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REVIEW

Body Image and Body Awareness Interventions in Chronic Pain: A Systematic Review of Effects on Pain-Related Variables and Emotional Distress

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Abstract: Growing evidence highlights the high prevalence of body image (BI) and body awareness (BA) disturbances in individuals with chronic pain. Moreover, these constructs appear to play a significant role in pain experience. Despite a growing number of interventions targeting BI and BA in chronic pain populations, no systematic review has synthesized their effects. This systematic review was conducted in accordance with PRISMA guidelines and included 24 randomized controlled trials (RCTs). Studies were identified through four databases (PubMed, APA PsycNET, Scopus, and Web of Science), searched on November 14, 2022, and updated on February 26, 2025. Inclusion criteria were: (1) adults (≥18 years) with chronic pain; (2) BI or BA-based interventions; (3) RCTs; and (4) outcomes assessing BI, BA, pain intensity, disability, interference, catastrophizing, kinesiophobia, or emotional distress. Quality assessment was carried out with The Panacea Project Quality Assessment Tool for Quantitative Studies and the results were synthesized narratively. Most studies involved female participants (20 out of 24 RCTs). The most studied conditions were fibromyalgia (N=8) and chronic low back pain (N=4). Interventions including physical activity (N=4) (e.g. aerobic exercise, dance, Pilates) consistently showed positive effects on BI and pain intensity. Evidence on kinesiophobia, catastrophizing, and emotional distress was limited and heterogeneous. Overall, while BI appears to be a relevant therapeutic target in chronic pain, the evidence remains modest. In contrast, BA-focused interventions yielded more robust effects. Taken together, these findings highlight the effects of interventions targeting body image and body awareness and support their integration into multidisciplinary chronic pain management.

Plain Language Summary: This review looked at whether treatments that focus on the body can help people living with chronic pain. Often, people with chronic pain feel uncomfortable, disconnected, frustrated or even distrustful toward their bodies. This can make pain harder to manage. However, it has not been clear whether treatments that focus on body image or body awareness can reduce pain or improve daily life. We reviewed 24 high-quality studies that tested different types of treatments. These included movement-based activities such as yoga, Pilates, tai chi, dance, and aerobic exercise, as well as approaches using virtual reality or positive psychology. Programs that included physical activity often helped people feel better about their bodies and reduced pain levels. However, the number of studies was small. Treatments that focused on body awareness, such as gentle movement, balance, and breathing exercises, were studied more often. These treatments showed benefits both shortly after treatment and over time. In summary, helping people feel more positive about their bodies may be useful, but more research is needed. Treatments that improve body awareness seem to offer more consistent benefits. These findings suggest that combining body image and body awareness approaches may improve care for people living with chronic pain.

Keywords: body perceptions, kinesiophobia, catastrophization, rehabilitation

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Introduction

Chronic pain is understood as a complex, multidimensional experience influenced by biological, psychological, and social factors.[1] In recent years, growing body of research has drawn attention to the high prevalence of body image disturbances among people living with chronic pain.[2,3] Likewise, from the paradigm of embodiment, pain not only affects physical function but also reshapes the way a person relates to their own body and to the world around them.[4] These findings underscore the importance of understanding how people experience their bodies not merely as sites of pain, but as integral components of their lived pain experience, an area that remains relatively underexamined within pain field.

BI is a complex, multifaceted construct composed of three interrelated components: (1) a cognitive-affective component, referring to how people think and feel about their bodies; (2) a perceptual component, relating to how they perceive their body's shape and size; and (3) a behavioral component which encompasses actions such as body checking or avoidance and self-care behaviors.[5]

Sündermann et al[6] proposed a model that explains how disturbances in BI emerge in the context of chronic pain. According to this model, when pain persists, people may rely on maladaptive coping strategies, such as catastrophizing or avoiding movement. These strategies, in turn, contribute to alterations in BI, including a distorted perception of appearance and a perceived loss of functionality and mobility due to distorted BI. People may interpret these changes negatively, reinforcing a negative BI and intensifying their pain experience. This negative loop represents a core mechanism of the pain chronification model proposed by Vlaeyen et al[7–9] Likewise, the inclusion of BI provides a complementary and clinically relevant view of the pain experience.

Closely linked to BI is the construct of BA, defined as the conscious perception of proprioceptive and interoceptive signals, modulated by cognitive and emotional processes such as attention, interpretation, beliefs, memories, emotions, and attitudes.[10] BA plays a crucial role in BI, as difficulties in interoceptive and proprioceptive processing can contribute to distorted body representations. Research suggests that people living with chronic pain frequently experience impairments in BA, leading to altered sensory integration and maladaptive movement patterns.[11]

While the biopsychosocial model of pain remains the dominant and the most recognized framework for understanding chronic pain, with integrative approaches that combine medical, psychological, pharmacological, and rehabilitative strategies,[12] the outcomes achieved with this model still leave room for improvement. In light of emerging evidence pointing to the role of BI and BA as potentially modifiable treatment targets,[13,14] there is a need to systematically evaluate interventions that address these dimensions. Given the substantial heterogeneity in the measurement tools used to assess BI and BA across studies, a narrative synthesis approach was considered the most appropriate. The objective of this systematic review is to synthesize the available current evidence on the effectiveness of interventions targeting BI and BA in individuals with chronic pain.

Materials and Methods

Registration and Search Strategy

This study has been conducted according to the Preferred Reporting for Systematics Reviews and Meta-Analyses (PRISMA) guidelines,[15] (Supplementary Material 1). The study protocol was registered on PROSPERO (CRD42022370718). The first search was conducted on the 14th of November 2022 and was updated on 26th February 2025. The following databases were used: Pubmed, Scopus, Web of Science (WoS), and APA PsycNET. The search terms were related to Chronic Pain, BI and non-pharmacological interventions.

