Dance for Chronic Pain Conditions: A Systematic Review

Benjamin Hickman, B(ExPhys), M(Phty), Fereshteh Pourkazemi, BSc(Phty), MSc, PhD, Roxanna N. Pebdani, CRC, PhD, Claire E. Hiller, BAppSc(Phty), PhD, and Alycia Fong Yan, BAppSc(ExSpSci), PhD

Faculty of Medicine and Health, The University of Sydney, Sydney, NSW, Australia

Correspondence to: Benjamin Hickman, B(ExPhys), M(Phty), Faculty of Medicine and Health, The University of Sydney, Susan Wakil Health Building, Western Avenue, Camperdown, Sydney, NSW 2006, Australia. Tel: +61 431 561 065; E-mail: Benjamin.hickman@sydney.edu.au.

Funding sources: This research received no funding from any funding agency in the public, commercial, or not-for-profit sectors.

Conflicts of interest: The authors report no financial, consultant, institutional, or other relationships that might lead to bias or a conflict of interest.

Study registration: International Prospective Register of Systematic Reviews: CRD42020165557.

Received on 18 October 2021; revised on 4 June 2022; Accepted on 7 June 2022

Abstract

Objectives. Globally, 20–25% of people will experience chronic pain in their lifetimes. Dance is a physical activity with psychosocial benefits that might positively impact pain. This review aimed to investigate the effect of dance interventions on the experience of pain by quantitative measures and qualitative themes. Methods. Seven major databases were searched from inception to January 2021. Two independent reviewers screened articles at each stage. Qualitative and quantitative studies were included if the dance interventions lasted more than 6 weeks, participants reported pain of duration longer than 3 months, and pain was an outcome of the study. All articles were critically appraised with appropriate Joanna Briggs Institute tools, and data were collated through the use of results-based convergent synthesis. Results. From 23,628 articles, 34 full papers were included, with a total of 1,254 participants (75.2% female). Studies predominantly investigated individuals with fibromyalgia (26%) and generalized chronic pain (14%), with aerobic dance (20.7%) and Biodanza (20.7%) being the most common dance genres investigated. Overall, 74% of studies noted either reduced pain through quantitative pain measures or qualitative themes of improved pain experience (88% for chronic primary pain and 80% for chronic secondary musculoskeletal pain). Discussion. There were positive effects of dance on chronic primary and secondary musculoskeletal pain across diverse populations. A variety of study designs and interventions noted improved pain measures and themes around pain coping and acceptance, with all dance therapies showing improvements, particularly when performed for 60–150 minutes’ duration weekly. Dance should be considered as an effective adjunct in the management of chronic pain.

Key Words: Dance for Health; Fibromyalgia; Pain Management; Pain Experience; Dance Therapy

Introduction

Pain that persists into chronicity is a common and challenging phenomenon, as it is multifaceted and could require several treatment modalities to be managed effectively [1]. Pain is defined as “an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage” [2], with chronic pain defined as persistent or recurrent pain lasting for longer than 3 months [3]. Chronic pain is now considered a clinical disease in itself and involves a complex interplay among biological, psychological, and social factors [4]. Recent classifications of pain have differentiated types of chronic pain, notably chronic primary and chronic secondary pain syndromes, and have noted differences in diagnosis and characteristics [5]. One common presentation, chronic primary pain, may...
be defined as a pain syndrome of longer than 3 months’ duration that cannot be accounted for by another pain condition, and secondary musculoskeletal pain may be defined as pain that arises from a disease process that affects the musculoskeletal system [5]. Chronic pain is associated with heightened stress responses [6], deconditioning [7], fear and catastrophization [8], and feelings of separation and isolation [9]. Additionally, over time, there is the potential for increased sensitivity of the nervous system through pathophysiological changes [10]. Therefore, a biopsychosocial approach to chronic pain management, which considers the multifactorial nature and dynamic interaction of human functioning and the unique pain experience of each individual, has been widely adopted [4, 11].

Evidence on multidisciplinary pain management approaches has demonstrated improvements in quality of life in those with fibromyalgia [12], improved pain levels in complex chronic pain conditions [13], and greater efficacy than isolated physical therapy treatments alone [14]. Coordinating multimodal treatment is necessary for the best outcome for those experiencing chronic pain. Therefore, interventions that promote physical activity, self-efficacy [15, 16], and social connection [17] are important in the management of chronic pain conditions [18, 19].

Current pain management practices emphasize the need for physical activity that reintroduces activities needed for daily living [20], addressing maladaptive beliefs [21], and using social connection as a means of reducing symptoms and improving quality of life [22]. Frequent activity for people experiencing chronic pain could aid in reducing pain and related symptoms [23]. Additionally, therapies with high adherence and progressive exposure to activity that assists in finding active coping strategies are beneficial [24]. The use of graded activity or graded exposure could be helpful in reducing pain intensity [25], improving quality of life and reducing disability in the long term [24], and catastrophization in the short term [26]. Other strategies of activity pacing could assist in pain coping with an emphasis on meaningful activities [27]. Therefore, the use of dance could fit into the biopsychosocial model of health care.

Dance is defined as “a series of steps and movements that match the speed and rhythm of a piece of music” [28]. Dance can be described in many ways, most commonly by genre (for example, ballet, ballroom, hip-hop), and categorized into the contexts of performance, competition, social dancing, or dance therapy. These contexts differ by the motivation and goals of dancing, of which performance and competitive dancing requires more hours of training, psychosocial stress [29], and attention to technique. In contrast, dance in a social setting is structured around a particular genre and performed for recreational purposes with a partner or in a group setting. These genres of dancing are considered as “structured dances” in the context of the present article. In comparison, dance can also be used a form of therapy, in which there is no structure per se in how it may be performed but rather an emphasis on creation and exploration of movement and music.

Unstructured dance can be used for the purpose of addressing an identified issue, which may be termed “dance therapy,” or it can have the aim of creating and improvising a dance to a given piece of music, generally defined as a “creative dance.” Two popular genres of dance therapy are Biodanza and Dance Movement Therapy (DMT). Biodanza is defined as “an intervention intended to promote health by encouraging self-expression and autoregulation through music, dance and interaction” [30]. DMT is defined as “the use of creative movement and dance in a therapeutic relationship” [31]. Both creative dances and dance therapies are grounded in exploration of movement and music and an interoception of the body.

Dance has a range of benefits that address the physical and biological issues associated with a number of health conditions. Research investigating dance and health found that a variety of dance genres showed improved body composition, blood biomarkers, and musculoskeletal function [32]. Dance has also been shown to improve pain, quality of life, impact of disease, and function in those with fibromyalgia [33]. Other physiological benefits of dance include improvements in cardiovascular parameters, balance, and stride velocity [34]. When dance interventions are compared with other forms of exercise, it appears dance has an equal, and at times superior, effect on physical health benefits [32].

Although dance has many physical benefits, these do not occur without the presence of psychosocial benefits. Dance promotes psychosocial benefits such as socialization [35], in-group bonding, [36] eye contact [37], and touch [38], which in turn appear to improve mood and self-confidence [35] and pain thresholds [36]. Dance has significantly reduced the effects of depression and anxiety, and it improves confidence in ability to cope with serious mental illness [39]. Additionally, improvements in health-related quality of life, mental representations linked to body image, and consciousness have also been noted in obese individuals participating in dance therapy [40]. When compared with exercise alone, dance might have the most significant effects on depression in those with psychiatric disorders [41]. Therefore, dance has the potential to address the wider psychosocial issues that people may be experiencing.

Given the numerous benefits of dance from a biopsychosocial context, the use of dance could address the multifactorial nature of chronic pain conditions, with the potential to have increased adherence [42] compared with conventional guided exercises [32]. This could be due to the reported experiences of joy, satisfaction, and increased motivation [43] associated with dance. Additionally, the use of music could be an important aspect of adherence to and enjoyment of a dance
intervention. A 2006 Cochrane Review [44] on music for pain relief found small positive effects on pain reduction and reduced requirements for analgesics. Music could also be a beneficial adjunct in chronic pain management when self-selected [45], with increased pain thresholds when there is an active component such as dancing [46] that is more potent than just exercise alone [47]. As dance is a highly adaptable form of activity that can be modified to different physical and cognitive loads, it offers an enjoyable form of graded activity and pacing strategy [48].

It is evident that dance can have a broad range of benefits that address the physical, cognitive [49], and psychological issues [50] associated with a number of clinical conditions. However, a wider consensus on dance for chronic pain management, via a mixed-methods synthesis, and recommendations for dance interventions are lacking and constitute a gap in the current literature. Investigating the consensus of quantitative and qualitative literature will aid in gaining a wider view of the multifactorial nature of pain. In addition, there is typically a mismatch within patient-directed care, wherein patients prioritize pain reduction and management and clinicians prioritize improving function [51]. Therefore, the aim of the present systematic review was to investigate the effect of dance interventions on pain perception through quantitative pain outcome measures and through psychosocial benefits identified by qualitative themes related to pain experience. We also endeavored to provide practical recommendations for dance interventions. We hypothesized that dance would have positive effects in reducing the perception of pain and have indirect psychosocial benefits in populations experiencing chronic pain.

Methods

This systematic review was registered in the International Prospective Register of Systematic Reviews (CRD42020165557) [52] and adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines [53].

Initial preliminary database searches were performed via Medline and Embase to determine the most suitable key terms required to address the research questions. The final search was performed via seven electronic databases, including Medline, Embase, Web of Science, Scopus, CINAHL, SportsDiscus, and AMED from earliest records until February 1, 2021. The search strategy included two domains, one involving general dance key terms and dance genres and the second involving general key terms around pain, treatment, and therapy. Search terms from the dance domain and pain domain were combined with Boolean operator “OR,” and the two domains were combined with “AND” (Table 1). This strategy was designed in conjunction with a specialized health sciences librarian.

