

REVIEW PAPER

Non- Pharmacological Intervention in Orthopedic Pain: A Systematic Review

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Abstract

Background: Acute joint or chronic musculoskeletal pain is common among orthopedic patients. After the pain assessment for effective pain management, both the pharmacological and non-pharmacological approaches must be used.

Objectives or Aims: To improve the quality of care in acute or chronic pain, this systematic review was find out what kind of non-pharmacological interventions used for reducing pain in orthopedic patients.

Methodology: The computer-assisted search was performed using the databases of Medline, Pubmed, Cochrane, and Cumulative Index to Nursing and Allied Health Literature (CINAHL). The search was performed using both MeSH terms and keywords by the option 'search all text'. The nursing studies selected were those published from 2002-2012. The Oxford 2011 Levels of Evidence was used to appraise the literature. 17 studies were extracted and further reviewed.

Results: According to reviewed studies, self management programs, relaxation techniques, guided imagery, listening to music, and back massage are defined as helping to ease the intensity of pain in orthopedic patients.

Conclusions: With this study, nurses can gain specific knowledge on the most preferred and used non-pharmacological interventions in orthopedic patients. For effective pain management, nurses can implement these interventions safely.

Key Words: Pain, Pain Management, Orthopedic Patients, Nursing Care, Non-Pharmacological Interventions.

Introduction

Joint or musculoskeletal pain is common among orthopedic patients. Joint pain (acute or chronic) is defined as discomfort or tenderness in one or more joints (Gregory, 2005; Collyott & Vasquez Brooks, 2008). Acute joint pain is any joint pain that is expected to resolve within six to eight weeks and is typically due to infection or trauma. Acute joint pain may lead to orthopedic surgery (Gregory, 2005). Orthopedic surgery is often cited as among the most painful of surgeries (Pasero & McCaffery, 2007). According to the studies, majority of the patients had pain at the surgical site (*e.g.*, hip, knee, and vertebra) and in areas of pressure (*e.g.*, back, breast, buttocks). The words most commonly used to describe their pain were as follows: 'throbbing', 'cramping', 'aching', 'sharping', 'stabbing', 'exhausting',

'awful' and 'nagging'(Bergh, et al., 2005; Dahlen, et al., 2006; Akyol, et al., 2009; Esen Büyükyılmaz & Aştı, 2010). In the assessment done during the postoperative days, pain intensity was determined to be moderate to severe (Sjöling, et al., 2003; Esen Büyükyılmaz & Aştı 2010). Warren Stomberg and Öman (2006) determined that the patient's pain experience was reported to be highest on the first postoperative day and decreased in the following days.

Prolonged acute joint pain frequently becomes chronic joint pain that can last for weeks or more or is associated with a pathological process that is ongoing or degenerative (*e.g.*, osteoarthritis, rheumatoid arthritis, and so on). Patients can experience severe or the worst type of pain, which is a major cause of psychological and physical disability that can lead to several

complications, such as inability to perform simple activities of daily living (ADLs), loss of a job, fatigue, weight loss, hopelessness, and social isolation (Gregory, 2005; Mann & Carr, 2006; Wentz, 2009). McDonald (2009) emphasized that patients experienced scores of moderate pain, especially around the joints (hip, knee, shoulder and so on). Tsai et al. (2008) emphasized that majority of the patients experienced pain on two separate sites (35.1%), particularly on both knees (58.0%). In the assessment, pain intensity was determined to be moderate to severe, especially when walking.

