome) in ACT and BATD.
Serrat M et al.[25] p. 104188, 2022	Randomized clinical trial. To examine the effectiveness of two video-based programs (FIBROWALK) and the Multicomponent Physical Therapy Program (MPP)—which utilize cognitive restructuring and mindfulness—for patients with fibromyalgia (FM).	Patients who underwent FIBROWALK showed greater improvements in clinical outcomes, with superior effects on pain, anxiety and depressive symptoms, and physical functioning compared to MPP. Similarly, participants in the MPP program also showed greater improvements in functional impairment, perceived pain, kinesiophobia, and depressive symptoms compared to TAU alone.
Taguchi K et al.[26] 2021	Randomized clinical trial. Examining the effectiveness of the CBT protocol for patients with high-intensity, treatment-resistant chronic pain.	The integrated CBT program was effective in providing pain management skills to patients with chronic pain in a clinical setting, improving catastrophic cognition, disability in daily living, depression, and anxiety.
Vowles KE et al.[27] 2023	Randomized clinical trial. To evaluate the feasibility of two interventions for veterans with chronic pain: (1) Acceptance and Commitment Therapy for chronic pain; (2) Mindfulness-Based Relapse Prevention for opioid misuse (ACT+MBRP).	The study is ongoing, seeking to determine the effectiveness of the behavioral treatment program on pain interference and hazardous opioid use among veterans with chronic pain and ODD who are prescribed buprenorphine,
Williams RM et al.[28] 2022	Randomized clinical trial. To compare the effectiveness of hypnosis training (HYP) and mindfulness meditation (MM) with an active education (ED) control in veterans with chronic pain.	This study suggests that all 3 interventions provide post-treatment benefits across a range of outcomes, but the benefits of HYP and MM continue beyond the end of treatment, whereas the improvements associated with ED dissipate over time.

Source: Prepared by the authors, 2025.

Discussion

This research sought to highlight how chronic pain is associated with depression, posing a significant challenge to public health, since these comorbidities have a high prevalence and substantial impacts on quality of life. In recent studies, approximately 35.7% of the Brazilian adult population suffers from chronic pain, with an even higher prevalence among the elderly, reaching about 47.3%.[29,30] These conditions are also associated with several distinct factors, such as female sex, advanced age, lower educational level, sedentary lifestyle, excessive alcohol consumption, smoking, central obesity, and pre-existing mood disorders.

In addition to compromising physical functionality, chronic pain is also closely linked to psychological suffering, often correlated with sleep disorders, anxiety, and depression, further aggravating the patient's condition (Dos Santos.[31] The coexistence of chronic pain and depression reflects an overlap of neural circuits that regulate both nociceptive perception and emotional processing. Structures such as the medial prefrontal cortex, the amygdala, the anterior cingulate cortex, and the insula form a common functional axis responsible for integrating sensory and affective experienceS.[32] Thus, it is noted that in conditions of persistent pain there is limbic hyperactivity and hypofunction of the prefrontal cortex, which reduces the capacity for cognitive modulation of pain and facilitates negative emotional responses.[33]

This functional dysfunction may help explain why patients with chronic pain exhibit more depressed mood, hopelessness, and catastrophizing- elements that reinforce the cycle of suffering. In this context, the randomized clinical trial conducted by Andersen et al.[11] investigated the effect of Values-Based Cognitive Behavioral Therapy (V-CBT) in preventing functional disability and psychological distress in individuals affected by whiplash injury. Although the study is predominantly based on self-reported disability, which may introduce subjective perception bias—especially in patients with depressive symptoms (whose self- assessment tends to be more negative)-it shows that participants undergoing V-CBT experienced a significantly greater reduction in functional disability compared to the control group. This finding is particularly relevant, since disability is one of the most debilitating manifestations of chronic pain, negatively impacting an individual's autonomy, interpersonal relationships, and work productivity[34] — factors that, in turn, can reinforce psychological suffering and intensify the perception of pain.[35]

This result directly relates to the study conducted by Day et al. (2020), which compared different psychotherapeutic approaches in the treatment of chronic low back pain, a condition known to be associated with psychological symptoms, especially depression and anxiety. The article investigated three intervention modalities: Cognitive Therapy (CT), Mindfulness Meditation (MM), and Mindfulness-Based Cognitive Therapy (MBCT), with the aim of identifying which patient profiles would benefit most from each approach. Although the study analyzed presents methodological limitations, such as the absence of

longitudinal follow-up and objective measures (neurophysiological or behavioral that confirm the observed changes), the reported results reinforce the need for personalized therapeutic approaches that integrate the cognitive, emotional, and neurobiological dimensions of the patient.