Articles were imported into EndNote (Clarivate Anytics, Philadelphia, PA, Version X9) [54] for duplicate removal, after which they were imported into the data management software Covidence (Covidence systematic review software, Veritas Health Innovation, Melbourne, Australia. Available at www.covidence.org) [55]. Articles were independently screened against the eligibility criteria by two independent reviewers (BH with AFY, FP, RP, or CH) via title and abstract. Eligibility criteria were as follows: human population, pain as an outcome measure, chronic pain of at least 3 months duration, dance intervention of 6 weeks or longer, and dance that included music and movement (Table 2). Studies were excluded if they studied acute pain (defined as less than 3 months’ duration), were reviews or non-experimental evidence, or if they studied music therapy, art therapy, Pilates, or yoga.

Data were extracted from full texts by two independent reviewers (BH with AFY, FP, RP, or CH) using a pre-piloted extraction form. Any conflicts were resolved via group discussion. Data extracted included study years, populations, age range, location, dance intervention details, compliance, dropouts, post-intervention follow-up length, pain outcomes such as subjective scales, pain-related outcome measures within questionnaires and questionnaire total score, and major qualitative themes relating to pain experience. Compliance was defined as the number of sessions attended by the participants and dropouts as the number of participants who did not finish the intervention. For studies that had a progressive increase in duration of dance sessions, the duration was determined by the duration of dance performed by the end of the study.

Included articles were assessed for risk of bias at the study level through the use of the Joanna Briggs Institute (JBI) critical appraisal tools for Randomized Controlled Trials [56], Quasi-Experimental Studies [56], Qualitative Studies [57], and Case Series [58] (Figures 2A–D). Mixed-methods studies were assessed with both the respective quantitative and qualitative JBI checklists. Two reviewers (BH with AFY, FP, RP, or CH) assessed each article and resolved conflicts within each of the checklists, with disputes being resolved via group discussion among the five reviewers involved.

Studies were categorized into chronic pain categories via the International Classification of Diseases, 11th Revision [3]. Studies were also categorized as either structured dance or dance therapy. Quantitative study data were planned to be synthesized via a random-effects meta-analysis with pain as the outcome measure if appropriate [59]. Qualitative study data have been presented as a results-based convergent synthesis [60] reporting on the main themes of pain and the participant’s changed relationship to pain.

Results

The initial search yielded 23,628 articles. After screening, 34 articles were included for review (Figure 1). Meta-
analysis was considered inappropriate because of the heterogeneity of the data, and as such, a narrative synthesis of both the quantitative and qualitative data has been reported. This review identified 27 quantitative studies, four qualitative studies [61–64], and three mixed-methods studies [65–67]. The quantitative studies consisted of 13 randomized controlled trials [68–80], 11 quasi-experimental studies [81–91], and three case series [92–94]. One randomized controlled trial produced two articles [70, 71], and one quasi-experimental study produced two articles [82, 90] with different measures reported. For qualitative studies, the theoretical framework was not specified, and data were collected via interviews [61, 63, 64] or focus groups [62].

Most participants in the studies were women (n = 943 women; 75.2% of the included population) with an age range of 10–99 years, with 76.5% of participants 45–70 years of age. Of the studies in this review, only four noted that the participants had previous dance experience, but they did not elaborate on the participants’ ability or the extent of their experience. The most studied populations included those with fibromyalgia [68, 70, 71, 75–77, 81–83, 85, 90] and those with nonspecific diagnoses of chronic or persistent pain [63, 64, 67, 94] or medically undiagnosed symptoms [63, 64, 66, 67, 94]. On the basis of classifications of pain according to the International Classification of Diseases, 11th Revision [5], pain conditions in 15 studies were classified as chronic primary pain [63, 64, 66–68, 70, 71, 75–77, 81–83, 85, 90, 94], with 10 of those classified as chronic secondary musculoskeletal pain [61, 69, 72–74, 78, 79, 87–89], three as chronic neuropathic pain [84, 91, 93], two as chronic cancer treatment pain [62, 86], and three as chronic primary pain [65, 80, 92]. Further details on participant demographics and pain classifications can be found in Table 3.

The most common dance interventions were aerobic dance (17.6%), Biodanza (17.6%), DMT (11.8%), and choreographed dances (11.8%), about which varied details were given about the structure across the

### Table 1. Database search strategy used

| 1. Dance | 2. Pain |
|----------|---------|
| Dancing/ | Tap dance*.mp |
| Danc*.mp | Pain/ |
| Couple danc*.mp | Jazz dance*.mp |
| Social danc*.mp | Pain*.mp |
| Partner danc*.mp | Free dance*.mp |
| Group danc*.mp | Dance improvisation.mp |
| Dance sport*.mp | Interpretive dance*.mp |
| Ballroom danc*.mp | Ballet.mp |
| Latin danc*.mp | Medieval dance*.mp |
| Biodanza*.mp | Circle dance*.mp |
| Dance therap*.mp | Line dance*.mp |
| Resseguier*.mp Free dance movement*.mp Exercise Movement | Round dance*.mp |
| Technique*.mp | Square dance*.mp |
| Creative danc*.mp | Rhythm dance*.mp |
| Rueda*.mp Contemporary | Calypso*.mp |
| Rumba*.mp | Argentine tango*.mp |
| Improvisation*.mp | Danza*.mp |
| Modern dance*.mp | Jive*.mp |
| Modern dance*.mp | Merengue*.mp |
| Contemporary Hearing therapy*.mp | Dance movement therapy*.mp |

Search strategy included one term from the Dance column and one from the Pain column.

### Table 2. Eligibility criteria

| Inclusion Criteria | Exclusion Criteria |
|--------------------|--------------------|
| Human population | Animal population |
| Pain as outcome measure | Acute pain (<3 months) |
| Chronic pain (>3 months) | Books |
| Dance intervention of >6 weeks | Excerpts |
| Dance must include music and movement | Opinion |
| | Abstracts |
| | Systematic reviews |

Used during the screening process of abstracts and full articles.
interventions (Table 4). Aerobic dance [65, 77, 79, 87–89] generally involved various types of movement coordinated with higher-tempo music, but details about the intervention were poorly described and had missing or questionable data for analysis [65, 77, 79]. Types of dance were classified into 20 structured dance interventions [61, 65, 68, 69, 73, 74, 77–80, 84–89, 91–94] and 14 dance therapies [62–64, 66, 67, 70–72, 75, 76, 81–83, 90]. The dance therapies were all exploratory in nature and involved creative components that allowed self-expression and improvisation. All dance interventions were performed in a group setting but done individually, with the exception of one study that utilized a partnered tango dance [61]. All dances were also led by a dance instructor who facilitated each session, with no studies detailing the use of mirrors in class.

The average intervention duration across all included studies was 69.9 minutes of dance per session, ranging from 30 to 120 minutes. Average reported frequencies of dance were 1.8 times per week, ranging from 1 to 5 times per week. Average intervention length was 13.6 weeks, ranging from 6 to 40 weeks. Structured dances tended to be shorter than 60 minutes and had a greater variety of dance genres and structures when compared with the dance therapies. The dance therapy sessions tended to be longer in duration (60–120 minutes) and largely involved participants with fibromyalgia (45.5%), along with goals of movement experimentation, play, and self-expression [63, 70, 71, 92]. Across all studies, there was large heterogeneity in comparison groups, ranging from no intervention to provision of usual care, other activities, and therapy, and there was different sequencing of interventions, with 38.2% of studies offering no control group.

Of all studies, only 58.1% investigated pain as a primary outcome measure. Quantitative pain data were measured via several tools. Twenty studies used unidimensional outcome measures, such as a visual analog scale [65, 67, 68, 70, 71, 75, 76, 79, 85, 89–91] or other
numerical rating scales \([67, 74, 77, 78, 81, 86, 88, 89, 92, 94]\) in conjunction with other pain outcome measures, with three solely using a visual analog scale \([79, 90, 91]\). Of the six studies using the visual analog scale, the average decrease in score was two points on a 10-point scale \([68, 75, 76, 79, 85, 90]\). There were 18 studies that used multidimensional measures, such as specific questionnaires that have a pain component, with the majority of these using a 36-Item Short-Form Survey (SF-36) \([68, 81–85, 93]\) or 12-Item Short-Form Survey (SF-12) \([73, 86]\), from which bodily pain data were extracted. One study did not report bodily pain \([86]\) in their SF-12.

Tallying scores on the JBI critical appraisal tools are discouraged \([95]\). Therefore, the following comments are made on general trends of bias across each of the study types. Randomized controlled trials had adequate standardization of outcome measures for control and intervention groups, appropriate statistical analysis, and trial design. However, the majority of studies had a lack of “true randomization, concealment of treatment allocation, assessor blinding and reliability of outcome measures” \([56]\) (Figure 2A). Although it is not possible to blind therapists or participants to dance interventions, assessor blinding was not mentioned in any of the studies. Quasi-experimental studies all stated clear causes and effects, multiple outcome measures before and after the intervention, and appropriate statistical analysis (Figure 2B). Of the two case studies, one study \([92]\) was highly robust and fulfilled all criteria, and another \([93]\) had missing data around condition identification and complete and consecutive participant inclusion (Figure 2C). Critical appraisal of the qualitative studies

---

### Figure 2.

(A) Risk-of-bias assessment for randomized controlled trials (Joanna Briggs Institute Tool). (B) Risk-of-bias assessment for quasi-experimental studies (Joanna Briggs Institute Tool). (C) Risk-of-bias assessment for cases series (Joanna Briggs Institute Tool). (D) Risk-of-bias assessment for qualitative studies (Joanna Briggs Institute Tool).