The inclusion criteria were the following: 1. Papers in English, Spanish, Italian or Portuguese. 2. RCT studies. 3. Body image-based interventions. 4. Chronic pain populations. 5. Adult population (age ≥ 18 years). 6. Studies targeting at least one of the following variables: level of pain, interference and emotional distress. One amendment was made to the protocol: although the original plan was to include all study designs reporting quantitative data (eg., single-case designs, pre-post studies), we decided to restrict inclusion to randomized controlled trials (RCTs) only. This change was made due to the high number of eligible RCTs identified during screening, and to ensure greater methodological consistency and comparability. Studies were grouped for synthesis according to their primary focus on body image or

body awareness. In subsequent sections, studies were further organized based on the outcomes assessed: (1) pain-related variables (eg., pain intensity, disability, kinesiophobia), and (2) emotional distress (eg., anxiety, depression).

While the search strategy for Pubmed is reported here, the complete search strings for all databases (including Scopus, Web of Science, APA PsycNET) are available in Supplementary Material 2.

("neuropathic pain" OR "fibromyalgia" OR "back pain" OR "neck pain" OR "tension headache" OR "phantom limb syndrome" OR "phantom arm*" OR "dorsalgia" OR "cervicalgia*" OR "arthritis" OR "migraine" OR "temporo mandibular disorder*" OR "neuralgia" OR "joint pain" OR "herpes" OR "complex regional pain syndrome" OR "chronic pain" OR "peripheral neuropathic" OR "central neuropathic" OR "visceral pain" OR "musculoskeletal pain") AND ("body image" OR "positive body image" OR "body compassion" OR "body acceptance" OR "self-compassion" OR "body awareness" OR "internal body orientation" OR "body appreciation" OR "body image flexibility" OR "body satisfaction" OR "body functionality" OR "positive embodiment" OR "body dissatisfaction" OR "distorted body image" OR "body preoccupation" OR "body concern" OR "body shame" OR "body checking" OR "disembodiment" OR "body consciousness" OR "Body surveillance" OR "Body monitoring" OR "Body esteem" OR "disturbed" OR "body distortion" OR "body discrepancy" OR "positive embodiment" OR "body image avoidance" OR "disembodiment" OR "body schem*") AND ("intervention" OR "treatment" OR "induction").

Quality Assessment of the Studies

The quality assessment of the studies was carried out according to The Panacea Project Quality Assessment Tool for Quantitative Studies[16] evaluating study quality across six domains: selection bias, study design, confounders, blinding, data collection, and withdrawals. Each domain was rated as weak, moderate, or strong, with an overall rating assigned based on the number of weak domains. Four researchers independently assessed each study, and their ratings were compared to reach a consensus.

Data Extraction

The search was conducted on 14th November 2022 and updated on 26th February 2025. Following the search, duplicate entries were automatically identified and removed after revision. Four researchers (VN-M, AZ, GP, and VS) independently reviewed the titles and abstracts of the records and discussed any inconsistencies until a consensus was reached. In case of disagreement, a fifth researcher (RH) was consulted to make the final decision. Subsequently, the same procedure was followed to assess full-text articles for inclusion. The tool used to screen and track articles was Hubmeta.[17]

The following data were extracted from the remaining studies: (1) study authors, (2) aim of the study, (3) sample, (4) type of intervention, (5) study design, (6) measures, (7) main results. All the data were extracted by VN-M and reviewed by AZ, GP, and VS to ensure accuracy. In case of discrepancies, they were discussed and solved by agreements.

The outcomes of interest were: (1) body image, (2) body awareness, (3) pain-related variables (eg., pain intensity, disability, kinesiophobia, pain catastrophizing), and (4) emotional distress-related variables (eg., anxiety, depression). When multiple time points or measurement tools were reported, all the results and different instruments used were considered. Results were synthesized narratively. For each outcome (eg., pain intensity, body image), we collected available quantitative data (eg., mean differences or p-values) as reported in the original studies.

To determine study eligibility for each synthesis, the included studies were first classified based on whether they targeted body image or body awareness. Subsequently, within each of these categories, studies were further grouped according to the outcomes assessed: (1) pain-related variables (eg., intensity, disability, kinesiophobia), and (2) emotional distress (eg., anxiety, depression). This classification process was guided by a structured data extraction table that summarized intervention targets and outcome domains, allowing for systematic assignment of studies to the relevant sections of the narrative synthesis.

Results

Study Selection

The search strategy generated a total of 2,599 records in the initial search, with an additional 591 records identified in the second search. Regarding the number of articles retrieved from each database, 611 records were obtained from PubMed (475 from the first search and 136 from the second); 237 records were retrieved from APA PsycNET (207 from the first search and 30 from the second); 1,202 records were identified through Scopus (952 from the first search and 250 from the second); and finally, 1,140 records were obtained from Web of Science (965 from the first search and 165 from the second). After removing duplicates (n=1493), 1697 articles were screened by title and abstract, 1488 of which were excluded. The total number of full-text articles reviewed was 207,182 of which were excluded based on the exclusion criteria. Finally, 28 articles met the inclusion criteria, three of which were added manually (see Figure 1).