In this sense, it was revealed that the individual characteristics of the participants influence the response to treatment, corroborating the way in which Cognitive Behavioral Therapy (CBT) and mindfulness-based interventions have stood out for their effectiveness in reducing pain, improving functionality, and attenuating psychological symptoms.[36] Corroborating this idea, the study by Sanabria-Mazo et al.[24] evaluated the effectiveness of two psychotherapeutic interventions - Acceptance and Commitment Therapy (ACT) and Behavioral Activation Therapy for Depression (BATD) - applied via videoconference in patients with chronic low back pain and comorbid depressive symptoms. While ACT was effective in reducing pain interference both post-treatment and at follow-up, BATD showed positive results at late follow-up, indicating sustained effects and helping to reduce pain catastrophizing.

This temporal difference in therapeutic effects suggests that ACT and BATD act through distinct mechanisms of emotional and motivational regulation: ACT prioritizes the development of acceptance and psychological flexibility, helping in desensitization to pain and experiential avoidance—which explains its more immediate response. BATD, on the other hand, by emphasizing the reorganization of reinforcing activities and increased behavioral engagement, tends to produce gradual and sustained improvements, reflecting adaptive changes in the dopaminergic reward system, which is often hypoactive in depression associated with chronic pain.[24]

In this same context, the research conducted by Hadjistavropoulos et al.[19] stands out by investigating the effects of a Cognitive Behavioral Therapy (CBT) program also administered online in a five-year observational follow-up. The results obtained demonstrated that the online CBT program was effective in significantly reducing depressive and anxious symptoms, with benefits maintained in the three-month follow-up. In addition to the positive effects on mood, participants also showed improvement in pain severity, acceptance of the chronic condition, and reduction in fear of movement, an important factor in the pain maintenance cycle.[37] However, although the results are encouraging, the long follow-up was observational and without active control, which makes it difficult to establish direct causality between the intervention and the observed improvements. Furthermore, the predominant use of self-reported measures may overestimate therapeutic effects due to social desirability or subjective improvement in coping (a set of cognitive and behavioral strategies), without necessarily reflecting lasting neurobiological changes.

Another prominent shared pathophysiological mechanism between pain and depression is neuroinflammation: the activation of microglia and astrocytes in the central nervous system promotes the release of pro-inflammatory cytokines, such as IL-1β, IL-6, and TNF-α, which alter neuronal excitability and decrease synaptic neuroplasticity.[38] Once these substances cross or modulate the blood-brain barrier, they affect key areas of mood and pain regulation, which in the long term generates central sensitization, characterized by amplification of the pain response and reduction of the nociceptive threshold. Thus, the interrelationship between chronic pain and depression has been widely described in the literature as a bidirectional association, in which the presence of one condition tends to amplify the severity and chronicity of the other.[39] Thus, it is noted that the serotonergic, noradrenergic, and dopaminergic systems end up playing a dual role in pain modulation and mood control, since the reduction in the availability of serotonin and noradrenaline in the brainstem nuclei (such as the locus coeruleus and the raphe nucleus) weakens the descending inhibitory pain pathways, further intensifying nociception.[40]

Thus, the study by Darnall et al.[17] investigates the effectiveness of pain management skills-based interventions in adults with chronic low back pain. The results obtained were particularly significant: a single brief session of pain management skills training proved effective in significantly reducing catastrophizing, pain intensity, and pain interference in daily life. Thus, the study stands out for demonstrating the therapeutic potential of ultrabrief interventions, but also raises questions about the durability of the effects and the underlying mechanisms involved. Therefore, the lack of prolonged follow-up prevents us from verifying whether the cognitive changes obtained in this study are maintained in the long term or whether they only reflect an initial improvement resulting from positive expectations and a temporary increase in self-efficacy. From a neurobiological point of view, it is plausible that the brief intervention acts by rapidly activating prefrontal and cingulate circuits involved in the cognitive reinterpretation of pain, modulating the connectivity between the dorsolateral prefrontal cortex and the amygdala. This functional reconfiguration, although transient, can reduce the emotional aspect of pain and partially restore top-down control over nociceptive responses,[41] helping to strengthen cognitive flexibility, a central factor for adaptive coping with chronic pain.[42]

Another study used as a reference was the research by Chen et al.[15] that evaluated the comparative effectiveness of Mindfulness-Based Stress Reduction (MBSR) techniques, Cognitive Behavioral Therapy (CBT), and usual care in the management of chronic low back pain. The results revealed that individuals with greater severity of depressive symptoms at the beginning of the study showed better progress when subjected to CBT, while those with lower levels of affective distress responded more balancedly to MBSR or conventional treatment. Despite the randomized design and the comparison between active approaches, the follow-up period of the analyzed study was relatively short (8 to 12 weeks), making it impossible to determine the sustainability of the therapeutic effects. Furthermore, the absence of objective measurement (either through inflammatory biomarkers or functional neuroimaging) restricts the ability to link psychological improvements to measurable neurophysiological changes. Even so, the findings of Chen et al.[15] empirically reinforce the role of CBT as an integrated intervention in the joint management of chronic pain and depression, especially in patients with more severe affective profiles.[43]