In this context, it is very important to make use of the “pain management” process. Nurses are in a pivotal position with regards to pain management in clinical practice. Mann and Carr (2006) established that pain assessment is the cornerstone to effective pain management (Gregory, 2005; Mann & Carr, 2006; Herr, 2010). After the pain assessment for effective pain management, both the pharmacological and non-pharmacological approaches must be used combine (Vallerand, 2003; Gregory, 2005). In this point, non-pharmacological approach is very important in orthopedic pain as well as pharmacological treatments. Non-pharmacological nursing applications (behaviour therapy, relaxation techniques, back massage, cold/hot application, etc.) help the individual both to attain his expectations and to reduce his pain (Gregory 2005; Mann & Carr 2006). These applications are easy to explain and teach to patients, they can be applied economically with a minimal amount of equipment, and their effects can be observed (Christiaens, 2003). Based on international literature, several researches have been focused on the non-pharmacological interventions in orthopedic patients’ pain. There is little evidence regarding this concept, though, especially in the systematic review of the literature.

Purpose of the Study

To improve the quality of care in acute or chronic pain, this systematic review was find out what kind of non-pharmacological interventions used for reducing pain in orthopedic patients.

Methodology

Information Sources

The computer-assisted search was performed using the databases of Medline, Pubmed, Cochrane, and Cumulative Index to Nursing and

Allied Health Literature (CINAHL). The search was performed using both MeSH terms and keywords by the option ‘search all text’. Search terms used included ‘acute orthopedic pain’, ‘chronic orthopedic pain’, ‘orthopedic pain’, ‘non-pharmacological intervention’ and ‘nursing care’. The screened papers were published in the nursing peer review journals from January 1, 2002 to December 31, 2012. The literature review was limited to articles in English.

Eligibility Criteria

Eligibility criteria for this study included the following:

- (a) the article was published after 2002,
- (b) the design was an experimental (such as a pilot study, and clinical trials, randomized controlled trials), and quasi-experimental study
- (c) the study was researched by nurse author/s,
- (d) a measure of pain was included in the outcomes.

Studies included cancer pain and consciousness impairment on obese, infant or children patients, intra-operative interventions were excluded. Studies of laboratory included pain, case, secondary analyses, and dissertations were also excluded.

Study Selections

Eligibility assessment was conducted independently in an unblinded, standardized manner by the author. The author first eliminated the irrelevant contents based on the literature’s abstracts, then scrutinized the full texts of the included papers (methods, participants, interventions, outcomes, and strengths and weakness of the study). To ascertain the validity of eligible clinical trials, the author assessed the study designs, adequacy of randomization, as well as the concealment of allocation and the blinding of participants across the studies. In addition, the effect of the non-pharmacological intervention on pain was also reviewed.

Data Items

The Oxford 2011 Levels of Evidence was used to appraise the literature (www.cebm.net). The characteristics of the study designs, participants of the experimental and control groups, acupoints, key outcome measurements and statistical significances for treating a variety of pains are summarized in Table.

Results

At the title search 176 hits were given to data base. At title-level reviewed 87 studies were given. After the full-text reviewed 17 studies

were extracted and further reviewed (Figure 1). The study characteristics and results are summarized in the Table 1-2.