---

| Study             | 1 True randomisation | 2 Treatment allocation concealment | 3 Group similarity at baseline | 4 Participant blinding | 5 Therapist blinding | 6 Assessor blinding | 7 Identical group treatments | 8 Follow up completion | 9 Participant analysis | 10 Outcome measured in original groups | 11 Reliability of outcome measures | 12 Appropriate statistical analysis | 13 Appropriate trial design |
|-------------------|---------------------|-----------------------------------|-------------------------------|-----------------------|---------------------|---------------------|---------------------------|-----------------------|-------------------------|------------------------------------|-------------------------------|-----------------------------------|-----------------------------|
| Baptista 2012     | +                   | +                                 | ?                             | -                     | +                   | +                   | +                         | +                     | +                       | +                                  | +                               | +                                 | +                           |
| Barene 2014       | +                   | +                                 | ?                             | -                     | +                   | +                   | +                         | +                     | +                       | +                                  | +                               | +                                 | +                           |
| Bojner Horwitz 2003 | +                   | +                                 | ?                             | -                     | +                   | +                   | +                         | +                     | +                       | +                                  | +                               | +                                 | +                           |
| Bojner Horwitz 2006 | +                   | +                                 | ?                             | -                     | +                   | +                   | +                         | +                     | +                       | +                                  | +                               | +                                 | +                           |
| Broscheid 2020    | +                   | +                                 | ?                             | -                     | +                   | +                   | +                         | +                     | +                       | +                                  | +                               | +                                 | +                           |
| Casilda-Lopez 2017 | +                   | +                                 | ?                             | -                     | +                   | +                   | +                         | +                     | +                       | +                                  | +                               | +                                 | +                           |
| Kaholokula 2017   | +                   | +                                 | ?                             | -                     | +                   | +                   | +                         | +                     | +                       | +                                  | +                               | +                                 | +                           |
| Krampe 2014       | +                   | +                                 | ?                             | -                     | +                   | +                   | +                         | +                     | +                       | +                                  | +                               | +                                 | +                           |
| Lopez-Rodriguez 2012 | +                   | +                                 | ?                             | -                     | +                   | +                   | +                         | +                     | +                       | +                                  | +                               | +                                 | +                           |
| Lopez-Rodriguez 2013 | +                   | +                                 | ?                             | -                     | +                   | +                   | +                         | +                     | +                       | +                                  | +                               | +                                 | +                           |
| Norregaard 1997   | +                   | +                                 | ?                             | -                     | +                   | +                   | +                         | +                     | +                       | +                                  | +                               | +                                 | +                           |
| Qin 2018          | +                   | +                                 | ?                             | -                     | +                   | +                   | +                         | +                     | +                       | +                                  | +                               | +                                 | +                           |
| Tharani 2018      | +                   | +                                 | ?                             | -                     | +                   | +                   | +                         | +                     | +                       | +                                  | +                               | +                                 | +                           |
| Okafor 2012       | +                   | +                                 | ?                             | -                     | +                   | +                   | +                         | +                     | +                       | +                                  | +                               | +                                 | +                           |

---

**Figure 2A**: Risk-of-bias assessment for randomized controlled trials (Joanna Briggs Institute Tool).

**Figure 2B**: Risk-of-bias assessment for quasi-experimental studies (Joanna Briggs Institute Tool).

**Figure 2C**: Risk-of-bias assessment for case series (Joanna Briggs Institute Tool).

**Figure 2D**: Risk-of-bias assessment for qualitative studies (Joanna Briggs Institute Tool).
was assessed via the JBI critical appraisal tool and found either a low risk of bias (n = 4) [61, 62, 64, 67] or a high risk (n = 3) [63, 65, 66] (Figure 2D). Four qualitative studies were performed with notable biases, including questionable “congruity between research methodology and representation and data analysis” [57], and lacked “statements locating the researcher culturally and addressing researcher influence” [57].

Overall, across all studies, 74% showed either a quantitative reduction in level of pain or qualitative themes of improvement in pain experience. Of the quantitative studies, 70.6% (n = 27) reported statistically significant improvements in at least one pain outcome measure. All mixed-methods studies [65–67] noted reduced pain quantitatively or described themes of improved coping or acceptance, whereas none of the case studies showed improvements in pain [92–94].

Qualitative themes of changing pain experience were taken only from the included qualitative studies and grouped together for narrative synthesis. The main qualitative themes included improved coping and acceptance of pain [64, 67], increased body understanding [61, 62, 64, 67], challenging fear of movement [62, 63, 67], acceptance of a new normalcy related to the participant’s chronic pain [61], new levels of mental and emotional well-being [61, 64, 65, 67], and freedom from pain [67].

Positive themes around pain or coping with pain [61–67] were found, of which dance therapy was the
predominant dance genre used. Some women with breast cancer participating in a Mindful Movement Program found pain relief in the dance itself: “I don’t feel the pain as much . . . when I’m dancing . . . it just kind of dissipates the pain” [62]. Some women in the same program remarked on the effect of mindfulness and movement to help cope with pain: “My mind-set would go into dealing with the pain, and the movement would help me with the pain, to deal with the pain” [62]. For other participants within a private clinic, there was the belief that DMT physically and emotionally assisted reductions in pain: “You are releasing pain and negative emotions out of your body . . . it helps you get out of the ‘stuck-ness’ or that mold you’ve been in” [67]. Other ideas around improved pain coping were emphasized through themes of ordering chaos [63], creating new strategies [65], and achieving self-efficacy and resilience [67]. One participant attending a clinic program using DMT noted that “… in my body the pain has changed from the worst thinkable to something I can live with . . .” [63].

Although some participants found pain relief and the ability to cope with this pain after the dance intervention, others with increased pain chronicity found relief in their acceptance of the pain [61, 64, 67]. Acceptance of pain [64, 67] was the main benefit for some by refocusing on what was still possible for them: “I am more accepting of my aging body and pain, because it helped me to realise that although I can’t do things that I used to do, I can find another way of doing things . . .” [67]. Others found acceptance of their limitations and experienced a greater sense of normalcy and health, where researchers noted their tango intervention led to stronger acceptance of physical limits via awareness of musical and dancing abilities [61]. An understanding of limitations further allowed for greater interoception and consideration of bodily experiences.

Dance enabled an understanding of the body that was relayed through greater appreciation of sensing the body that was in pain: “[Movement] made me aware of what did hurt and okay, it hurts, move it anyway” [62]. Other participants found new meaning in body signals: “To dance different parts of the body and then the feelings flared up . . . I didn’t have a clue that the pain and the feelings belonged together” [64]. For those in a study participating in DMT, there was a broadening of thoughts and actions that led to learning “new ways of living in the body and being in the world” [67]. Further themes of participants regaining control of the body [61, 67] and taking responsibility for their own well-being were highlighted by Shim et al. (2017) [67]: “I feel like I am in control, and can master the pain better . . . I don’t feel as helpless because there are things I can do to cope with it” [67]. This new understanding of the body allowed for changes in the participant’s beliefs and perspectives.

A change in beliefs typically accompanied reductions in fear avoidance behavior and catastrophization, which helped to increase activity levels [67]. Similarly, participants in a DMT program challenged their fear of pain, which allowed them to find alternative ways to move [63]. Furthermore, those in a Mindful Movement Program reported less focus on the fear of pain reoccurrence in the future: “I’m so much more in the here and now . . . Being able to step out of the craziness of the
By changing how participants related to their pain, they were able to change their response to the pain, which also includes their emotional responses to the pain. There were a variety of themes around changed perception and outlook, such as the enhancement of emotional intelligence [67], connecting to self and others [67], connecting emotions and symptoms [65], feeling calmer and happier [64], and general positive feelings and sensations [61]. One participant in a DMT class noted the beneficial effects on his mental health: “My attitude changed. It helped me to laugh and smile more, be kinder and open-minded” [67]. A participant in a Free Movement Dance class found acceptance of his emotions through dance, noting that “if you are sad you are sad . . . it is ok to feel whatever you feel; it is ok to be whoever you are” [64].

Lastly, the ideas of freedom from pain [62] and motivation for movement [61] are important and were noted by Beerenbrock et al. (2020): “I was able to let go and go with the flow and be more determined to be fluid in my postures and movement and dance” [62]. Other observations were also noted by the researchers in a DMT study around disconnecting pain from identity: “… by expressing their pain, pain-related thoughts and feelings in movement metaphors, participants were able to separate self from pain . . .” (Shim et al., 2017) [67].