In this sense, understanding neurobiological mechanisms reinforces that both chronic pain and depression are neuroplastic conditions, capable of partial reversal with appropriate interventions. Pharmacological strategies, such as the use of tricyclic antidepressants and serotonin and norepinephrine reuptake inhibitors, act not only on mood but also on descending pain inhibition pathways, while non-pharmacological interventions restore the balance between excitatory and inhibitory networks. In line with this concept, the study by Palermo et al.[22] stands out for evaluating the feasibility and effects of an online course based on CBT, focused on pain coping skills for patients with chronic pancreatitis over eight weeks. The outcome of the study indicated that patients who received the intervention reported significantly greater reductions in pain interference in their lives, as well as a decrease in pain intensity, both post-treatment and at follow-up.

However, it is necessary to recognize that the study design focused on self-reported outcomes, without including objective measures of adherence, behavioral engagement, or physiological biomarkers. This makes it difficult to determine whether the reported improvements stem from lasting cognitive changes or momentary subjective variations. From a mechanistic point of view, CBT training helps promote cognitive restructuring and adaptive coping strategies, helping to reduce amygdala hyperactivity and strengthening the functional connectivity of the ventromedial prefrontal cortex, resulting in a lower emotional response to nociceptive stimuli.[41] Furthermore, the digital format can enhance the patient's self-efficacy and sense of autonomy, contributing to the effective management of chronic pain, including when applied online.[44]

Another noteworthy study is that of Bushey et al,[14] which compares, in a randomized clinical trial, the effectiveness of medication

optimization with CBT in a specific population: US veterans with chronic low back pain undergoing long-term opioid therapy. The study results indicated that, over a 12-month follow-up, medication optimization was modestly more effective than CBT in reducing the impact of pain on participants' lives. However, the results reveal that the studied sample presents neuroadaptive alterations that reduce the response to natural rewards, hindering engagement in cognitive therapies. Thus, it is plausible that the pharmacological intervention, by promoting dose adjustment and withdrawal management, provided more immediate physiological relief, while the effects of CBT depend on gradual cognitive and behavioral changes. Furthermore, the study lacks an integrated assessment of the mechanisms involved, as it does not include neurophysiological measures or inflammatory biomarkers capable of distinguishing between symptomatic improvement and the actual neurobiological modulation of pain. Even so, despite the slight superiority observed for drug intervention in the study analyzed, psychotherapy can be seen as an important factor in reducing the intensity and interference of pain, as well as in improving symptoms of depression and anxiety in this group.[45]

Another study that also focuses on a similar population is that of Vowles et al,[27] which analyzed American veterans who simultaneously live with chronic pain and opioid use disorder (OUD). The choice of this population is relevant not only because of the clinical severity of the condition, but also because it reflects a common challenge in contemporary practice, in which the management of physical pain and psychological suffering occurs in a scenario of chronic opioid use, often associated with dependence.[46] Regarding the results, it is noted that the mechanisms of action of the two interventions, although convergent in their fundamentals, present distinct emphases: ACT works on the acceptance of pain and the alignment of actions with personal values, while MBRP prioritizes awareness of impulses and relapse triggers, promoting self-regulation and reduction of automatic behavior.

However, disadvantages of the study can be seen as: short-term follow-up and outcomes assessed mainly based on self-reports, without the inclusion of objective measures of craving, adherence, or neurocognitive function. These factors ultimately limit the ability to infer the longevity and specificity of the therapeutic effects. Nevertheless, even with this difference, both interventions can exert a restorative effect on dysfunctional circuits that underpin the neurobiological link between addiction, depressed mood, and chronic pain. Thus, the comparison between the two interventions proved effective in promoting coping skills, psychological flexibility, and acceptance of internal experiences – essential components both in pain management and in mitigating depressive symptoms and preventing relapse in substance use.[47]

In line with these concepts, Cooperman et al.[16] contribute to the debate by exploring the effects of Mindfulness-Oriented Recovery Enhancement Therapy (MORE) in individuals with chronic pain and opioid use disorder undergoing methadone treatment. The results were significant: participants who received the intervention showed a significant reduction in illicit drug use, less craving, reduced physical pain, and reduced emotional distress, compared to those who received only usual treatment. It was noted, therefore, that these approaches not only alleviate immediate symptoms but also strengthen internal resources, such as mindfulness and the reframing of painful experiences, generating the patient's active engagement in their own care and producing more lasting benefits than exclusively pharmacological strategies.[48]

