



Systematic Review

A Systematic Review of Complementary Therapy for Treating Osteoarthritis

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ABSTRACT

Introduction: Osteoarthritis (OA) is a chronic progressive disease that is often experienced by the elderly resulting in pain and joint stiffness which then causes movement or mobility disorders. Complementary therapy eases osteoarthritis with a traditional technique known as non-pharmacological treatment. The aim of this systematic review is to identify the effectiveness of several complementary therapies as osteoarthritis management.

Methods: The review was performed according to PRISMA guidelines. We searched from PubMed, Scopus, ProQuest, and ScienceDirect databases. The search identified 14 relevant journals from the 19,123 articles published between 2016 and 2020, and all studies used the Randomized Control Trial (RCT).

Results: Complementary therapies consisted of flaxseed poultice compress, acupressure, acupuncture therapy, cumin black oil compress, aromatherapy massage, ginger oil massage, lavender oil massage, sensorimotor exercise, application of heat, exercises with elastic bands, ultrasound therapy, geotherapy combination kinesiotherapy, phonophoresis therapy, and stimulation of compression.

Conclusion: The effectiveness of these therapies can be seen from the different results of osteoarthritis patients who received the intervention and the control group. The decrease in the total index WOMAC and Lequesne, VAS and increase in the physical function of patients with osteoarthritis who received the complementary therapy are significantly higher than the control group. It proved that the complementary therapy has positive impact as management of osteoarthritis pain. The effects of complementary therapy have an influence on pain, joint stiffness, and physical function limitations in osteoarthritis patients.

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INTRODUCTION

Osteoarthritis (OA) is one of the commonly seen pathologies in elderly. The result of this disease in the elderly is chronic pain in foot and leg joints. OA is the most commonly seen form of arthritis and is a degenerative joint disease characterized by joint pain and dysfunction due to the pathologic changes in all joint structures. The most frequent involvements of joint are knee, hip, fingers, lumbar and cervical spine (Tuna, Babadag, Ozkaraman, & Balci Alparslan, 2018).

Osteoarthritis (OA), also known as degenerative arthritis or osteoarthrosis, is the most common

musculoskeletal disorder that leads to disability in activities of daily living (ADL), particularly in the elderly [3]. It is already one of the ten most disabling diseases in developed countries as reported by the WHO. OA can affect any joint, but the knees are among the most vulnerable. Common risk factors for developing OA include obesity, age increase, race, previous joint injury, hormonal problems, overuse of the joint, and job. A major risk factor reported is age, such that the prevalence of OA rises remarkably from 4% in the 18-24 years age group to 85% in the 75-79 years age group. Approximately 27 million Americans

have OA and its prevalence will increase to 70 million in the coming decades (Nasiri & Mahmodi, 2018).

Previous studies have generally found clients with osteoarthritis. This study also discusses weaknesses that may occur due to muscular atrophy. The study also illustrates that elderly with knee osteoarthritis have decreased muscular strength and standing balance resulting in an increased incidence of falls. Quadriceps femoris muscle weakness often causes the knee joint to not be able to contract entirely, which causes a buildup of load on the joint that causes damage to the articular cartilage of the knee joint (Alnahdi, Zeni, & Snyder-Mackler, 2012).

Anti-inflammatory and analgesic drugs are commonly used in the current treatment of OA as a standard method for pain management of patients with knee OA. In elderly patients, standard pharmacological treatment may not be sufficient to alleviate pain because of concomitant diseases and interactions among the multiple simultaneously taken drugs. The high costs and adverse effects of using multiple analgesics may be another important concern. There is a need for an inexpensive, self-implemented, nontoxic, natural method that alleviates the symptoms of OA, requires minimum material and is free of the adverse effects of traditional medical or surgical procedures (Tosun et al., 2017).

One of the main goals of the management of patients with OA is to minimize disability in ADL. Treatment strategies for OA include pharmacological and non-pharmacological treatments as well as surgical interventions as the last expedient. Pharmacological treatments have side-effects and surgical interventions are of high economic costs. In this line, complementary therapies have taken a step forward toward self-sufficiency and have attracted the attention of researchers as they both promote health and reduce complications and costs. The aim of this systematic review is to identify the effectiveness of several complementary therapies as osteoarthritis management (Nasiri & Mahmodi, 2018).

MATERIALS AND METHODS

Searching strategy for studies

This systematic review contains an original journal that discusses the complementary effect on pain, joint stiffness, and physical limitations of osteoarthritis patients. Reviews are carried out in accordance with PRISMA guidelines. A systematic literature search was carried out in key databases such as PubMed, Scopus, ProQuest, and ScienceDirect by including keywords complementary therapy, healing, joint stiffness, physical surgery, and osteoarthritis patients. There were no other restrictions used to maximize the literature search. List of literature references was done manually. Search results of full-text articles databases assessed for eligibility are PubMed eight journals, Scopus 24 journals, ScienceDirect 18 journals, and ProQuest as many as 14 journals. A search was conducted to answer

research questions about which complementary therapies affect osteoarthritis patients compared to standard care.