Whether pain was classified as chronic primary or chronic secondary musculoskeletal pain, the majority of all reviewed studies showed similar benefits from dance interventions when synthesizing both quantitative and qualitative data. There were improvements in pain experience and outcome measures, in both participants with chronic primary pain (n = 14 out of 16 studies) [63, 64, 66–68, 70, 71, 75, 76, 81–83, 85, 90] (Table 3) and participants with chronic secondary musculoskeletal pain (n = 8 out of 10 studies) [61, 69, 72–74, 78, 79, 87–89]. Only one [65] of three studies classified as chronic neuropathic pain [84, 91, 93] noted improved pain measures, and both studies including chronic cancer treatment showed improved pain rating scores [86] and improved pain coping [62]. Lastly, one of three studies classified as chronic primary musculoskeletal pain showed improvements in pain measures [91].

| Study            | Coding | Research Methodology and Analysis | Data Collection and Interpretation | Subjective Representation of Participant's Voice | Researcher Influence |
|------------------|--------|-----------------------------------|-----------------------------------|------------------------------------------------|----------------------|
| Beerenbrock 2019 | +      |                                   |                                   | +                                               |                      |
| Crane-Okada 2012 | ?      |                                   |                                   | ?                                               |                      |
| Flanagan 2004   | ?      |                                   |                                   | ?                                               |                      |
| Nordstrom 2018  | ?      |                                   |                                   | ?                                               |                      |
| Okafor 2012     | -      |                                   |                                   | -                                               |                      |
| Payne 2009      | ?      |                                   |                                   | ?                                               |                      |
| Shim 2017       | -      |                                   |                                   | -                                               |                      |

**Figure 2. Continued**
Table 3. Demographic summary of participants and classifications of their diagnosed conditions

| Study                          | Population (Total Number)                     | ICD-11 Classification             | Age, years (Mean ± Standard Deviation or Range) | Gender (F:M) |
|-------------------------------|------------------------------------------------|-----------------------------------|-----------------------------------------------|--------------|
| Baptista et al., 2012         | Fibromyalgia (80)                              | Chronic primary                   | 49.3 ± 8.0                                  | 80F          |
| Barene et al., 2014           | Hospital employees (107)                       | Chronic secondary MSK             | 45.8 ± 9.3                                  | 107F         |
| Bojner Horwitz et al., 2006   | Fibromyalgia (36)                              | Chronic primary                   | 57 ± 7.2                                    | 36F          |
| Bojner Horwitz et al., 2003   | Fibromyalgia (36)                              | Chronic primary                   | 57 ± 7.2                                    | 36F          |
| Broscheid et al., 2020        | Lower back pain with spinal stenosis and neurogenic claudication (32) | Chronic primary MSK              | 70 ± 10.6                                   | 24F, 8M      |
| Casilda-Lopez et al., 2017    | Postmenopausal women with knee OA (34)        | Chronic secondary MSK             | 65.6 ± 7.2                                  | 34F          |
| Kaholokula et al., 2017       | Hypertensive Pacific Islanders (53)            | Chronic secondary MSK             | 55 ± 10                                     | 47F, 6M      |
| Krampe et al., 2014           | Older adults with leg pain (37)                | Chronic secondary MSK             | 80 ± 8.9                                    | 31F, 6M      |
| Lopez-Rodriguez et al., 2012  | Fibromyalgia (70)                              | Chronic primary                   | 55.4 ± 7.5                                  | 70F          |
| Lopez-Rodriguez et al., 2013  | Fibromyalgia (76)                              | Chronic primary                   | 54.8 ± 7.8                                  | 76F          |
| Norregaard et al., 1997       | Fibromyalgia (38)                              | Chronic primary                   | 50                                          | UR           |
| Qin et al., 2018              | Postmenopausal women with osteoporosis (50)    | Chronic secondary MSK             | 45–60                                       | 50F          |
| Tharani et al., 2018          | Primary dysmenorrhrea (30)                     | Chronic secondary MSK             | 17–23                                       | 30F          |
| Assunção Júnior et al., 2017  | Fibromyalgia (25)                              | Chronic primary                   | 52.6                                        | 25F          |
| Carbonell Baeza et al., 2010  | Fibromyalgia (71)                              | Chronic primary                   | 54 ± 6.2                                    | 71F          |
| Carbonell Baeza et al., 2012  | Fibromyalgia (38)                              | Chronic primary                   | MD 50.9 ± 7.7                               | 38F          |
| Cherriere et al., 2020        | Charcot-Marie-Tooth Disease hereditary peripheral neuropathy type (9) | Chronic neuropathic              | 10.2 ± 1.5                                  | 7F, 2M       |
| De Carvalho et al., 2012      | Hemiparetic stroke (8)                         | Chronic neuropathic               | Female (58.2 ± 3.8)                          | 5F, 3M       |
| Maddali Bongi et al., 2012    | Fibromyalgia (38)                              | Chronic primary                   | 57.3 ± 11.5                                 | UR           |
| Mirandola et al., 2015        | Breast cancer survivors (18)                   | Chronic cancer treatment          | 53 ± 7.7                                    | 18F          |
| Moffet et al., 2000           | Rheumatoid arthritis (10)                      | Chronic secondary MSK             | 54 ± 10                                     | 10F          |
| Noreau et al., 1995           | Rheumatoid arthritis VII (29)                  | Chronic secondary MSK             | 49.3 ± 13                                   | 20F, 9M      |
| Perlman et al., 1990          | Rheumatoid arthritis (43)                     | Chronic secondary MSK             | 40–60; 51%                                   | 41F, 2M      |
| Segura-Jimenez et al., 2017   | Fibromyalgia (27)                              | Chronic primary                   | 54.2 ± 6.2                                  | 27F          |
| Beerenbroek et al., 2019      | Parkinson’s disease (12)                       | Chronic secondary MSK             | 67.1                                        | 10F, 11M     |
| Crane- Okada et al., 2012     | Breast cancer survivors (49)                   | Chronic cancer treatment          | 66.3                                        | 49F          |
| Flanagan, 2004                | Chronic pain (153)                             | Chronic primary                   | 45                                          | UR           |
| Nordstrom et al., 2018        | Persistent pain (20)                           | Chronic primary                   | UR                                          | 19F, 1M      |
| Okafor et al., 2012           | Nonspecific low back pain (30)                 | Chronic primary MSK               | 55.2                                        | 20F, 10M     |
| Payne, 2009                   | Chronically medically undiagnosed symptoms (24) | Chronic primary                   | UR                                          | UR           |
| Shim et al., 2017             | Chronic pain (22)                              | Chronic primary                   | 51.9 ± 8.8                                  | 16F, 6M      |
| Castrillon et al., 2017       | Chronic lower back pain (2)                    | Chronic primary MSK               | 22.5                                        | 2F           |
| Ribeiro et al., 2011          | Multiple sclerosis (3)                         | Chronic neuropathic               | 45                                          | 2F, 1M       |
| Simoes et al., 2020           | Institutionalized older adults (7)             | Chronic primary                   | 86 (mean) 68–99                             | 5F, 2M       |
| • Total studies:              | Total participants = 1,254                     | Chronic primary = 16              | 45–70 = 26                                  | F = 943 (75.2%) |
| • 34 articles                | Fibromyalgia = 9 (446)                         | Chronic secondary                 | <45 = 3                                     | M = 67       |
| • 32 studies                 | Chronic/persistent pain = 5 (226)             | Chronic neuropathic               | >71 = 1                                     | Unclassifiable = 4 |
|                              | Rheumatoid arthritis = 3 (82)                 | Chronic cancer treatment          |                                             |              |
|                              | Breast cancer patients = 2 (67)               | Chronic primary MSK               |                                             |              |
|                              | Lower back pain = 3 (64)                      | Chronic primary MSK               |                                             |              |

ICD-11 = International Classification of Diseases, 11th Revision; F = female; M = male; MSK = musculoskeletal; MD = multidisciplinary; OA = osteoarthritis; UR = unreported.
| Study | Study Design | Dance Intervention | Comparator | Pain Measure (Statistical Significance) | Follow-Up (SS) | Compliance, % | Dropouts, % |
|-------|--------------|---------------------|------------|-----------------------------------------|----------------|---------------|-------------|
| Baptista et al., 2012* | RCT | Belly dance 60 minutes × 2/week for 16 weeks | Waitlist (40) Dance (40) | VAS SF36 (SS) | 16 weeks VAS (SS) | 83 | 5 |
| Barene et al., 2014* | RCT (Cluster) | Zumba 60 minutes × 2–3/week for 40 weeks | Soccer (37) Zumba (35) Control (34) | Nordic MSK Questionnaire (SS) | None | 84 | 14.3 |
| Bojner Horwitz et al., 2003* | RCT | DMT 60 minutes × 1/week for 24 weeks | Control (16) Dance (20) | VAS | None | UR | UR |
| Bojner Horwitz et al., 2006* | RCT | DMT 60 minutes × 1/week for 24 weeks | Control (16) Dance (20) | VAS GAWP (SS) | 32 weeks GAWP (SS) | UR | UR |
| Broscheid et al., 2020 | RCT | Choreographed dance 60 minutes × 2/week for 6 weeks | Multimodal intervention (14) Physio control (10) | Brief Pain Inventory Oswestry Low Back Pain Index | None | >80 | UR |
| Casilda-Lopez et al., 2017 | RCT | Biodanza 45 minutes × 3/week for 8 weeks | Control (17) Biodanza (17) | WOMAC (SS) | 12 weeks | UR | 0 |
| Kaholokula et al., 2017 | RCT | Hula dance 60 minutes × 2/week for 12 weeks | Waitlist (28) Dance (27) | SF12 | 12 weeks | 87 | 7.4 |
| Krampe et al., 2014 | RCT | Dance 45 minutes × 2/week for 12 weeks | Waitlist (15) Dance (19) | Functional Pain Scale (SS) | None | 88 | 10.5 |
| Lopez-Rodriguez et al., 2012* | RCT | Aquatic Biodanza 60 minutes × 2/week for 12 weeks | Stretching (35) Dance (35) | Pressure algometry (SS) VAS (SS) SF36 FIQ (SS) MMQ (SS) | None | >58 | 45.7 |
| Lopez-Rodriguez et al., 2013* | RCT | Aquatic Biodanza 60 minutes × 2/week for 12 weeks | Stretching (38) Dance (38) | Pressure algometry (SS) VAS (SS) SF36 FIQ (SS) MMQ (SS) | None | >60 | 21.1 |
| Norregaard et al., 1997* | RCT | Aerobic dance 50 minutes × 3/week for 12 weeks | Control (8) Exercise (15) Dance (15) | Pressure algometry FIQ | None | UR | 66.7 |