However, the short duration of the follow-up also limits inferences about the durability of the benefits, since initial gains may not be sustained in the medium or long term. Furthermore, co-interventions and variations in methadone dosage or concomitant treatments (psychiatric, physiotherapy) can generate confusion in observing the effects attributed to MORE, since these interventions act primarily on emotional regulation processes—that is, they strengthen top-down mechanisms (attention, cognitive reappraisal, acceptance) that decrease catastrophizing and improve self-regulation even when nociceptive intensity persists. In turn, Williams et al.[28] makes a relevant contribution to the discussion by comparing the effectiveness of three interventions: hypnosis (HYP), mindfulness meditation (MM), and active education (ED), the latter used as a control group. The results indicated that all interventions generated benefits in the post-treatment period for chronic pain among another population of veterans, with a difference observed in the maintenance of positive effects over time for the groups that received mindfulness, unlike the education group, whose effects were transient.

Despite this, it is observed that non-specific differences between interventions (expectations, requirement for home practice, contact time) may have favored the persistence of effects in the MM group, especially if the mindfulness protocol encouraged daily practice while HYP and ED did not. Furthermore, many outcomes in this study appear to depend on self-reports—which increases the risk of response bias and the influence of beliefs about efficacy—and there is also an absence of objective measures (inflammatory biomarkers, assessments of analgesia use, or functional neuroimaging) that support the hypothesis of lasting neurobiological changes. Moreover, this finding highlights the ability of mind-body interventions to produce more lasting changes, an aspect that is particularly relevant when dealing with chronic and persistent conditions.[49]

On this topic, Taguchi et al.[26] corroborate the effectiveness of these therapies by conducting a CBT program for patients with intense chronic pain refractory to conventional treatment. With results showing effectiveness in promoting self-regulation and pain coping skills, a reduction in catastrophic thinking, a decrease in functional disability in daily activities, and an attenuation of depressive and anxious symptoms were observed.[50] However, it is necessary to put these results into critical perspective: conducting this study in a clinical setting with the selection of motivated patients and structured follow-up may inflate the effects observed in research conditions compared to real-world practice.

Complementing this idea, Jensen et al.[20] observed that individuals with high levels of catastrophizing responded better to mindfulness training, while those with lower catastrophizing obtained greater benefits from mindfulness-based cognitive therapy (MBCT). This observed aspect again highlights the importance of personalized care, suggesting that the patient's baseline psychological profile can guide the choice of the most effective therapeutic approach.[51] Thus, although catastrophizing is a robust predictor of worse prognosis and greater pain perception,[52] it also functions as an effect moderator—that is, its presence can both signal greater severity and indicate a greater opportunity for gain with intensive psychological interventions; therefore, the presence of high catastrophizing is not only a risk marker, but a useful marker for therapeutic stratification.

Analyzing other psychobehavioral symptoms**,** Malfliet et al.[21] investigates the effectiveness of Cognitive Behavioral Therapy for Insomnia (CBT-I) integrated with pain treatment in patients with nonspecific chronic spinal pain. It is known that the literature already recognizes that sleep disorders, particularly insomnia, are not only prevalent in individuals with chronic pain, but also share neurobiological mechanisms with mood disorders, such as depression,[53] which interact bidirectionally and hinder the therapeutic response.[40] However, much of the evidence supporting the integration of CBT-I into pain management is based on self-reported outcomes (sleep quality, pain intensity, mood), making it difficult to separate real improvements in sleep architecture from perceptual and cognitive changes about sleep. Furthermore, the study does not add objective measures such as actigraphy or polysomnography, which would be essential to confirm physiological gains from sleep. Still, the study contributes to the debate by evaluating different therapeutic combinations (such as self-care and psychoeducation/CBT) that resulted in a significant reduction in pain intensity and insomnia

severity, factors strongly related to worsening mood, greater catastrophizing, and lower functional capacity.[54]

Consequently, Reilly et al.[23] expands the discussion by investigating the feasibility and effects of a virtual Acceptance and Commitment Therapy-based intervention applied to veterans with chronic pain. The results obtained demonstrated not only the feasibility of the virtual format but also the effectiveness of the intervention: participants who received online ACT reported a significant increase in pain acceptance and a reduction in depressive symptoms, showing positive impacts on both the physical and psychological dimensions. These findings make it clear that the reduction of depressive symptoms represents an important therapeutic gain, contributing to breaking the cycle of suffering frequently observed in patients with chronic pain, in which depressed mood amplifies the perception of pain and vice versa.[55]

However, it should be noted that the veteran sample usually presents a high prevalence of comorbidities (PTSD, TBI, substance use) that act as potential moderators of the response - thus, without moderator analyses, it remains uncertain whether the benefits of virtual ACT are replicated in civilian populations and in patients with distinct clinical profiles. This model is also particularly relevant because it solves one of the barriers faced by many patients with chronic pain: functional limitation, distance from specialized centers, and even stigmatization.[56] Still in the virtual context, Serrat et al.[25] compared the effectiveness of two multicomponent video-based programs aimed at patients with fibromyalgia: FIBROWALK and MPP (Multicomponent Physiotherapy Program), both offered remotely.