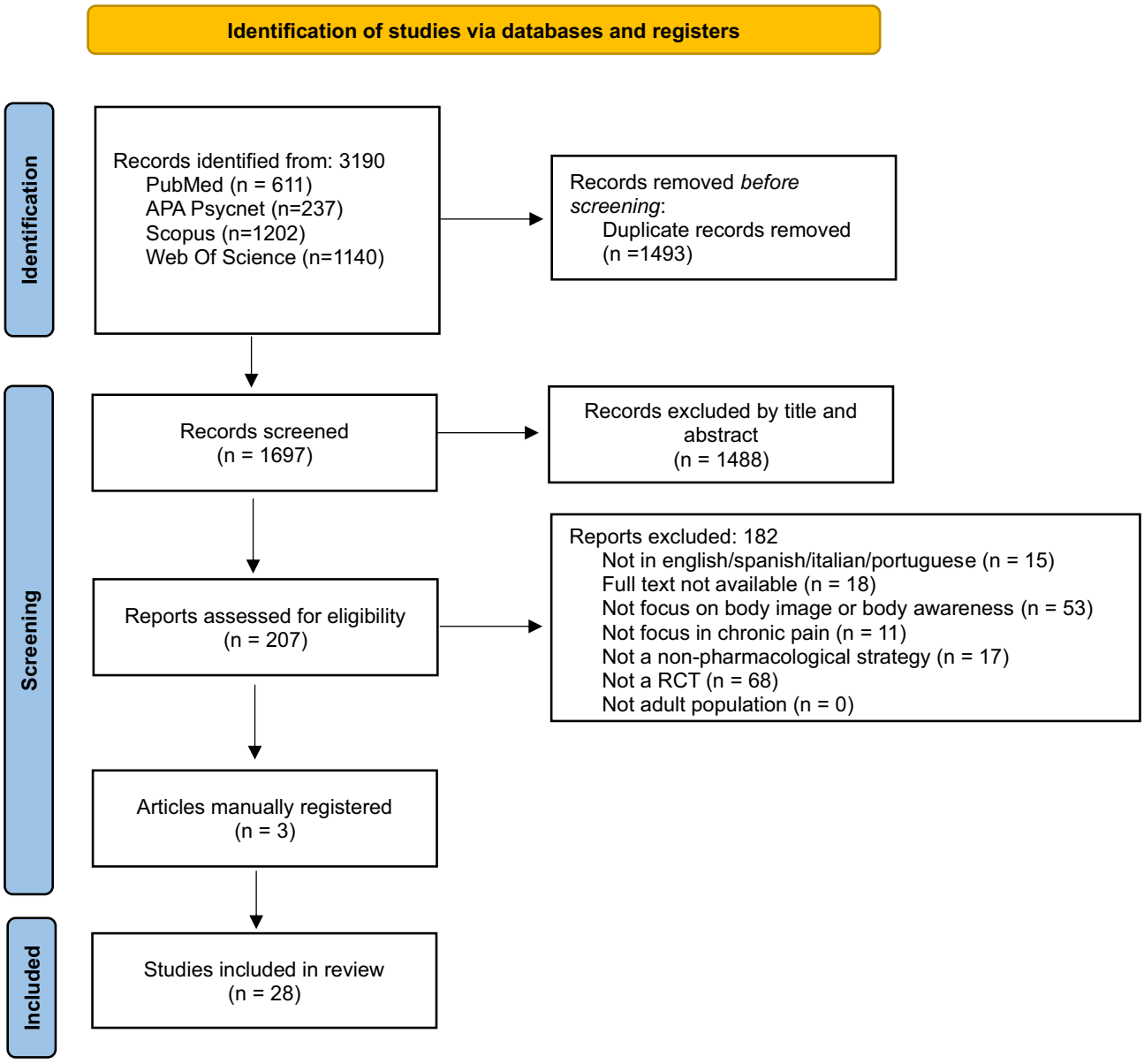

Figure 1 PRISMA flow diagram of identified studies through database search.

Quality Assessment results

Regarding methodological quality (Table 1), four RCT studies were classified as having "strong" methodological quality,[18–21] while 17 studies were rated as having "moderate" methodological quality, 13 of which had problems with selection bias (eg. participants were not representative of the target population due to the recruitment method used) or confounders (they were not sufficiently controlled or the control of confounders was not described). Finally, three studies

Table 1 Methodological Quality results of the Articles

Author/Year	Selection Bias	Study Design	Confounders	Blinding	Data Collection Methods	Withdrawals and Dropouts	Global Quality Rating
Aspegren Kendall et al[22]	Weak	Strong	Strong	Moderate	Strong	Strong	Moderate
Mannerkorpi & Arndorw[23]	Weak	Strong	Strong	Moderate	Strong	Weak	Weak
Mehling et al[24]	Moderate	Strong	Strong	Weak	Strong	Strong	Moderate
Dittrich et al[25]	Moderate	Strong	Weak	Moderate	Strong	Moderate	Moderate
[a]Sherman et al[26]	Moderate	Strong	Weak	Moderate	Strong	Strong	Moderate
[b]Sherman et al[27]	Moderate	Strong	Weak	Moderate	Strong	Strong	Moderate
Baptista et al[28]	Moderate	Strong	Weak	Moderate	Strong	Strong	Moderate
Cramer et al[18]	Moderate	Strong	Strong	Moderate	Strong	Moderate	Strong
Seferiadis et al[20]	Moderate	Strong	Strong	Moderate	Strong	Moderate	Strong
[a]Van Der Maas et al[29]	Moderate	Strong	Strong	Moderate	Strong	Weak	Moderate
[b]Van Der Maas et al[30]	Moderate	Strong	Strong	Moderate	Strong	Weak	Moderate
Haller et al[31]	Weak	Strong	Strong	Strong	Strong	Strong	Moderate
De Jong et al[32]	Moderate	Strong	Weak	Moderate	Strong	Strong	Moderate
[a]Lauche et al[33]	Weak	Strong	Strong	Moderate	Strong	Strong	Moderate
[b]Lauche et al[34]	Weak	Strong	Strong	Moderate	Strong	Strong	Moderate
Alleva et al[35]	Weak	Strong	Strong	Strong	Strong	Strong	Moderate
Bravo et al[36]	Moderate	Strong	Strong	Weak	Strong	Strong	Moderate
Kotiuk et al[37]	Weak	Strong	Weak	Moderate	Weak	Weak	Weak
Reeves et al[38]	Moderate	Strong	Weak	Moderate	Strong	Strong	Moderate
Harvie et. al[19]	Moderate	Strong	Strong	Strong	Strong	Strong	Strong
[a]Franco et al[39]	Weak	Strong	Strong	Moderate	Strong	Strong	Moderate
[b]Menten et al[40]	Weak	Strong	Strong	Moderate	Strong	Strong	Moderate
Alshehre et al[41]	Moderate	Strong	Weak	Moderate	Strong	Strong	Moderate
Fayet et al[42]	Moderate	Strong	Strong	Moderate	Strong	Weak	Moderate
Arey et al[43]	Moderate	Strong	Weak	Moderate	Strong	Moderate	Moderate
Tahran et al[21]	Moderate	Strong	Strong	Moderate	Strong	Strong	Strong
Ulusoy & Iyigun[44]	Weak	Strong	Weak	Weak	Strong	Strong	Weak
Sari et al[45]	Weak	Strong	Strong	Moderate	Strong	Strong	Moderate

Notes: [a]Primary analysis; [b]Secondary analysis.