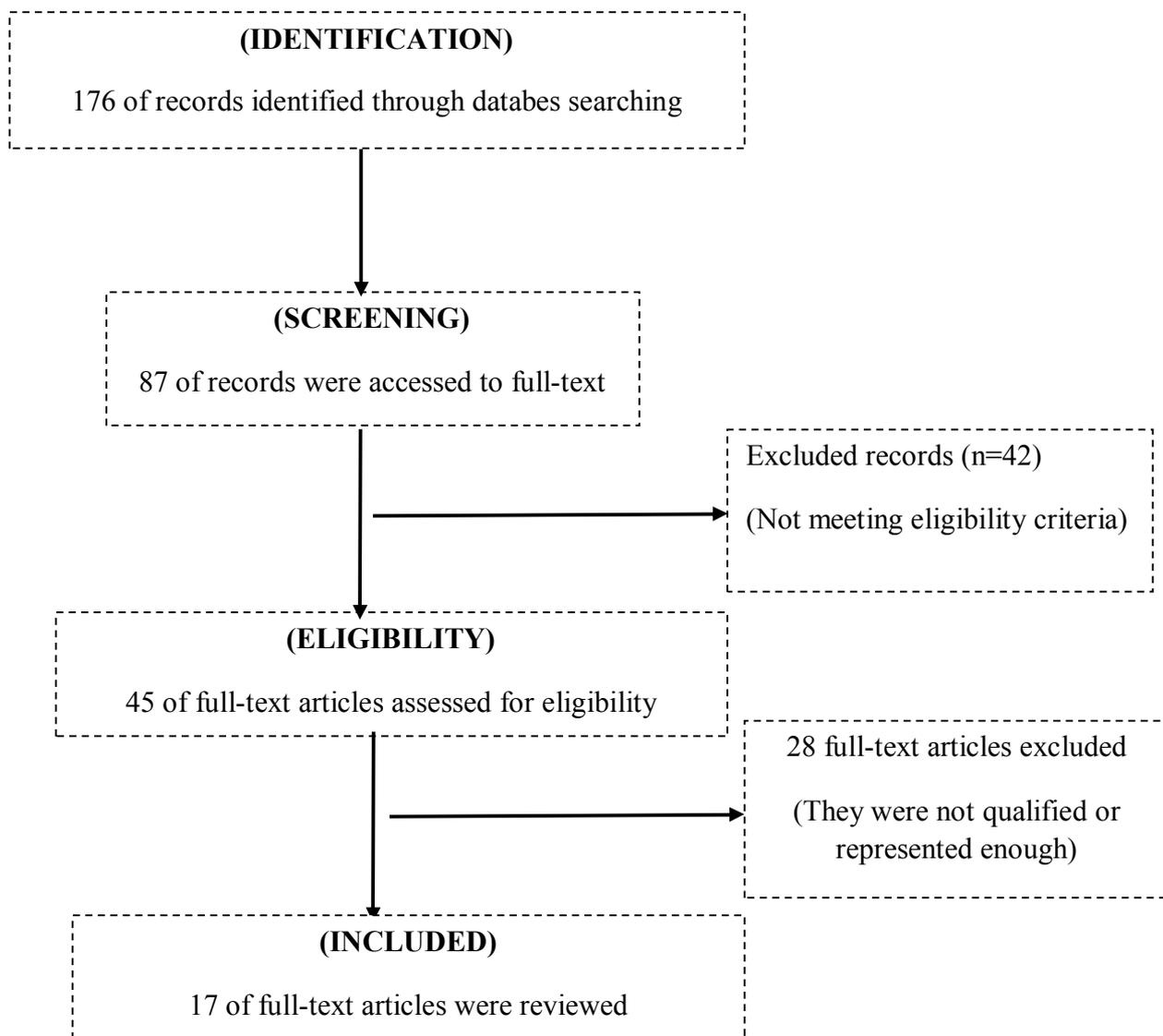


Figure 1. Schema for study selection.

Acute pain: 7 articles were (1 studies were about pain management program, 6 studies were about non-pharmacological intervention) reviewed about acute pain. According to articles about 30 minutes postoperative educational intervention program (pain, coping strategies and breathing, relaxation exercises etc.) decreased the levels of pain, analgesic equivalent, anxiety, and increased self-efficacy scores of orthopedic patients. In addition, according to articles about the use of

non-pharmacological interventions, music (n=2 studies), relaxation techniques (n=2 studies), back massage (n=1 study), and guided imagery (n=2 studies) applied twice daily, were used for postoperative orthopedic pain. These studies showed that 16-20 minutes listening to music, relaxation techniques, guided imagery or 10 minutes back massage and their combination and/or a quiet rest period decreased the intensity of pain and anxiety level and improved vital

signs when measured over time after replacement surgery (before surgery to third postoperative day) (Table 1).