The results showed that FIBROWALK produced significant improvements in pain, depressive symptoms, anxiety, and physical functionality, while MPP showed a positive impact on reducing kinesiophobia (fear of movement due to fear of worsening pain), perceived pain, and depressive symptoms. However, it is observed that video-based interventions tend to vary greatly in terms of interactivity and professional support, generating differences in effect that may reflect the support involved and not just the program content. Another point to highlight is that selecting participants with access to and digital skills favors selection bias, reducing generalizability to older patients, those with low digital literacy, or those without technological infrastructure. Furthermore, the reduction in kinesiophobia is an important clinical finding, but it is necessary to assess whether this decrease translates into real and sustained functional gain (greater physical activity, less disability) over time. In general, overcoming barriers such as fear of movement, frequently present in patients with chronic pain, suggests that functional recovery is intrinsically linked to the modification of dysfunctional cognitive and emotional patterns.[57]

Consistent with these findings, Tang et al.[58] presents an innovative proposal by describing an electronic pain management program aimed at working-age individuals living with chronic pain, called ePain. Although it does not yet present conclusive results, the intervention design is highly relevant to this research, as it reflects a growing trend of using digital resources to expand the reach and effectiveness of psychosocial therapies.[59] However, due to its quasi-experimental design and the absence of an active control group, there are difficulties in directly comparing this instrument with face-to-face interventions, such as traditional Cognitive-Behavioral Therapy. In addition, the follow-up period was short (12 weeks), which prevents assessing the durability of behavioral and emotional effects. Even so, ePain represents a relevant conceptual advance by incorporating the use of digital platforms in the integrated management of chronic pain, bringing psychosocial therapy closer to contemporary demands for accessibility and flexibility.

Another study highlighting the importance of multidisciplinary management was conducted by Brünahl **et** al.,[13] which investigated the efficacy and feasibility of combining physiotherapy and Cognitive Behavioral Therapy (CBT) in the treatment of patients with chronic pelvic pain syndrome. The results indicated that the combination of physiotherapy and CBT is particularly effective in relieving emotional distress and reducing functional limitations, showing a better outcome compared to isolated treatments.[60,61] However, the study has limitations regarding its small sample size and the predominance of female participants, which limits the generalizability of the findings to other population groups. Furthermore, the absence of objective measures of autonomic reactivity or inflammatory markers prevents establishing a direct correlation between clinical improvement and neurophysiological changes. Nevertheless, the findings of Brünahl et al.[13] support the hypothesis that combined interventions produce synergistic effects by simultaneously addressing the peripheral and central mechanisms of pain.

Thus, based on the analysis of the studies presented, it is evident that integrated therapeutic interventions, especially those based on behavioral and psychotherapeutic approaches, have demonstrated significant potential in the concomitant treatment of chronic pain and depressive symptoms.[62] This evidence converges on the central premise of this research: that non-pharmacological therapies, especially when associated with behavioral changes and accessible delivery methods (such as online platforms or instructional videos), are essential to reduce suffering and improve the quality of life of patients with chronic pain and depression. Therefore, understanding pain as a multidimensional experience, modulated by emotional and cognitive factors, justifies investing in practices that consider this complexity[63] and that not only complement conventional treatment but often represent an indispensable path to promoting functional recovery, psychological well- being, and the restoration of patient autonomy.[64,65]

Final considerations

The interrelationship between chronic pain and depressive disorders is significantly complex, highlighting the importance of integrated therapeutic approaches that consider both the physical and emotional aspects of these conditions. Analysis of behavioral and psychotherapeutic interventions, especially those based on Cognitive Behavioral Therapy (CBT), shows that effective management of these comorbidities requires strategies that promote not only pain relief but also the reduction of psychological symptoms such as anxiety, depression, and catastrophizing. This demonstrates that the integration of non-pharmacological therapies represents a significant advance in the treatment of chronic pain and depression.

Thus, the need to rethink the traditional treatment model becomes evident, integrating complementary therapies to promote functional recovery, autonomy, and patient well-being. This approach is expected to not only significantly improve pain intensity but also improve patients' physical functionality and psychological well-being, enabling the recovery of autonomy and resulting in a better quality of life and reduced psychological distress. Therefore, this study hopes to contribute to fostering more humane, effective care practices aligned with contemporary healthcare guidelines, emphasizing the patient's role in their therapeutic process.