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were classified as having "weak" methodological quality which presented problems mostly due to recruitment, confounders and/or the percentage of withdrawals and dropouts.

Main Results

Study Characteristics

The final pool of articles is 28, 24 RCT studies (8 RCT pilots, 16 RCTs), four RCTs studies reported primary or secondary analyses (Van der Maas et al;[29,30] Menten et al[40] and Franco et al;[39] Sherman et al;[26,27] Lauche et al[33,34]) All the articles manually added[26,33,39] are the primary analysis of an article included in the systematic review (For the full Data Extraction table, see Supplementary Material 3).

Most of the studies were conducted in high-income countries The distribution was the following: Germany (3), Turkey (3), Sweden (3), the United States (3), the Netherlands (2), Australia (2), Brazil (2), Austria (1), Spain (1), Ukraine (1), Israel (1), Saudi Arabia (1), and France (1). As for publication years, the articles span from 2000 to 2025, with a marked increase in output from 2015 onward—21 of the 28 articles were published during this period. This growth has also been accompanied by an improvement in methodological quality, with a higher number of studies rated as having strong methodological rigor (See Figure 2).

Concerning to the type of comparison group used to assess intervention efficacy, the studies reviewed employed a wide variety of control conditions. Among the 24 RCTs, four compared their intervention with treatment as usual (TAU) or enhanced TAU. These TAU conditions included various types of interventions, such as physical exercise, pharmacological treatment, relaxation training, psychotherapy or physiotherapy.[29,30,32,36,38] Seven RCTs used a waitlist control group.[18,21,23,28,33–35,42] The remaining 13 RCTs compared their intervention to another active treatment including physiotherapy, psychoeducation about the potential of exercise, virtual reality, physical exercise, yoga, mindfulness, among others.

The duration of interventions varied substantially, ranging from a single session to one year. In this regard, of the 24 RCTs, one study consisted of a single-session intervention,[43] while five interventions were short lasting from two to five weeks.[19,35,36,44,45] Most studies implemented interventions lasting between six and twelve weeks.[18,20,21,24–27,29–34,37,39–41] Finally, five studies implemented longer interventions, ranging from 16 weeks to one year.[22,23,28,38,42]

Follow-up assessments were conducted in 13 of the 24 RCTs, with post-intervention follow-ups ranging from one week to 18 months. The most commonly reported follow-up periods were 3 and 6 months.[18–20,22,24,26–31,35,36,38,39]

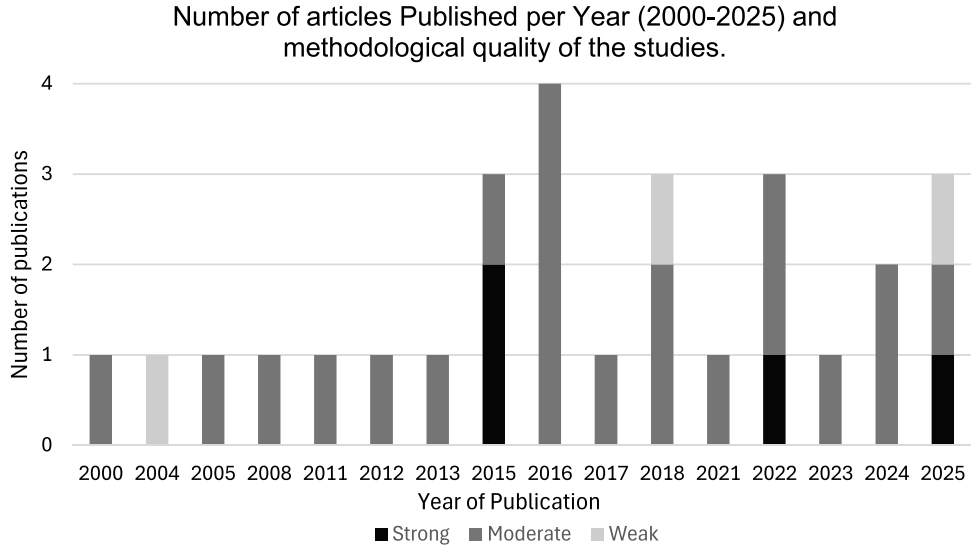

Figure 2 Graphical data for number of articles published per year and methodological quality the studies.

Sample Characteristics

Regarding gender distribution, 10 of the 24 RCTs included exclusively female participants while in 10 RCTs, the sample consisted predominantly female. Two studies did not report gender, while two studies had a predominantly male sample.

With respect to the pain conditions studied, eight studies focused on fibromyalgia.[21–23,28,36,39,40,43,45] The most frequently studied intervention was Body Awareness Therapy (BAT) evaluated in four studies. Among these, two included follow-ups (from 3 to 18 months).

Chronic low back pain was the focus in four studies,[19,24,26,27,44] while three targeted neck pain.[31,33,34,41]

Additionally, two studies addressed rheumatoid arthritis,[35,42] one focused on migraine,[25] one investigated colorectal cancer-related pain,[18] one studied chronic whiplash-associated disorder,[20] one examined complex regional pain syndrome,[37] and one focused on breast cancer-related pain.[38] Lastly, two studies addressed chronic pain without specifying the condition.[29,30,32]

Study Findings

Efficacy in Improving BI and BA

Prior to presenting the results, it is important to highlight the substantial heterogeneity in the instruments used to assess the construct of BI, with ten different scales employed across the studies included in this review (see Data Extraction in Supplementary Material 3). In contrast, BA assessments showed more consistency, with the Scale of Body Connection (SBC),[46] the Basic Awareness Rating Scale (BARS),[47] and the Multidimensional Assessment of Interoceptive Awareness (MAIA)[48] being the most frequently used.

Of the 24 RCTs included in this review, eight assessed BI,[19,25,28,35,38,40,42,44] while 11 examined BA.[18,20,23,27,29–34,37,43,45] Nonetheless, one of these 11 RCTs assessed but did not report BA outcomes[20] (See Figure 3).