(continued)
| Study                     | Study Design | Dance Intervention | Comparator | Pain Measure (Statistical Significance) | Follow-Up (SS) | Compliance, % | Dropouts, % |
|--------------------------|--------------|--------------------|------------|----------------------------------------|----------------|---------------|-------------|
| Qin et al., 2018         | RCT          | Square dance       | Control (25) Dance (25) | WHO 4 Level Pain Grade (SS) | None | UR | UR |
| Tharani et al., 2018*    | RCT          | Aerobic dance      | Stretch (15) Dance (15) | VAS (SS) | None | UR | UR |
| Assunção Júnior et al., 2017* | QES     | Zumba              | –          | VAS (SS) FIQ SF36 | None | 86 | 24 |
| Carbonell Baeza et al., 2010* | QES | Biodanza           | Usual care (32) Biodanza (27) | Pressure algometry (SS) FIQ (SS) SF36 (SS) VPMI (SS) | None | 85.6 | 27.1 |
| Carbonell Baeza et al., 2012* | QES (pre/post)  | Biodanza           | MDT (21) Biodanza (17) | Pressure algometry (SS) FIQ (SS) SF36 (SS) VPMI (SS) | None | 85.4 | 23.5 |
| Cherriere et al., 2020   | QES (pre/post) | Adapted dance      | Control (4) Adapted dance (5) | VAS (SS) | None | 89 | 0 |
| De Carvalho et al., 2012 | QES (Pre-Experimental) | Brazilian folk dance | None | SF36 | None | UR | UR |
| Maddali Bongi et al., 2012* | QES (Crossover Study) | Resseguier         | RM then QG (15) QG then RM (15) | Pressure algometry RPS (SS) SF36 (SS) FIQ (SS) | 12 weeks FIQ (SS) | 100 | 21 |
| Mirandola et al., 2015   | QES (Pre-Experimental) | Choreographed dance | None | SF12 NRS (SS) | None | UR | 0 |
| Moffet et al., 2000      | QES (Pre-Experimental) | Aerobic dance      | None | RAI | None | 92.5 | 0 |

(continued)
| Study                  | Study Design                      | Dance Intervention            | Comparator           | Pain Measure (Statistical Significance)                  | Follow-Up (SS) | Compliance, % | Dropouts, % |
|-----------------------|-----------------------------------|-------------------------------|----------------------|--------------------------------------------------------|----------------|---------------|-------------|
| Noreau et al., 1995*  | QES                               | Aerobic dance 35–50 minutes × 2/week for 12 weeks | Control (10) Dance (19) | AIMS (SS) Painful joints (SS) | 24 weeks | 83.3 | UR |
| Perlman et al., 1990* | QES (Pre-Experimental)            | Aerobic dance 120 minutes × 2/week for 16 weeks | None                  | VAS (SS) AIMS (SS) ROM pain | None | None | 75 (for more than 77% participants) | 19 |
| Segura-Jimenez et al., 2017* | QES                        | Biodanza 120 minutes × 1/week for 12 weeks | None                  | VAS (SS) | None | 85.6 | 27 |
| Beerenbrock et al., 2019 | Qualitative                     | Tango 60 minutes × 1/week for 10 weeks | –                    | Interviews | None | None | UR |
| Crane-Okada et al., 2012 | Qualitative Study                | Mindful movement 120 minutes × 1/week for 20 weeks | Control (19) Dance (30) | Interviews | None | 52 (average) | 46.7 |
| Flanagan, 2004       | Qualitative Study (Experiential)  | DMT 120 minutes × 1/week for 9 weeks | None                  | Interviews | None | 71.9 | 28.1 |
| Nordstrom et al., 2018 | Qualitative Study               | Free Dance Movement 90 minutes for 1–6 semesters | None                  | Interviews | None | None | UR |
| Okafor et al., 2012* | Mixed Methods (RCT + qualitative) | Aerobic dance 45 minutes × 3/week for 6 weeks | Physio (15) Physio + Dance (15) | VAS (SS) RMDQ | None | None | UR |
| Payne, 2009*         | Mixed Methods (QES Crossover + qualitative) | BodyMind Approach 120 minutes × 1/week for 12 weeks | None                  | Interviews | 12 weeks | UR | 25 |
| Shim et al., 2017    | Mixed Methods (QES Pre-Experimental + qualitative) | DMT 70 minutes × 1/week for 10 weeks | None                  | VAS (SS) NRS Patient journal and interviews | None | None | 13.6 |
| Castrillon et al., 2017* | Case Series                 | Belly dance 30 minutes × 2/week for 6 weeks | None                  | NPRS Oswestry Low Back Pain Index | 8 weeks | UR | 0 |
| Ribeiro et al., 2011 | Case Series                     | Choreographed dance 90 minutes × 1/week for 36 weeks | None                  | SF36 | None | UR | UR |

(continued)
Table 4. continued

| Study                  | Study Design | Dance Intervention                                      | Comparator | Pain Measure (Statistical Significance) | Follow-Up (SS) | Compliance, % | Dropouts, % |
|------------------------|--------------|----------------------------------------------------------|------------|----------------------------------------|----------------|---------------|--------------|
| Simoes et al., 2020*   | Case Series  | Choreographed dance 65 minutes × 1/week for 6 weeks     | None       | NRS                                    | None           | 100           | 0            |

Total Studies: 34 articles
32 studies

RCT = 13 (38.2%)
QES = 11 (32.4%)
Qualitative = 4 (11.8%)
Mixed Methods = 3 (8.8%)
Case Series = 3 (8.8%)

Aerobic Dance = 6 (17.6%)
Biodanza = 6 (17.6%)
Choreographed dance = 4 (11.8%)
DMT = 4 (11.8%)
Average duration = 69.9 minutes
Average frequency = 1.8 ×/week
Average length = 13.6 weeks

No control = 13 (38.2%)

Pain-related Questionnaire = 18
Short Form = 9
20 quantitative studies with statistically significant reduction in pain (70.4%)

Average = 17.8 weeks
(9 studies)

Unreported = 15
0% = 6
1–25% = 11
25–50% = 5
51–75% = 1
Unreported = 11

QES = quasi-experimental study; RCT = randomized controlled trial; UR = unreported; MSK = musculoskeletal; DMT = Dance Movement Therapy; RM = Rességuiër Method; QG = Qi Gong; VAS = visual analog scale; SF36 = Short-Form 36; SF12 = Short-Form 12; GAWP = Global Assessment of Wellbeing and Pain; FIQ = Fibromyalgia Impact Questionnaire; RA = rheumatoid arthritis; PMI = Vanderbilt Pain Management Inventory; WOMAC = Western Ontario and McMaster Universities Osteoarthritis Index; NPRS = Numeric Pain Rating Scale; SS = statistical significance; MMQ = McGill Melzack Questionnaire; RPS = Regional Pain Scale; NRS = Numeric Rating Scale; RAI = Ritchie Articular Index; AIMS = Arthritis Impact Measurement Scale; ROM pain = articular pain on motion; RMDQ = Roland Morris Disability Questionnaire; NPQ = Neurophysiology of Pain Questionnaire.

*Studies investigating pain as a primary outcome measure.
Both categories of dance were beneficial in improving pain outcome measures or involved positive themes around the pain experience. Twelve out of the 20 articles using structured dance showed statistically significant reductions in pain [61, 65, 68, 69, 74, 78, 79, 85, 86, 88, 89, 91] or had themes of pain reduction [61, 63]. In comparison, all fourteen studies using dance therapies found statistically significant improvements in pain outcomes or themes of pain reduction, acceptance, or release. Nine studies used dance therapies that included quantitative measures, with seven reporting improvements in pain scores [67, 75, 76, 81–83, 90]. Studies with longer sessions of 90 minutes or more had longer intervention lengths of 16 weeks and were more likely to show significant improvements in pain outcome measures (80%) [56, 57, 75, 78] and themes of pain reduction and pain coping (100%) [60, 62, 70, 74] when compared with those 30–60 minutes long (71%).

An assessment of long-term follow-up was difficult, as only nine studies included an assessment after the end of the dance intervention [66, 68, 70–73, 81, 88, 92], averaging 17.8 weeks after the conclusion of the intervention, of which 66% maintained at least one statistically significant improvement in pain outcome [66, 68, 70, 71, 73, 81]. Studies with longer follow-ups of more than 13 weeks tended to maintain statistically significant improvements [68, 70, 71], but 75% of these studies were from those with fibromyalgia, which tends to be more likely to improve.

Discussion

To our knowledge, this is the first systematic review to specifically investigate the literature around chronic pain and dance as a form of pain reduction and management and to encompass both quantitative and qualitative literature. Through this review, we identified promising research using dance to assist in pain reduction and improve qualitative psychosocial components of coping, self-efficacy, and pain acceptance across a variety of populations. There were overall improvements in pain identified from the narrative synthesis of both the quantitative and qualitative data that reflect a variety of positive experiences and changes in the participants. Dance therapies with durations of 60 minutes or longer appeared to show the greatest effect on pain management for those with chronic pain. The mechanisms of how these benefits might occur are speculated from this review and previous literature.