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Conflicts of interest

The authors declare that there are no conflicts of interest.

References

1. Ramos Guedes D, Bispo ES, Nobre LMAF. Depression, the disease of the century: prevalence of depression and associated factors in women – a literature review. *Recisatec –Scientific Journal of Health and Technology.* 2022;2(2):e2277.
2. Zhang GF, Guo J, Yang JJ. The lateral habenula: role in chronic pain and depression. Transl *Perioper Pain Med*. 2020;7(4):271–278.

3. Ma Y, Xiang Q, Yan C, et al. Relationship between chronic diseases and depression: the mediating effect of pain. *BMC Psychiatry.* 2021;21(1):1–11.

4. Campos ACP, antunes GF, Matsumoto M, et al. Neuroinflammation, pain and depression: an overview of the main findings. *Front Psychol*. 2020;11:538553.

5. Tenti M, Raffaeli W, Gremigni P. A narrative review of the assessment of depression in chronic pain. *Pain Manag Nurs*. 2022;23(2):158–167.

6. Zhou W, Jin Y, meng Q, et al. A neural circuit for comorbid depressive symptoms in chronic pain. *Nat Neurosci.* 2019;22(10):1649–1658.

7. Meda RT, Nuguru SP, Rachakonda S, et al. Chronic pain–induced depression: a review of prevalence and management. *Cureus.* 2022;14(8):e28416.

8. Tanajura NPM, Santana EGD, Flôres GLF, et al. Mindfulness in the approach to patients previously diagnosed with major depression: an integrative review. *Rev Eletr Acervo Saúde.* 2022;15(2):e9699.

9. Powell VB, Abreu N, de Oliveira IR, et al. Cognitive–behavioral therapy for depression. *Braz J Psychiatry.* 2008;30(suppl 2):s73–s80.

10. Souza MT, Silva MD, Carvalho R. Integrative review: what it is and how to do it. *Einstein* (*São Paulo).* 2010;8:102–106.

11. Andersen TE, Ravn SL, Mejldal A, et al. Values–based cognitive behavioural therapy for the prevention of chronic whiplash associated disorders: a randomized controlled trial. *Eur J Pain.* 2022;26(6):1256–1268.

12. Bicego A, Monseur J, Collinet A, et al. Complementary treatment comparison for chronic pain management: a randomized longitudinal study. *PLoS One.* 2021;16(8):e0256001.

13. Brünahl CA, Klotz S, Christoph D, et al. Physiotherapy and combined cognitive–behavioural therapy for patients with chronic pelvic pain syndrome: results of a non–randomised controlled feasibility trial. *BMJ Open*. 2021;11(12):e053421.

14. Bushey MA, Slavan JE, Outcalt SD, et al. Effect of medication optimization vs cognitive behavioral therapy among US veterans with chronic low back pain receiving long–term opioid therapy: a randomized clinical trial. *JAMA Netw Open.* 2022;5(11):e2242533.

15. Chen JA, Anderson ML, Cherkin DC, et al. Moderators and nonspecific predictors of treatment benefits in a randomized trial of mindfulness–based stress reduction vs cognitive–behavioral therapy vs usual care for chronic low back pain. *J Pain.* 2023;24(2):282–303.

16. Cooperman NA, Hanley AW, Kline A, et al. A pilot randomized clinical trial of mindfulness–oriented recovery enhancement as an adjunct to methadone treatment for people with opioid use disorder and chronic pain: impact on illicit drug use, health, and well–being. *J Subst Abuse Treat.* 2021;127:108468.

17. Darnall BD, Roy A, Chen AL, et al. Comparison of a single–session pain management skills intervention with a single–session health education intervention and 8 sessions of cognitive behavioral therapy in adults with chronic low back pain: a randomized clinical trial. *JAMA Netw Open*. 2021;4(8):e2113401.

18. Day MA, Thorn BE, Ehde DM, et al. Moderators of mindfulness meditation, cognitive therapy, and mindfulness–based cognitive therapy for chronic low back pain: a test of the Limit, Activate, and Enhance model. *J Pain*. 2020;21(1–2):161–169.

19. Hadjistavropoulos HD, Peynenburg V, Thiessen D, et al. Five–year observational study of internet–delivered cognitive behavioural pain management when offered as routine care by an online therapy clinic. *Eur J Pain*. 2022;26(2):390–404.

20. Jensen MP, Ehde DM, Hakimain S, et al. Who benefits the most from different psychological chronic pain treatments? An exploratory analysis of treatment moderators. *J Pain.* 2023;24(11):2024–2039.