Among the studies assessing BI, six reported significant improvements after the intervention.[19,28,35,38,42,44] Four of these studies implemented physical activity-based interventions, either through dance,[28,42] aerobic exercise and resistance training with caloric deficit[38] or Pilates.[44] These four interventions led to significant improvements in BI; however, in the two interventions that included follow-up the effects were not maintain over time[28,38] (See Figure 3, panel A).

In addition to physical activity-based interventions, other innovative and less frequently studied approaches have shown promising effects on BI. Harvie et al[19] implemented a virtual reality-based intervention in which participants embodied an enhanced avatar body (eg. a muscular boxer, a superhero, and a climber) and engaged in movement tasks. This condition was compared to a control group in which participants embodied non-enhanced virtual body. The

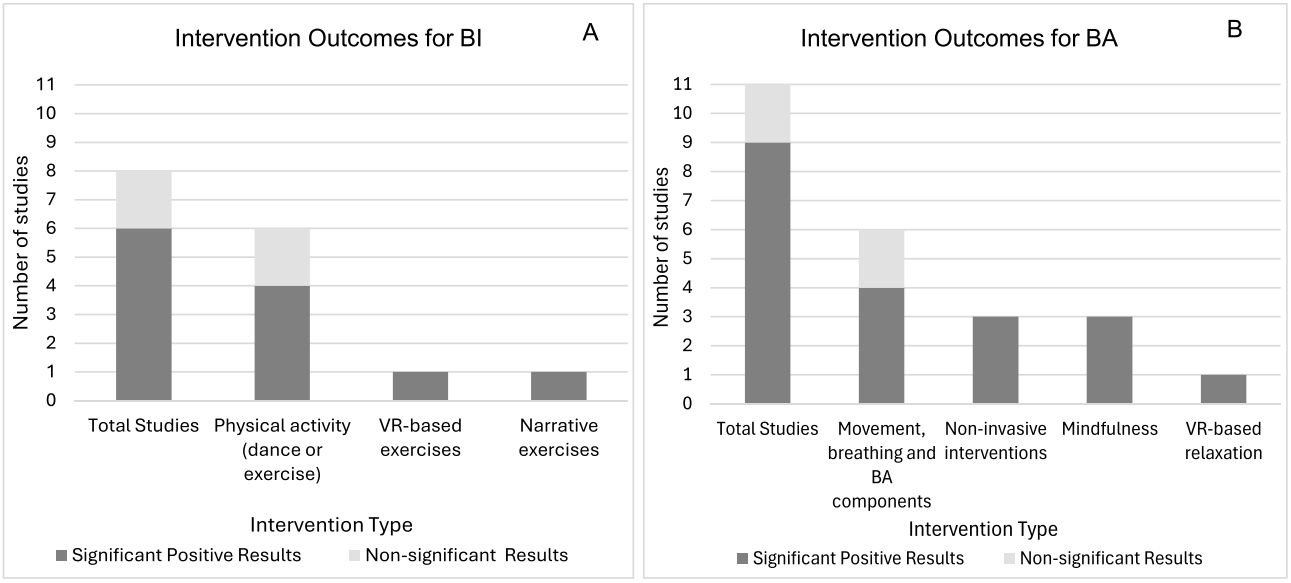

Figure 3 BI (**A**) and BA (**B**) outcomes by intervention type.

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experimental group showed a significant improvement in BI during and immediately after the exposure, but these effects did not persist at follow-up. Likewise, Alleva et al[35] implemented a positive BI intervention using narrative exercises centered on body functionality appreciation, where participants wrote about what their bodies could do. Compared to a waitlist control group, intervention group reported improvements in almost all the BI variables assessed (functionality appreciation, body appreciation, body satisfaction, body-self alienation). These effects remaining stable at one-week and one-month follow-ups.

Regarding BA, nine of the 11 RCTs that assessed the variable, reported significant positive changes after the intervention[23,27,29–32,34,37,43,45] (See Figure 3, panel B). Mannerkorpi & Arndorw[23] examined the effects of a BA intervention incorporating Qigong for patients with fibromyalgia. Compared with a waitlist control group, intervention group showed significant improvements within and between groups.

Similarly, Van der Maas et al[29,30] evaluated the effectiveness of Psychomotor Therapy, added to a TAU compared with TAU alone. The experimental group showed significantly improvements in BA, quality of life, disability, and depression, compared to TAU alone.

Lauche et al[33,34] also examined the effects of movement-based interventions in BA. The study compared the effectiveness of Tai Chi, neck exercises and a waitlist group. Although both active interventions improved BA, no significant differences were found between Tai Chi and neck-specific exercises. Similarly, Sherman et al[26,27] found that yoga-based intervention led to greater improvement in BA than a self-care book, with changes in this construct mediating reductions in pain interference.

Two studies implemented non-invasive perceptual interventions aimed at change body representation. On one hand, Haller et al[31] compared the efficacy of Craniosacral Therapy to Sham. The Craniosacral Therapy group showed significant improvements in BA, although these effects were not maintained at follow-up. On the other hand, Kotiuk et al[37] evaluated the efficacy of Mirror Therapy compared to exercise therapy and medication. Mirror Therapy was found to improve awareness of the affected limb's position, emotional valence, and the coherence between visual and sensory perceptions.

Mindfulness-based interventions also showed promised results. For instance, De Jong et al[32] found that Mindfulness-Based Cognitive Therapy + TAU led to significant improvements in emotional awareness and self-regulation compared to TAU alone. Similarly, Arey et al[43] compared the efficacy of a single session of Mindfulness Self-Compassion delivered in two modalities—audio-only and audio with nature imagery—against a control group. Results showed that both formants of Mindfulness Self-Compassion significantly improved interoceptive awareness compared to the control group.

Finally, Sari et al[45] conducted a relaxation-based intervention delivered through virtual reality, in which participants were exposed to a forest walk compared with Progressive Muscular Relaxation. Upon completion of the intervention, the VR-based relaxation group showed a significant improvement in BA.

In summary, fewer interventions have targeted improvements in BI, but those incorporating physical activity showed the most consistent positive evidence. Some innovative approaches—such as those proposed by Harvie et al[19] and Alleva et al[35]—have also addressed BI, though their results remain modest. In contrast, a wider range of interventions has focused on enhancing BA, and these appear to be more consistently effective in individuals with chronic pain.