Chronic pain: 10 articles were (4 studies were about pain management program, 6 studies were about non-pharmacological intervention) reviewed about chronic pain. According to articles about 30 minutes coach management, self-management, and pain management programs including hot/cold application, exercise, and relaxation technique, reduced chronic pain intensity and improved self-efficacy and quality of life during 1-4 months. In addition, according to study about physical exercise programs (stretching, strengthening, balancing, towel dancing and massage) led to a decrease in pain intensity and to an increased mobility among older adults with chronic pain. 10-15 minutes guided imagery with relaxation (n=3 studies) was useful for pain management of osteoarthritis symptoms, decreasing pain intensity and boosting the quality of health during 2 weeks or 2 months. Listening to music (n=2 studies) was especially effective in decreasing chronic osteoarthritis pain (Table 2).

Discussion

This study showed the literature review on the effective non-pharmacological intervention that can be implemented safely in acute and chronic orthopedic pain. In the literature, it has been determined that pain (acute or chronic) management is essential for orthopedic patients. Postoperative pain begins as a result of the surgical incision and gradually decreases with wound healing (Gregory, 2005). Deformation under mechanical load and friction joint movement brings about chronic pain (Vallerand, 2003). Acute or chronic pain, such as those felt due to arthritis or other diseases, is localized to an extremity and may suddenly be felt when lifting, twisting, or bending (Harvey, 2005). Pain can negatively affect patients with ADLs (activity, sleep and so forth). For effective pain management, non-pharmacological intervention is essential as well as pharmacological approach (Gregory, 2005). In this systematic review non-pharmacological interventions, such as self management programs (30 minutes), relaxation techniques/guided imagery/listening to music (16-20 minutes), and 10 minutes back massage are defined as helping to ease the intensity of pain in orthopedic patients (Table 1-2). Relaxation techniques, guided imagery

(combined with background music) and listening to music reduced muscle tension and pain by distracting patients and decreasing vital signs. Similarly, they were the most effective non-pharmacological interventions in the literature for patients (Christiaens, 2003; Gregory, 2005; Hart, 2008). Kwekkeboom and Gretarsdottir (2006) reviewed that the most frequently supported technique was progressive muscle relaxation, particularly for chronic pain. These authors also identified jaw relaxation as a systematic relaxation intervention for relieving acute pain. The pain reducing mechanism of massages was explained by the 'Gate Control Theory' of Melzack (Delany, 2002; Wentz, 2009).

Holland and Pokorny (2001) suggested slow stroke back massage in rehabilitation settings. Back massage consisted of a 10-minute back massage with the patients lying on a sound joint. Patients were positioned comfortably by the researcher with pillows to support their bodies. Vicker and Zollman (1999) described the back massage technique (effleurage, petrissage, friction, kneading and hacking) as using massage oil to prevent friction and using relaxation effects.

Limitations

The most important limitation of this paper is that this only reflects the results of the article that have been reviewed to determine data base and time period. The limit of 10 years was chosen because acute or chronic nursing care process about pain management change relatively quickly. Another limitation is that the author reviewed only nursing articles about acute or chronic pain in orthopedic patients.

Conclusions

This study showed a systematic review of the literature about the effective non-pharmacological approach in orthopedic patients' pain. The author feels that this is a key study that shows the safe non-pharmacological interventions in acute and chronic orthopedic pain. With this study, nurses can gain specific knowledge on the most preferred and used non-pharmacological interventions in orthopedic patients. For effective pain management, nurses can implement these interventions safely. Further studies regarding this matter are needed to better explore the useful interventions that can be utilized in the nursing practice.