The narrative synthesis of the quantitative data from this review noted reductions in objective pain outcome measures over a range of participants with differing demographics and diagnoses partaking in a variety of dance interventions. Although pain was measured through a range of screening tools, 70.6% of studies using quantitative measures found statistically significant improvements in pain outcome measures. Furthermore, when synthesizing both quantitative and qualitative data relating to reduced pain perception, 74% of studies showed an improvement in pain. By triangulating the treatment effects with both quantitative and qualitative data, this offers insight into the multifaceted benefits of dance to not just improve the quantitative measures of pain but also address the complexity of the human experience of pain.

This review found numerous psychosocial benefits of dance, as reflected in the narrative synthesis of qualitative studies by the overall themes and voices of the individual participants. All studies that included qualitative data found at least one positive theme about pain management. Unexpectedly, many participants noted no decreased pain per se but rather improved acceptance of pain [64, 67], acceptance of a new normalcy [61], finding a new level of mental and emotional well-being [61, 64, 65, 67], or developing ideas around self-efficacy and resilience [67]. These qualitative aspects not only highlight the effect of dance on the lived experience of pain but also the value that these dance interventions have in changing perspectives and management of both pain and an individual’s overall health. Similarly, previous research has identified numerous psychosocial benefits for dance, including improved perceived emotional, physical, social, and spiritual dimensions [43], along with quality of life, depression, and anxiety [33]. Therefore, dance not only reduces the quantitative rating of pain but also has psychosocial benefits for individuals experiencing chronic pain and could therefore be a potent intervention for pain management.

The proposed components from all reviewed studies that are hypothesized to enable these benefits are physical activity, music, presence of a group setting, and physical touch. Our study found a variety of benefits in pain reduction and improved coping that could be attributed to serotonin and opioid secretion through exercise [96], descending pain modulation in the central nervous system when listening to music [97], and mirror neurons assisting in socially learned pain modulation [98]. This is relevant, as all the reviewed studies included a group setting, and those involving partnered touch [61, 62] showed their partner to assist with emotional and physical support of movement. Improvements in psychosocial parameters have been suggested to relate to functional changes that are associated with improved memory, attention, and psychosocial parameters as a result of dance [99]. The dance interventions included in the present review addressed the complex and multifaceted nature of pain and how it can be better managed.

This review found that the dance interventions that appeared to have the greatest influence on pain reduction and improved pain management were those with session durations of at least 60 minutes. Additionally, shorter-duration studies had fewer dropouts, of which those with 0% dropouts averaged intervention lengths of 7.7 weeks and those with 0–5% dropouts averaged intervention...
lengths of 9.4 weeks, potentially indicating better adherence with shorter study duration. Furthermore, interventions that approached the recommended 150 minutes of weekly activity [100] were more likely to show improved pain outcome measures; 86% of these showed improvements in quantitative measures or qualitative themes [65, 69, 72, 77–79, 89]. This is of importance to promote habitual physical activity [101], given that those with chronic pain generally do not meet the activity recommendation of moderate to vigorous activity for 150 minutes per week [102, 103]. As a result, we recommend that dance classes for those with chronic pain be a minimum of 60 minutes at least twice per week structured into 7- to 9-week blocks for positive results and to aid in adherence.

Although the majority of studies showed positive benefits for pain and the pain experience, some considerations should be noted in considering the results of this review. A number of qualitative and mixed-methods studies [61–67] recruited a convenience sample of participants who were current patients from the clinic running the study. This might have introduced a selection bias whereby these participants could have previous experience, rapport, trust, and belief in the treatment effect that are not reflective of the larger population. A majority of studies using dance therapies lacked clear reporting of methodology and were conducted poorly when assessed through the JBI risk-of-bias tool. This could reflect the exploratory nature of these interventions and a lack of adequate structure to warrant treatment standardization. The lack of reported compliance and adherence data leads to questions about the safety and potential risk of pain aggravation in those with chronic pain. However, this review found only one participant, out of 1,254 participants, who reported a pain flare-up, yet this was also accompanied by other benefits, such as awareness of body, regaining mobility, and feelings of pride and acceptance [61].

Although fibromyalgia is controversial as a diagnosis [104], we have included those with fibromyalgia as used in the included articles. Because of the large number (69%), robustness, and positive results from these studies, the results seen in the chronic primary pain category can be generalized only to those diagnosed with fibromyalgia. In contrast, studies of those classified as having chronic secondary musculoskeletal pain noted a variety of conditions, and as such they could be generalizable to the wider category population. Most study participants were women (75.2%), and as such, the results might not be generalizable to men; however, given this bias, it might also be expected that those with chronic pain participating in future dance programs could also be predominantly women [105]. Lastly, the lack of post-trial follow-up data across all studies leads us to question the long-term effects of these interventions on individuals with chronic pain and the likelihood of adherence to these interventions among individuals with chronic pain.

As the original aim and criteria of this study were deliberately broad to capture any conditions with chronic pain, this lends itself to increased heterogeneity of study designs, comparison groups, populations, and interventions, making meta-analysis inappropriate. Nonetheless, the overall synthesis of both quantitative and qualitative data showed evidence for dance to reduce pain or improve participant coping across a variety of conditions.

Consideration of the individual dance class components would be beneficial in designing future dance interventions. Structured dance and dance therapy have different intentions: learning the steps and choreography of a dance style vs expressing oneself through movement and music, respectively. Therefore, structured dances could benefit from more creative and exploratory components, which have been noted in this review to have many psychosocial benefits. Dance therapy might benefit from more structure to the classes, such as adding in sections of choreography or technique and using more quantitative measures if using it as a tool for research. The creative component of dance therapy studies is commonly found solely in therapy-based dance practices and not in the wider dance community but could offer additional benefit for those experiencing chronic pain.

Other factors to be considered in future research and practice include reporting the music used, class formats, use of mirrors, and the use of touch between participants or the dance teacher [106]. The use of music is potent in its effects on pain and enjoyment and should be reported in any dance intervention. Some of these components, such as mirrors and touch, are typical and required in certain dance styles [107]. Both mirrors [108] and touch [109] have been effectively used in chronic pain management, and as such they could influence the experience of dance and chronic pain. Additionally, the presence of group movement and socialization before or after class could have positive benefits on pain experience [110]. Lastly, the results of this study should be considered in the context of group classes only, as we cannot comment on the effect of private one-on-one dance classes. Therefore, a greater understanding of class structure and use of external cues could influence the effectiveness of dance intervention for those experiencing chronic pain.

This review demonstrated a link between dance and the reduction of pain, with concurrent improved function. Notably, but outside the scope of this review, the reviewed studies showed that dance was more effective for pain management than were control interventions such as stretching [75, 76, 79], had an additional benefit when used as an adjunct to physiotherapy treatment [65], and was associated with improved functional outcomes as measured by questionnaire data [72, 75, 76, 81–83]. This demonstrates that dance could be a viable alternative or adjunct to current pain relief treatments, with additional benefits for improving function.

This review took a broad picture of the current literature on the use of dance to address pain in a variety of contexts.
chronic pain populations. There appears to be value in the use of dance across a variety of pain-related conditions to reduce pain or improve pain coping in individuals with chronic pain, demonstrated through both quantitative and qualitative data. However, the lack of well-described and well-defined research specifically directed toward those with chronic pain conditions creates a gap between the current evidence base and the practical use of dance for pain management. This review supports the use of dance for those with chronic pain, with the recommendation that sessions be structured into 7- to 9-week blocks and a minimum of 60 minutes at least twice per week and include some creative components. Research in this field will further benefit from studies using both quantitative and qualitative methods with specific and detailed reporting of intervention, methodology, and results, which primarily investigates individuals with chronic pain.

Acknowledgments
The authors thank Kanchana Ekanayake, academic liaison librarian at the Sydney School of Health Sciences, for her guidance in the planning of this systematic review.