Effects on Pain-Related Variables

Regarding the effects on Pain-Related variables, 14 of the 24 RCTs included in the review evaluated pain intensity,[19,20,24,25,28,29,31,33,34,36,38–42,44] eight reported data on disability,[20,24,26,27,29–31,34,35,41] three on kinesiophobia,[19,44,45] and four on catastrophizing.[22,29,30,32,45]

Among the 14 RCTs that measured pain intensity, 12 reported significant improvements at the end of the intervention[20,24,25,28,31,33,36,38,39,41,42,44] (See Figure 4, panel A). Additionally, four of these studies also reported improvements in disability.[24,31,33,41]

Two of the interventions were based on physical activity,[25,38] both obtained significant reductions in pain intensity after the intervention compared with control groups. Additionally, two studies compared the effectiveness of Pilates with either aerobic exercise[39] or Proprioceptive Neuromuscular Facilitation.[44] Franco et al[39] found a significative reduction in

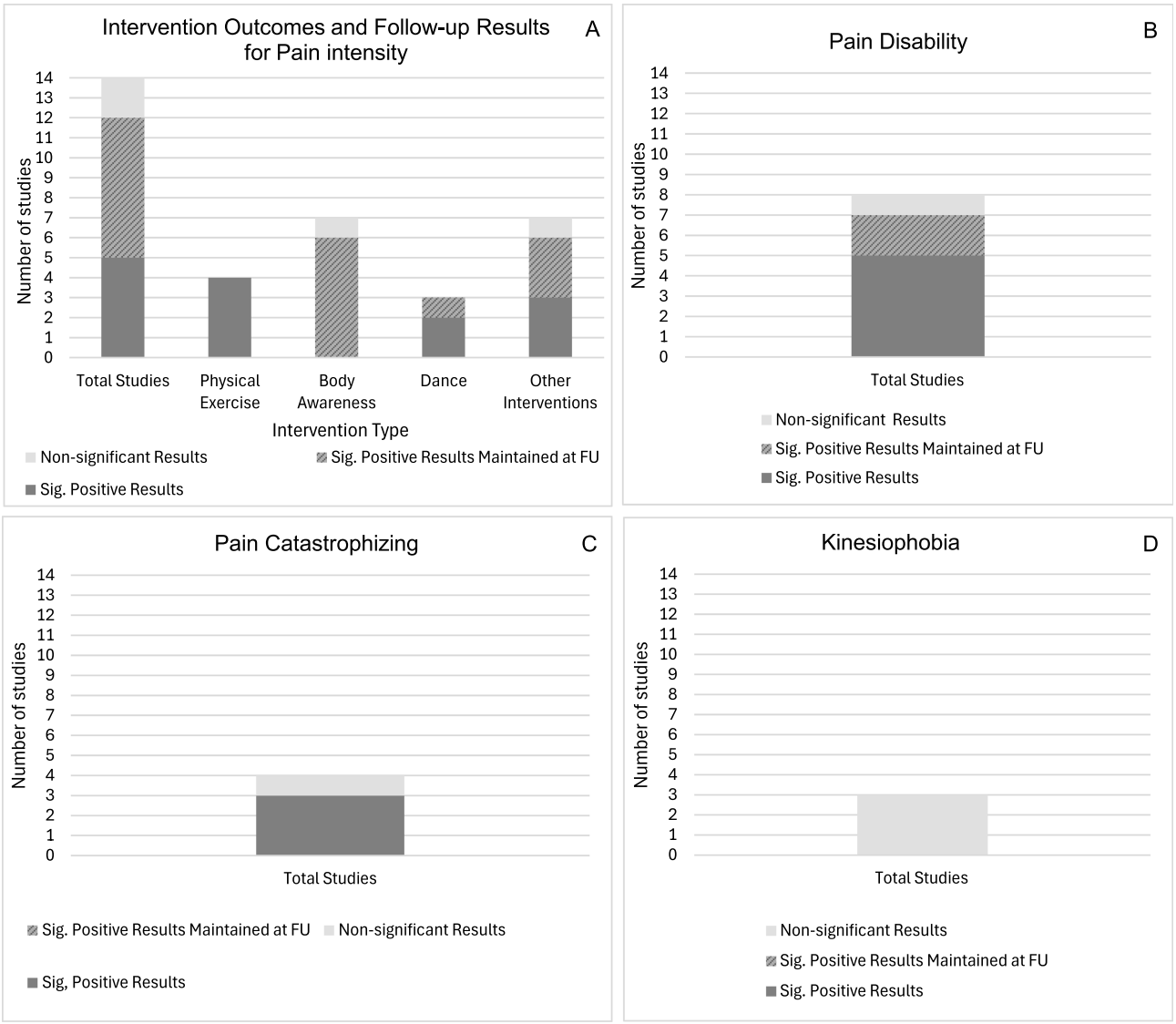

Figure 4 Significant positive results, follow-up maintenance of improvements, and non-significant results across randomized controlled trials evaluating pain-related variables: Pain intensity (**A**) Pain Disability (**B**) Pain Catastrophizing (**C**) and Kinesiophobia (**D**). In the Pain Intensity chart, "Other Interventions" refers to studies based on Breath Therapy, Craniosacral Therapy, and Tai Chi combined with neck exercises.

pain intensity in Pilates group. Conversely, Ulusoy & Iyigun[44] found substantial improvements in Pilates and Proprioceptive Neuromuscular Facilitation groups without differences between both. Similarly, three studies implemented BAT,[36] either compared with neck exercises[20] or combined BAT with neck exercises and ergonomic modifications.[41] All three studies found pain improvements in the BAT condition, although in different times: Bravo et al[36] found improvements only post-intervention, while Seferiadis et al[20] and Alshehre et al[41] observed improvements at follow-ups.

In the same way, Mehling et al[24] compared the efficacy of Breath Therapy, which incorporates BA as a key component with physical therapy. Both groups achieved improvements in pain intensity without significant between-group differences. Nonetheless, the Breath Therapy group showed greater improvements in disability at the end of the intervention.