21. Malfliet A, Baets LD, Blietrys T, et al. Cognitive behavioral therapy for insomnia in pain management for nonspecific chronic spinal pain: a randomized clinical trial. *JAMA Netw Open.* 2024;7(8):e2425856.

22. Palermo TM, Law EF, Topazain MD, et al. Internet cognitive–behavioral therapy for painful chronic pancreatitis: a pilot feasibility randomized controlled trial. *Clin Transl Gastroenterol*. 2021;12(6):e00373.

23. Reilly ED, Kelly MM, Grigorian HL, et al. Virtual coach–guided online acceptance and commitment therapy for chronic pain: pilot feasibility randomized controlled trial. *JMIR Form Res*. 2024;8:e56437.

24. Sanabria–Mazo JP, Colomer-Carbonell A , Borràs X, et al. Efficacy of videoconference group acceptance and commitment therapy (ACT) and behavioral activation therapy for depression (BATD) for chronic low back pain (CLBP) plus comorbid depressive symptoms: a randomized controlled trial (IMPACT study). *J Pain*. 2023;24(8):1522–1540.

25. Serrat M, Albajes K, Navrrette J, et al. Effectiveness of two video–based multicomponent treatments for fibromyalgia: the added value of cognitive restructuring and mindfulness in a three–arm randomised controlled trial. *Behav Res Ther*. 2022;158:104188.

26. Taguchi K, Numata N, Takansahi R, et al. Integrated cognitive behavioral therapy for chronic pain: an open–labeled prospective single–arm trial. *Medicine (Baltimore).* 2021;100(6):e23859.

27. Vowles KE, Witkiewitz K, Clarke E, et al. Rationale and design of a multisite randomized clinical trial examining an integrated behavioral treatment for veterans with co–occurring chronic pain and opioid use disorder: the pain and opioids integrated treatment in veterans (POSITIVE) trial. *Contemp Clin Trials*. 2023;126:107096.

28. Williams RM, Day MA, Ehde DM, et al. Effects of hypnosis vs mindfulness meditation vs education on chronic pain intensity and secondary outcomes in veterans: a randomized clinical trial. *Pain.* 2022;163(10):1905–1918.

29. Rocha ADX, Alfieri FM, Silva NCOVe. Prevalence of chronic pain and associated factors in a small town in southern Brazil. BrJP. 2021;4(3):225–231.

30. Costa MSS, Mageste CC, Simão DS, et al. Sleep disorders in patients with chronic pain: a cross–sectional study. BrJP (Sao Paulo). 2023;6(4):390–397.

31. Dos Santos Kanematsu J, et al. Impact of pain on the quality of life of patients with chronic pain. *Rev Med.* 2022;101(3).

32. Doan L, Manders T, Wang J. Neuroplasticity underlying the comorbidity of pain and depression. *Neural Plast*. 2015;2015:504691.

33. Ong WY, Stohler CS, Herr DR. Role of the prefrontal cortex in pain processing. *Mol Neurobiol.* 2019;56(2):1137–1166.

34. Matsui GK, Tsujiguchi J, Rodrigues LM, et al. Chronic pain: a comprehensive review of innovations and challenges in pain control in clinical practice. Braz J Health Rev. 2024;7(4):e72164.

35. Badaró AC, Zanetti JPAO. Psychological aspects of chronic pain: a perspective from cognitive–behavioral therapy. *Cader Psicol.* 2024;6(11).

36. Streck JNZ, Ceretta RA, Stuginski–Barbosa J. Mindfulness: a complementary therapy for pain. *Braz J Neurol.* 2021;57(1):22–29.

37. Moreira ALS, Lucena RNLS. The interference of biopsychosocial aspects in adults with chronic nonspecific low back pain. *Dialog Health J.* 2021;3(2):1–14.

38. Walker AK, Kavelaars A, Heijnen CJ, et al. Neuroinflammation and comorbidity of pain and depression. Pharmacol Rev. 2014;66(1):80–101.

39. Caríssimo JO, Santos PM, Gomides LF. Influence of emotions on the perception and modulation of physical pain. *Acad J Psychol Appl Humanit (JAPHAC).* 2021;7:89–103.

40. Finan PH, Goodin BR, Smith MT. The association of sleep and pain: an update and a path forward. J Pain. 2013;14(12):1539–1552.

41. Strobel C, Hunt S, Sullivan R, et al. Emotional regulation of pain: the role of noradrenaline in the amygdala. *Sci China Life Sci*. 2014;57(4):384–390.

42. Terassi M, Rossetti ES, Bento SR, et al. Chronic pain in elderly caregivers and its influence on stress and depressive symptoms. Acta Paul Enferm. 2024;37:eAPE003094.