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Table 1. Non-pharmacologic intervention results in acute orthopedic pain

Author/s	Year	Study design	Instruments	Sample	Interventions
<i>Acute Pain</i>					
Wong, Chan, & Chair	2010	Quasi-experimental	Visual Analog Scale (VAS)	125 patients with musculoskeletal trauma	Effects of an educational intervention (pain, coping strategies and breathing, relaxation exercises) (30 minutes educational intervention before surgery)
Allred, Byers, & Sole	2010	Experimental (randomized controlled)	Visual Analog Scale (VAS)	56 total knee replacement (TKR) patients	Effects of music (20 minutes before the first ambulation and for a 20 minutes on rest period after the ambulation)
Lukas	2004	Quasi-experimental	Numeric Rating Scale (NRS)	97 postoperative orthopedic patients	Effects of music (20 minutes before surgery)
Lin	2011	Quasi-experimental	Visual Analog Scale (VAS)	93 joint replacement surgery	Effects of relaxation therapy (20 minutes before surgery to the third postoperative day)
Buyukyilmaz & Asti	2013	Experimental (randomized controlled)	Short-Form McGill Melzack Pain Questionnaire (SF-MPQ) Visual Analog Scale (VAS)	60 total hip and knee replacement (THR-TKR) patients	Effect of relaxation techniques (30 minutes on 1-3 postoperative day) and back massage (10 minutes on 1-3 postoperative day)
Thomas & Sethares	2010	Quasi-experimental	Numeric Rating Scale (NRS)	121 total joint replacement patients	Effects of guided imagery (16 minutes 5 days before surgery and after surgery)
Antall & Kresevic	2004	Pilot	Visual Analog Scale (VAS)	13 total joint replacement older patients	Effects of guided imagery (20 minutes after surgery to discharge)

Table 2. Non-pharmacologic intervention results in chronic orthopedic pain

Author/s	Year	Study design	Instruments	Sample	Interventions
Chronic Pain					
Fouladbakhsh, Szczesny, Jenuwine, & Vallerand	2011	Quasi-experimental	Brief Pain Inventory (BPI)	53 chronic pain patients	Nondrug therapies (heath, cold, relaxation breathing) for pain management (30 minute educational session over the 2 week)
Davis & White	2008	Pilot	Pain Management Inventory (PMI) Chronic Pain Experience Instrument (CPEI) Pain Management Outcome Expectations Instrument Barriers to Arthritis Pain Management Instrument (BAPMI)	17 arthritis of older patients	Effects of pain management program (exercise and using a heated pool, tub, or shower) (group and individual meeting during 3 months)
Yip et al.	2007	Experimental (randomized controlled)	Visual Analog Scale (VAS)	120 osteoarthritis of knee (OA) patients	Effects of self-management program (exercise practice during 16 weeks)
Oh & Seo	2003	Quasi-experimental	A Face Scale	36 rheumatoid arthritis patients	Effects of health promotion program (pain, stress management, problem solving, exercise etc. during 1 month)
Tse, Wan, & Ho	2011	Quasi-experimental	0-10 scale	75 chronic pain patients	Effects of physical exercise during 8 weeks
Baird, Murawski, & Wu	2010	Longitudinal randomized experimental	Numeric Rating Scale (NRS) (0-20 scale)	30 osteoarthritis of knee (OA) older patients	Effects of guided imagery with relaxation during 4 months
Baird & Sands	2006	Longitudinal	Health-related quality	28 osteoarthritis of	Effects of guided imagery with

		randomized	of life (HRQL)	joint (OA) women patients	relaxation (10-15 minutes during 12 weeks)
Baird & Sands	2004	Longitudinal randomized	Numeric Rating Scale (NRS) (0-20 scale) and Short-Form McGill Melzack Pain Questionnaire (SF-MPQ)	28 osteoarthritis of knee (OA) older women patients	Effects of guided imagery with relaxation (10-15 minutes during 12 weeks)
Siedliecki & Good	2006	Experimental (randomized controlled)	Short-Form McGill Melzack Pain Questionnaire (SF-MPQ)	60 chronic pain patients	Effect of music (60 minutes during 7 days)
McCaffery & Freeman	2003	Experimental (randomized controlled)	Visual Analog Scale (VAS) Short-Form McGill Melzack Pain Questionnaire (SF-MPQ)	66 osteoarthritis (OA) older patients	Effect of music (20 minutes during 14 days)