Finally, two RCTs implementing different interventions—Tai Chi and neck exercises,[33] and craniosacral therapy[31]—also reported improvements in both pain intensity and disability compared to Sham and these improvements were maintained at follow-up.

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Regarding disability (See Figure 4, panel B), in addition to the studies previously mentioned, two other studies add relevant information: Van Der Maas et al[29,30] and Sherman et al [26,27].On the one hand, Van der Maas et al[29] demonstrated that participants receiving TAU enhanced with Psychomotor Therapy experienced significant improvements in disability, as well as a reduction in pain catastrophizing, compared to those receiving TAU alone. On the other hand, Sherman et al[26] compared the efficacy of yoga versus stretching and a self-care book and found that the group receiving yoga experienced functional improvements at 12 and 26 weeks, as well as reduced pain-related discomfort at 12 weeks compared to the self-care group. Likewise, the stretching-based group showed significant functional improvements at 6, 12, and 26 weeks of follow-up compared to the self-care group, and at week 12, kinesiophobia among other mediators was related with this improvement.[27]

In relation to pain catastrophizing (See Figure 4, panel C), additionally to the studies by Van der Maas,[29,30] two other RCTs reported significant reductions in variables following the intervention: Kendall et al[22] and Sari et al.[45] Kendall et al[22] conducted a pilot RCT comparing the efficacy of the Mensendieck System with BAT. At the end of the intervention, the Mensendieck System group demonstrated significantly greater improvements in catastrophizing compared to the BAT group. Similarly, Sari et al[45] found that women in the VR-relaxation based group experienced a significant reduction in pain catastrophizing versus PMR.

Lastly, it is important to mention that among the 24 studies included in this review, only four compared the efficacy of the intervention in kinesiophobia or fear of movement (See Figure 4, panel D), but no significant differences were found between groups compared with other active treatments.[19,39,44,45]

Beyond the outcomes reported in this section, it is important to consider additional measures such as impact of the disease and other variables related to disability. For instance, Fayet et al[42] and Baptista et al[28] implemented dance-based interventions, both of which led to significant pain reductions in the experimental group, along with improvements in functional capacity. Additionally, Baptista et al[28] reported significant improvements in impact of the disease within the experimental group. Similarly, Sari et al[45] found that the VR-relaxation group showed a reduction in disease impact at the end of the intervention. In the same way, Kendall et al[22] also showed that MS group (compared with BAT) reported better impact of the disease. Reeves et al[38] showed that participants receiving the intervention showed physical improvements. Finally, Tahran et al,[21] after comparing the effectiveness of two modalities of Basic Body Awareness (BBA) (face-to-face and internet-based) in terms of impact of the disease with a waitlist control group, found that both BBA formats were superior to the control condition, and all participants in the BBA groups reached the Minimal Clinically Important Change (MCIC).

To conclude this section, it is worth highlighting that several interventions have demonstrated effectiveness in reducing pain intensity and disability. Among them, Pilates, and more broadly, physical exercise and Body Awareness Therapy, have shown more evidence. However, information on other relevant pain-related variables, such as catastrophizing or fear of movement, remains limited, as most studies have neither assessed nor considered these factors during the intervention.

Effects on Emotional-Related Variables

Of the 24 RCTs included in this review, three evaluated depression,[25,29,35] three reported results on anxiety,[31,36,43] and three reported measures of anxiety, depression, or emotional distress[18,28,41] (See Figure 5).

Regarding the studies that reported positive changes in depression-related variables, two studies found significant improvements,[29,35] while another study observed a non-significant trend toward improvement.[25] Alleva et al[35] showed that the group that received the intervention, based on narrative exercises about body functionality, experienced a slight improvement in depression. Similarly, Van Der Maas et al[29] demonstrated that the group receiving TAU enriched with Psychomotor Therapy showed improvements in depression both at the end of the intervention and at the 3-month follow-up.

Regarding the effect on anxiety, Bravo et al[36] found significant between-group differences in favour of Basic Body Awareness Therapy (BBAT) compared to the control group receiving TAU (pharmacological prescription) at both 12- and 24-week follow-ups. Additionally, Haller et al[31] reported significant differences in anxiety in favour of the Craniosacral Therapy group (compared with Sham) after 20 weeks of intervention. Finally, Arey et al[43] showed that

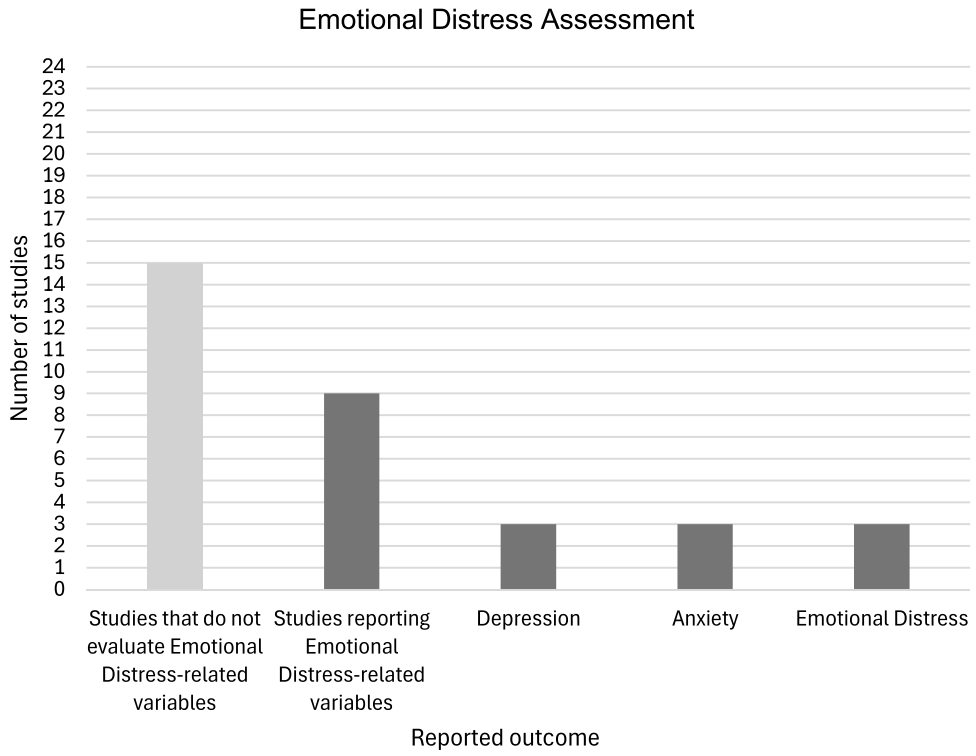

Figure 5 Graphical data for Emotional Distress Assessment.

both Mindfulness Self-Compassion groups reported a greater reduction in current anxiety compared with the waitlist control group, which was more pronounced in the group receiving the intervention with audio narrative and nature imagery compared to the group receiving audio only.