References
1. Scascighini L, Toma V, Dober-Spielmann S, et al. Multidisciplinary treatment for chronic pain: A systematic review of interventions and outcomes. Rheumatology 2008;47 (5):670–8.
2. Raja SN, Carr DB, Cohen M, et al. The revised International Association for the Study of Pain definition of pain: Concepts, challenges, and compromises. Pain 2020;161(9):1976–82.
3. Treede R-D, Rief W, Barke A, et al. A classification of chronic pain for ICD-11. Pain 2015;156(6):1003–7.
4. Gatchel RJ, Peng YB, Peters ML, et al. The biopsychosocial approach to chronic pain: Scientific advances and future directions. Psychol Bull 2007;133(4):581–624.
5. Treede RD, Rief W, Barke A, et al. Chronic pain as a symptom or a disease; The IASP Classification of Chronic Pain for the International Classification of Diseases (ICD-11). Pain 2019; 160(1):19–27.
6. Crofford LJ. Chronic pain: Where the body meets the brain. Trans Am Clin Climatol Assoc 2015;126:167–83.
7. Verbunt JA, Smeets RJ, Wittink HM. Cause or effect? Deconditioning and chronic low back pain. Pain Headache 2010;149(3):428–30.
8. Severijns R, Vlaeyen JWS, van den Hout MA, et al. Pain catastrophizing predicts pain intensity, disability, and psychological distress independent of the level of physical impairment. Clin J Pain 2001;17(2):165–72.
9. Thomas SP, Johnson M. A phenomenologic study of chronic pain. West J Nurs Res 2000;22(6):683–705.
10. Fine PG. Long-term consequences of chronic pain: mounting evidence for pain as a neurological disease and parallels with other chronic disease states. Pain Med 2011;12(7):996–1004.
11. Gatchel RJ, McGeary DD, McGeary CA, et al. Interdisciplinary chronic pain management: Past, present, and future. Am Psychol 2014;69(2):119–30.
12. Jacobs H, Bockaert M, Bonte J, et al. The impact of a group-based multidisciplinary rehabilitation program on the quality of life in patients with fibromyalgia: Results from the QUALIFIBRO study. J Clin Rheumatol 2020;26(8):313–9.
13. Stanos S. Focused review of interdisciplinary pain rehabilitation programs for chronic pain management. Curr Pain Headache Rep 2012;16(2):147–52.
14. Robbins H, Gatchel RJ, Noe C, et al. A prospective one-year outcome study of interdisciplinary chronic pain management: Compromising its efficacy by managed care policies. Anesth Analg 2003;97(1):156–62.
15. Edwards SD, Palavar K, Ngcobo HS, et al. Exploring the relationship between physical activity, psychological well-being and physical self-perception in different exercise groups. S Afr J Res Phys Educ Recreat 2005;27:59–74.
16. Williams SL, French DP. What are the most effective intervention techniques for changing physical activity self-efficacy and physical activity behaviour—and are they the same? Health Educ Res 2011;26(2):308–22.
17. Brochado A, Oliveira-Brochado F, Brito PQ. Effects of personal, social and environmental factors on physical activity behavior among adults. Rev Port Saúde Pública 2010;28(1):7–17.
18. Bandura A. Health promotion from the perspective of social cognitive theory. Psychol Health 1998;13(4):623–49.
19. McAuley E, Konopack JF, Motl RW, et al. Physical activity and quality of life in older adults: Influence of health status and self-efficacy. Ann Behav Med 2006;31(1):99–103.
20. Cheng J, Rutherford M, Singh VM. The HHS Pain Management Best Practice Inter-Agency Task Force report calls for patient-centered and individualized care. Pain Med 2020;21(1):1–3.
21. Hulla R, Brecht D, Stephens J, et al. The biopsychosocial approach and considerations involved in chronic pain. Healthy Aging Research 2019;08(01):7–12.
22. Booth J, Moseley GL, Schiltenwolf M, et al. Exercise for chronic musculoskeletal pain: A biopsychosocial approach. Musculoskeletal Care 2017;15(4):413–21.
23. Ambrose KR, Golightly YM. Physical exercise as non-pharmacological treatment of chronic pain: Why and when. Best Pract Res Clin Rheumatol 2015;29(1):120–30.
24. López-de-Uralde-Villanueva I, Muñoz-García D, Gil-Martínez A, et al. A systematic review and meta-analysis on the effectiveness of graded activity and graded exposure for chronic nonspecific low back pain. Pain Med 2016;17(1):172–88.
25. Simons LE, Vlaeyen JWS, Declerecq L, et al. Avoid or engage? Outcomes of graded exposure in youth with chronic pain using a sequential replicated single-case randomized design. Pain 2020;161(3):520–31.
26. Leeu M, Goossens ME, van Breukelen GJ, et al. Exposure in vivo versus operant graded activity in chronic low back pain patients: Results of a randomized controlled trial. Pain 2008;138(1):192–207.
27. Antcliff D, Keenan AM, Keeley P, et al. Survey of activity pacing across healthcare professionals informs a new activity pacing framework for chronic pain fatigue. Musculoskeletal Care 2019;17(4):335–45.
28. Stevenson A. Oxford Dictionary of English. Oxford: Oxford University Press; 2010.
29. Berndt C, Strahler J, Kirschbaum C, et al. Lower stress system activity and higher peripheral inflammation in competitive ballroom dancers. Biol Psychol 2012;91(3):537–64.
30. Struck M, Villegas A, Bauer K, et al. Psycho-immunological process evaluation of Biodanza. Signum Temporis 2009;2 (1):99–113.
31. Payne H. Dance Movement Therapy: Theory and Practice. London: Routledge; 2003.
32. Fong Yan A, Cobley S, Chan C, et al. The effectiveness of dance interventions on physical health outcomes compared to other forms of physical activity: A systematic review and meta-analysis. Sports Med 2018;48(4):933–51.
33. Murillo-García Á, Villafaina S, Adsuar JC, et al. Effects of dance on pain in patients with fibromyalgia: A systematic review and meta-analysis. Evid Based Complement Alternat Med 2018;2018:8709748.
34. Hackney ME, Earhart GM. Effects of dance on gait and balance in Parkinson’s disease: A comparison of partnered and nonpartnered dance movement. Neurorehabil Neural Repair 2010;24(4):384–92.
35. Maraz A, Király O, Urbán R, et al. Why do you dance? Development of the Dance Motivation Inventory (DMI). PLoS One 2015;10(3):e0122866.
36. Tarr B, Launay J, Cohen E, et al. Synchrony and exertion during dance independently raise pain threshold and encourage social bonding. Biol Lett 2015;11(10):20150767.
37. Mason MF, Tarkow EP, Macrae CN. The look of love: Gaze shifts and person perception. Psychol Sci 2005;16(3):236–9.
38. Inui K, Tsuji T, Kakiyi R. Temporal analysis of cortical mechanisms for pain relief by tactile stimuli in humans. Cereb Cortex 2006;16(3):355–65.
39. Hackney ME, Earhart GM. Social partnered dance for people with serious and persistent mental illness: A pilot study. J Nerv Ment Dis 2010;198(1):76–8.
40. Muller-Pinger S, Carrard I, Ybarra J, et al. Dance therapy improves self-body image among obese patients. Patient Educ Couns 2012;89(3):525–8.
41. Koch SC, Morlinghaus K, Fuchs T. The joy dance: Specific effects of a single dance intervention on psychiatric patients with depression. The Arts in Psychotherapy 2007;34(4):340–9.
42. Mangeri F, Montesi L, Forlani G, et al. A standard ballroom and Latin dance program to improve fitness and adherence to physical activity in individuals with type 2 diabetes and in obesity. Diabetol Metab Syndr 2014;6:74.
43. Quiroga Murcia C, Kreutz G, Clift S, et al. Shall we dance? An exploration of the perceived benefits of dancing on well-being. Arts & Health 2010;2(2):149–63.
44. Cepeda MS, Carr DB, Lau J, et al. Music for pain relief. Cochrane Database Syst Rev 2006;CD004834.
45. Garza-Villarreal EA, Pando V, Vuust P, et al. Music-induced analgesia in chronic pain conditions: A systematic review and meta-analysis. Pain Physician 2017;207(7):597–610.
46. Dunbar RF, Kaskaris K, MacDonald I, et al. Performance of music elevates pain threshold and positive affect: Implications for the evolutionary function of music. Evol Psychol 2012;10(4):688–702.
47. Espi-López GV, Inglés M, Ruescas-Nicolau M-A, et al. Effect of low-impact aerobic exercise combined with music therapy on patients with fibromyalgia. A pilot study. Complement Ther Med 2016;28:1–7.
48. Bruyneel A-V. Effects of dance activities on patients with chronic pathologies: Scoping review. Helion 2019;5(7):e02104.
49. Kiepe M-S, Stöckigt B, Keil T. Effects of dance therapy and ballroom dances on physical and mental illnesses: A systematic review. Arts Psychother 2012;39(5):404–11.
50. Strassel JK, Cherkin DC, Steuten L, et al. A systematic review of the evidence for the effectiveness of dance therapy. Alteern Ther Health Med 2011;17(3):50–9.
51. Henry SG, Bell RA, Fenton JJ, et al. Goals of chronic pain management: Do patients and primary care physicians agree and does it matter? Clin J Pain 2017;33(11):955–61.
52. Hickman BJ, Fong Yan A, Pourkazemi F, Pedbani R, Hiller C. Social Dance and Community Effects Research (DanCER) and Chronic Pain. CRDA2020165557. PROSPERO: International Prospective Register of Systematic Reviews; 2020.
53. Moher D, Liberati A, Tetzlaff J, et al.; PRISMA Group. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA statement. PLoS Med 2009;6(7):e1000097.
54. Endnote. Version X9. Philadelphia, PA: Clarivate Analytics; 2013.
55. Coviende Systematic Review Software [Computer Program]. Version 2156. Melbourne, Australia.
56. Tufanaru C, Munn Z, Aromataris E, et al. Chapter 3: Systematic reviews of effectiveness. Joanna Briggs Institute Reviewer’s Manual. The Joanna Briggs Institute; 2017.
57. Lockwood C, Munn Z, Porritt K. Qualitative research synthesis: Methodological guidance for systematic reviewers utilizing meta-aggregation. Int J Evid-Based Healthcare 2015;13(3):179–87.
58. Moola S, Munn Z, Tufanaru C, et al. Chapter 7: Systematic reviews of etiology and risk. Joanna Briggs Institute Reviewer’s Manual. The Joanna Briggs Institute; 2017:2019-05.
59. Higgins JP, Thomas J, Chandler J, et al. Cochrane Handbook for Systematic Reviews of Interventions. John Wiley & Sons; 2019.
60. Noyes J, Booth A, Moore G, et al. Synthesising quantitative and qualitative evidence to inform guidelines on complex interventions: Clarifying the purposes, designs and outlining some methods. BMJ Global Health 2019;4(Suppl 1):e000893.
61. Beerenbrock Y, Meyer L, Bohme J, et al. Perceived effects of Tango Argentino on body experience in persons with Parkinson’s disease (PD)—A qualitative study with affected persons and their partners. Complement Ther Med 2020;48:102221.
62. Crane-Okada R, Kiger H, Anderson NL, et al. Participant perceptions of a mindful movement program for older women with breast cancer: Focus group results. Cancer Nurs 2012;35(3):E1–10.
63. Flanagan CS. Creative arts therapy in the rehabilitation of chronic pain; movement and metaphor—reflections by clients and therapist. Nordisk Fysioterapi 2004;8:120–31.
64. Nordstrom K, Ekhammar A, Larsson MEH. Physiotherapist-guided Free Movement Dance for patients with persistent pain is empowering in everyday living. A qualitative study. Eur J Physiother 2020;22(1):2–13.
65. Okafor U, Solanke T, Akinbo S, et al. Effect of aerobic dance on pain, functional disability and quality of life on patients with chronic low back pain. S Afr J Physiother 2012;68(3):11–4.
66. Payne H. Pilot study to evaluate Dance Movement Psychotherapy (the BodyMind Approach) in patients with medically unexplained symptoms: Participant and facilitator perceptions and a summary discussion. Body Mov Dance Psychother 2009;4(2):77–94.
67. Shim M, Johnson RB, Gasson S, et al. A model of dance/movement therapy for resilience-building in people living with chronic pain. Eur J Integr Med 2017;9:27–40.
68. Baptista AS, Villela AL, Jones A, et al. Effectiveness of dance in patients with fibromyalgia: A randomized, single-blind, controlled study. Clin Exp Rheumatol 2012;30(6 suppl 74):18–23.
69. Barese S, Krustrop P, Holtermann A. Effects of the workplace health promotion activities soccer and Zumba on muscle pain,
work ability and perceived physical exertion among female hospital employees. PLoS One 2014;9(12):e115059.