43. de Oliveira CHA. Chronic pain and CBT: group psychoeducational intervention in rehabilitation. *Psychol Health Debate.* 2024;10(2):752–764.

44. Bertoldo MLM, et al. Pain perceptions: a multidimensional analysis from physiological, psychological, and social perspectives. *Braz J Implant Health Sci.* 2025;7(2):146–168.

45. Silva Filho FF, Moura JB, Terminellis JRMB, et al. The role of cognitive–behavioral therapy (CBT) in the treatment of stress, anxiety, and depression. Epitaya E–books. 2024;1(57):49–78.

46. Servin ETN, et al. The global opioid use crisis in chronic non–cancer pain: causes and management strategies and its relationship with Brazil. *Braz J Health Rev.* 2020;3(6):18692–18712.

47. Castro V. Chemical dependency – relapse prevention: contributions of cognitive behavioral therapy. In: Brandão MZS, Conte FCS, Brandão FS, Ingberman YK, eds. *On Behavior and Cognition: Behavioral and Cognitive Psychology – From Theoretical Reflection to Diversity in Application.* São Paulo: ESETec Editores Associados; 2004:374–383.

48. Williams ACdeC, Eccleston C, Morley S. Psychological therapies for the management of chronic pain (excluding headache) in adults. *Cochrane Database Syst Rev*. 2009;15(2):CD007407.

49. Schnaider JM, Lopes de Araúj GR, Carretero Silva J, et al. How mindfulness practice influences the treatment of patients with chronic non–cancer pain, whether associated or not with other therapies: a systematic review. BrJP (Sao Paulo). 2024;7:e20240019.

50. Lins JJdSC, Lopes dos Passos JP, Lima APL, et al. Catastrophic thoughts and functional disability in chronic pain patients in primary health care. *BrJP (Sao Paulo*). 2021;4(4):321–326.

51. Caporossi JVA. Cognitive–behavioral therapy in the treatment of depression: current evidence and future directions. *Ibero–Am J Humanit Sci Educ.* 2024;10(7):2212–2219.

52. Vargas e Silva NCdO, Gusmão Cardoso TS, Agrela de Andrade E, et al. Pain, disability and catastrophizing in individuals with knee osteoarthritis. BrJP (Sao Paulo). 2020;3:322–327.

53. Chellappa SL, Araújo JF. Sleep and sleep disorders in depression. Arch Clin Psychiatry (Sao Paulo). 2007;34:285–289.

54. Santana CAA, Carballo FP. Sleep quality in elderly individuals with chronic pain: an integrative review. Res Soc Dev. 2023;12(6):e29912642144.

55. Santos FS, et al. Perception of chronic pain by the central nervous system. *CPAQV J – Cent Adv Res Qual Life.* 2023;15(3).

56. Castro M, Quarantini LC, Daltro C, et al. Comorbidity of anxiety and depressive symptoms in patients with chronic pain and the impact on quality of life. *Arch Clin Psychiatry (Sao Paulo)*. 2011;38(4):126–129.

57. Marta IER, Baldan SS, Berton AF, et al. Effectiveness of therapeutic touch on pain, depression, and sleep in patients with chronic pain: a clinical trial. *J Univ* São Paulo *Sch Nurs*. 2010;44(4):1100–1106.

58. Tang SK, Tsee MMY, Leung SF, et al. The effectiveness of an electronic pain management programme for the working population with chronic pain: study protocol for a randomized controlled trial. *Trials.* 2020;21(1):421.

59. Maemura LM, Ferreira Matos JA, Paula Oliveira RF, et al. Evaluation of a multidisciplinary team in the treatment of chronic pain: an interventional and prospective study. *BrJP (Sao Paulo)*. 2021;4(4):327–331.

60. Gatchel RJ, McGeary DD, McGeary CA, et al. Interdisciplinary chronic pain management: past, present, and future. *Am Psychol.* 2014;69(2):119–130.

61. Woby SR. Cognitive factors are associated with disability and pain, but not with psychological distress, in patients with chronic low back pain. *Eur J Pain.* 2020;24(4):515–522.

62. Silva DS, Rocha EP, Vandenberghe L. Group psychological treatment for chronic pain. *Themes Psychol.* 2010;18(2):335–343.

63. Teixeira MJ. Pathophysiology of nociception and pain suppression. *JBA.* 2001;1(4):329–334.

64. Dalgalarrondo P. *Psychopathology and semiology of mental disorders.* 3rd ed. Porto Alegre: Artmed; 2019. 440 p.

65. Quartana PJ, Campbell CM, Edwards RR. Pain catastrophizing: a critical review. *Expert Rev Neurother.* 2009;9(5):745–758.

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