Finally, three studies reported significant improvements in emotional distress. On the one hand, Cramer et al[18] demonstrated that the group undergoing yoga as an intervention showed improvements in anxiety and depression at the 10-week follow-up; however, these improvements were not maintained in subsequent follow-ups. On the other hand, Baptista et al[28] reported significant improvements in emotional and mental health outcomes favouring the belly dance group compared with a waitlist. Lastly, Alshehre et al[41] found that the group receiving the intervention based on neck exercises, BBAT and ergonomic modifications experienced a reduction in work-related stress.

To conclude this section, only the 37.5% of the total RCTs assessed emotional-related variables, highlighting the need of more evidence regarding the impact of interventions on these variables.

Discussion

This systematic review aimed to synthesize current evidence on the efficacy of interventions targeting BI and BA in the management of chronic pain conditions. Traditionally, chronic pain has been assessed primarily in terms of functional limitations and its impact on daily life. This has led to interventions aimed at improving these domains which, while important, have shown room for improvement in certain outcomes[49] and have relegated the role of the body in the pain experience, overlooking the fact that pain is an embodied phenomenon inherently tied to the person experiencing it.[4,50,51] Beyond this, growing evidence suggests that working with the body, through interventions targeting BI and BA, can positively influence the pain experience.[13,14]

Overall, the evidence base supporting interventions focused on BA is more robust. Interventions such as Body Awareness Therapy, Psychomotor Therapy, Yoga, Tai Chi, and Mindfulness-based interventions have demonstrated beneficial effect on pain-related outcomes. Despite methodological diversity, these interventions share key components such as movement, balance, and breathing that appear to restore interoceptive and proprioceptive integration, helping

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modify maladaptive body schemas in chronic pain. The durability of the effects at follow-up assessments suggests BA may represent a key modifiable mechanism for long-term pain management.

In contrast, BI has received comparatively limited empirical attention and show more modest effects. The most frequently studied interventions in this domain are those based on physical activity (eg., aerobic exercise, dance, Pilates), which have shown positive outcomes, however, these benefits often appear short-lived, with limited evidence supporting sustained pain relief in the medium to long term. While aerobic exercise and dance improved BI perceptions, benefits frequently waned post-intervention, highlighting the need for adjunct strategies (eg., cognitive restructuring) to sustain gains. This aligns with models positing that BI disturbances in chronic pain arise from negative cognitive-affective loops,[6] which may require targeted psychological components. In addition, emerging approaches such as virtual reality-based interventions[19] and those based in positive BI[35] have yielded promising results, though further research is required to establish their efficacy.

Regarding pain-related outcomes, the available evidence indicates that interventions incorporating physical activity or BA components are effective in reducing pain intensity, disability or pain interference. However, other clinically relevant variables—such as kinesiophobia and pain catastrophizing—have been less frequently examined, and no conclusive data is available. This represents a notable gap, given the influence of these factors on pain experience.[7,9,52,53] Future research should consider including these variables to more comprehensively evaluate the effectiveness of interventions targeting chronic pain. Similarly, only a small number of studies assessed the emotional impact, such as distress, anxiety, and depression, limiting conclusions about the psychological impact of these interventions. Taking into account that anxiety and depression have a substantial influence on quality of life and have been shown to predict other pain-related outcomes, such as pain intensity and disability,[54] it is crucial that future studies systematically include these variables to better understand the comprehensive effects of interventions.

Regarding the populations studied, individuals with fibromyalgia were most commonly represented, followed by those with chronic low back pain. Future research should explore the applicability and efficacy of these interventions in a broader range of chronic pain conditions. Moreover, a considerable gender imbalance was observed across the included studies, with the majority of samples comprising predominantly or exclusively female participants highlighting the need for greater gender diversity in future research to enhance the generalizability of findings.

At the same time, this review has also identified several significant gaps in the literature. First, the number of available studies remains limited, with a predominance of physical interventions that include minimal psychological components, underscoring the need for more multidisciplinary or integrative approaches. Second, many studies lacked follow-up assessments, making it difficult to draw conclusions about the sustainability of intervention effects over time. Finally, the lack of a greater number of studies with strong methodological quality limits the strength of the current evidence and highlights the need for more rigorous research designs in future investigations.

Similarly, this review has several methodological limitations. First, the database search was comprehensive and included major platforms (Scopus, Web of Science, PubMed, and APA PsycNet) but some relevant studies indexed in other specialized databases may have been missed. Data extraction was conducted by a single reviewer and checked by three others, but not performed independently in duplicate, which could introduce errors or bias. No meta-analysis was conducted due to clinical and methodological heterogeneity, limiting the ability to quantitatively synthesize findings or explore potential sources of heterogeneity. Consequently, no sensitivity analyses or formal assessment of reporting bias were performed.

Conclusion

BI and BA approaches show promise for chronic pain management, but the field remains underdeveloped. While BA interventions show more consistent benefits, BI-focused approaches require further refinement to achieve lasting effects. Advancing this field demands higher-quality investigation to establish their full therapeutic potential and optimal implementation strategies, and to elucidate how body-centered interventions can be optimized within biopsychosocial frameworks.

Statement on the Use of AI Tools

During the preparation of this work the author(s) used ChatGPT-4o in order to enhance the writing and improve its readability. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Ethics Statement

Ethical approval was not required for this study as it is a systematic review of previously published research.

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Disclosure

The authors declare no conflicts of interest in this work.

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