70. Bojner-Horwitz E, Kowalski J, Theorell T, et al. Dance/movement therapy in fibromyalgia patients: Changes in self-figure drawings and their relation to verbal self-rating scales. Arts Psychother 2006;33(1):11–25.

71. Bojner-Horwitz E, Theorell T, Anderberg UM. Dance/movement therapy and changes in stress-related hormones: A study of fibromyalgia patients with video-interpretation. Arts Psychother 2003;30(5):255–64.

72. Casilda-López J, Valenza M, Cabrera-Martos I, et al. Effects of a dance-based aquatic exercise program in obese postmenopausal women with knee osteoarthritis: A randomized controlled trial. Menopause 2017;24(7):768–73.

73. Kaholokula JK, Look M, Mabellos T, et al. Cultural dance programs improve gait speed in older adults with chronic lower extremity pain: A feasibility study. Geriatr Nurs 2014;35(5):339–44.

74. López-Rodríguez M, Castro-Sánchez AM, Fernandez-Martinez M, et al. Comparison between aquatic-Biodanza and stretching for improving quality of life and pain in patients with fibromyalgia. Aten Primaria 2012;44(11):641–9.

75. López-Rodríguez MM, Fernandez-Martinez M, Mataran-Penarrocha GA, et al. Effectiveness of aquatic exercise on sleep quality, anxiety and other symptoms in patients with fibromyalgia. Med Clin (Barc) 2013;141(11):471–8.

76. Norregaard J, Lykkegaard JJ, Mehl Jensen J, et al. Exercise training in treatment of fibromyalgia. J Musculoskeletal Pain 1997;5(1):71–9.

77. Qin J, Rong X, Zhu G, et al. The effects of square dancing on bone mineral density and bone turnover markers in patients with postmenopausal osteoporosis. J Mech Med Biol 2018;18(08):1840027.

78. Tharani G, Dharshini E, Rajalaxmi V, et al. To compare the effects of stretching exercise versus aerobic dance in primary dysmenorrhea among collegiate girls. Drug Invention Today 2018;10:09745–7619.

79. Broscheid KC, Behrendt T, Hamacher D, et al. Effect of a multimodal movement intervention in patients with neurogenic claudication based on lumbar spinal stenosis and/or degenerative spondylolisthesis-a pilot study. Front Med (Lausanne) 2020;7:540070.

80. Maddali Bongi S, Del Rosso A, Felice C, et al. Ress/Coelho study and Qigong sequentially integrated in patients with fibromyalgia syndrome. Clin Exp Rheumatol 2012;30(6 Suppl 74):51–8.

81. Carbonell-Baeza A, Aparicio VA, Martins-Pereira CM, et al. Efficacy of Biodanza for treating women with fibromyalgia. J Altern Complement Med 2010;16(11):1191–200.

82. Carbonell-Baeza A, Ruiz JR, Aparicio VA, et al. Multidisciplinary and Biodanza intervention for the management of fibromyalgia. Acta Reumatol Port 2012;37(3):240–30.

83. Carbonell-Baeza A, de Carvalho PC, Dos Santos LAD, Silva SM, et al. Evaluation of quality of life of post-stroke hemiparetic patients before and after dance therapy for seniors. Conscientiae Saude 2012;11(4):573–9.

84. Assunção Júnior JC, de Almeida Silva HJ, da Silva JFC, et al. Zumba dancing can improve the pain and functional capacity in women with fibromyalgia. J Bodyw Mov Ther 2018;22(2):455–9.

85. Mirandola D, Monaci M, Muraca M, et al. Role of dance as part of an adapted physical activity program in breast cancer survivors: A pilot study. Med Sport (Roma) 2015;68(4):591–9.

86. Moffet H, Noreau L, Parent E, et al. Feasibility of an eight-week dance-based exercise program and its effects on locomotor ability of persons with functional class III rheumatoid arthritis. Arthritis Care Res 2000;13(2):100–11.

87. Noreau L, Martineau H, Roy L, et al. Effects of a modified dance-based exercise on cardiorespiratory fitness, psychological state and health status of persons with rheumatoid arthritis. Am J Phys Med Rehabil 1995;74(1):19–27.

88. Perlman SG, Connell KJ, Clark A, et al. Dance-based aerobic exercise for rheumatoid arthritis. Arthritis Care Res (Hoboken) 1990;3(1):29–35.

89. Segura-Jiménez V, Gatto-Cardia CM, Martins-Pereira CM, et al. Biodanza reduces acute pain severity in women with fibromyalgia. Pain Manag Nurs 2017;18(5):318–27.

90. Cherriere C, Martel M, Fortin S, et al. An adapted dance program for children with Charcot-Marie-Tooth disease: An exploratory study. J Bodyw Mov Ther 2020;24(2):85–91.

91. Castrillon T, Hanney WJ, Rothchild CE, et al. The effects of a standardized belly dance program on perceived pain, disability, and function in women with chronic low back pain. J Back Musculoskeletal Rehabil 2017;30(3):477–96.

92. Ribeiro FC, Braga DM. A interferência da Dança na Qualidade de Vida de Indivíduos Portadores de Esclerose Múltipla. Revista Neurociências 2001;19(2):258–65.

93. Simões P, Andrias R, Simões D, et al. Group pain neuroscience education and dance in institutionalized older adults with chronic pain: A case series study. Physiother Theory Pract 2022;38(1):1–9.

94. Munn Z, Barker TH, Moola S, et al. Methodological quality of case series studies: An introduction to the JBI critical appraisal tool. JBI Evid Synth 2020;18(10):2127–33.

95. Lima LV, Abner TS, Sluka KA. Does exercise increase or decrease pain? Central mechanisms underlying these two phenomena. J Physiol 2017;595(13):4141–50.

96. Dobek CE, Beynon ME, Bosma RL, et al. Muscle modulation of pain perception and pain-related activity in the brain, brain stem, and spinal cord: A functional magnetic resonance imaging study. J Pain 2014;15(10):1057–68.

97. Schenk L, Krimmel SR, Colloca L. Observe to get pain relief: Current evidence and potential mechanisms of socially-learned pain modulation. Pain 2017;158(11):2077–81.

98. Teixeira-Machado L, Arida RM, de Jesus Mari J. Dance for neuroplasticity: A descriptive systematic review. Neurosci Biobehav Rev 2019;96:232–40.

99. Garber CE, Blissmer B, Deschenes MR, et al. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: Guidance for prescribing exercise. Am Coll Sports Med 2011;43(7):1334–39.

100. Weyland S, Finne E, Krell-Roesch J, et al. (How) does affect influence the formation of habits in exercise? Front Psychol 2020;11:2866.

101. Zadro JR, Shirley D, Amorim A, et al. Are people with chronic low back pain meeting the physical activity guidelines? A cross-sectional study. Spine J 2017;17(6):845–54.

102. Alzahrani H, Mackey M, Stamatakis E, et al. The association between physical activity and low back pain meeting the physical activity guidelines? A cross-sectional study. Spine J 2017;17(6):845–54.

103. Cherriere C, Martel M, Fortin S, et al. An adapted dance program for children with Charcot-Marie-Tooth disease: An exploratory study. J Bodyw Mov Ther 2020;24(2):85–91.

104. Garber CE, Blissmer B, Deschenes MR, et al. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: Guidance for prescribing exercise. Am Coll Sports Med 2011;43(7):1334–39.
105. Sheppard A, Broughton MC. Promoting wellbeing and health through active participation in music and dance: A systematic review. Int J Qual Stud Health Well-Being 2020;15(1):1732526.

106. Goldstein P, Weissman-Fogel I, Shamay-Tsoory SG. The role of touch in regulating inter-partner physiological coupling during empathy for pain. Sci Rep 2017;7(1):3252.

107. Brodie JA, Lobel EE. More than just a mirror image: The visual system and other modes of learning and performing dance. J Dance Educ 2008;8(1):23–31.

108. Wittkopf PG, Johnson MI. Mirror therapy: A potential intervention for pain management. Rev Assoc Med Bras 2017;63(11):1000–5.

109. Monroe CM. The effects of therapeutic touch on pain. J Holist Nurs 2009;27(2):85–92.

110. Finlay KA, Peacock S, Elander J. Developing successful social support: An interpretative phenomenological analysis of mechanisms and processes in a chronic pain support group. Psychol Health 2018;33(7):846–71.