Inclusion and exclusion criteria

Studies were included in the study if they met the following criteria: (1) adult patients are osteoarthritis patients in all types of osteoarthritis with standard care; (2) a specific protocol for complementary therapy in-hospital was used as an intervention; (3) a control group receiving structured protocol given standard care already in place at the hospital that was used as a comparator; (4) complementary therapy in osteoarthritis patients; (5) were published in English; (6) the studies used the Randomized Controlled Trial (RCT) method on the effect of complementary therapy on pain, joint stiffness, and physical limitations of osteoarthritis patients with the years used for the last five years (2016-2020); (7) RCT design studies must meet PICO criteria among populations used, which are patients with all types of osteoarthritis who are undergoing pharmacological therapy.

The study was excluded if (1) they involved patients with osteoarthritis but didn't review complementary therapy; (2) complementary therapy was not described by the author; (3) the study did not involve a control group, because we felt that we would not be able to separate the effects of complementary therapy versus standard care in hospital; (4) did not involve adult patients; (5) intervention did not explain the specific protocol of complementary therapy.

Outcome measures

Interventions in the use of complementary therapies include flaxseed poultice compress, acupressure, acupuncture therapy, cumin black oil compress, aromatherapy massage, ginger oil massage, lavender oil massage, sensorimotor exercise, application of heat, exercises with elastic bands, ultrasound therapy, geotherapy combination kinesiotherapy, phonophoresis therapy, and stimulation of compression. Comparisons or comparisons in the study consisted of at least two groups, namely the intervention group and the control group. The results produced were measured with the WOMAC scale, AUSCAN OA Hand Index, and the VAS pain scale.

Study selection

The research screened through the titles and abstracts of the articles yielded by the search strategy. Irrelevant articles were excluded while remaining full-text articles were then screened independently against the selection criteria for inclusion and exclusion. Discrepancies were resolved within the research group. Data were then extracted independently from the articles chosen by researchers into a standardized data collection form. In addition to the outcome measures of interest, the researcher made a summary of the characteristics of included studies information about the type of osteoarthritis,

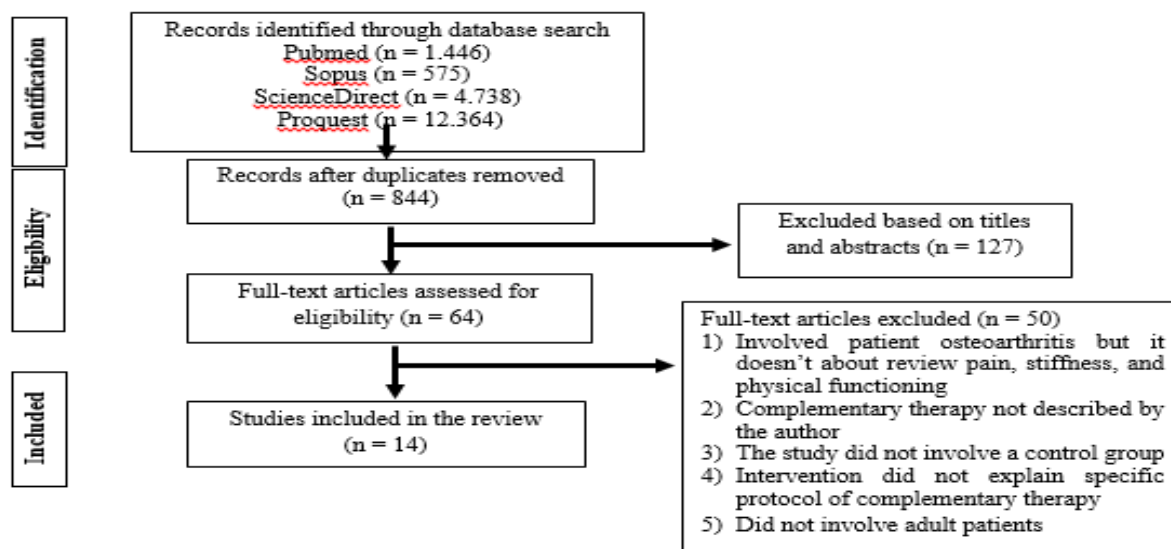


Figure. 1: PRISMA flowchart showing included and excluded articles.

measuring instrument, total of patient, study design, and follow-up.

RESULTS

Literature search

The review was performed according to PRISMA guidelines. We searched from PubMed, Scopus, ProQuest, and ScienceDirect databases. The search found 19,123 articles published between 2016 and 2020. The literature search yielded a total of 844 citations after the removal of duplicates. Of these citations, 64 full-text articles were screened and 50 were excluded (Fig). The main reasons for exclusion were intervention is the article was an editorial or review, the study did not involve a control group, complementary therapy was not described by the author, the study did not involve a control group, and intervention did not explain specific protocol of complementary therapy to osteoarthritis. Fourteen full-text articles met our selection criteria and were included in the review.

Characteristics of the included studies

From 14 journals, data collection was carried out in Turkey for five journals, Iran for two journals, Egypt for one journal, Korea for one journal, China for one journal, Brazil for two journals, Thailand for one journal, and Japan for one journal. The total number of participants in the literature was 851 participants. All journals involved patients with various types of osteoarthritis patients, namely knee, hand, and hip osteoarthritis. All research journals were designed with randomized controlled trials with measurement results in the form of pain, joint stiffness, and physical limitations based on the effectiveness of complementary therapy.

Complementary therapy interventions

Of the 14 journals discussing complementary therapies, these consisted of flaxseed poultice compress, acupressure, acupuncture therapy, cumin black oil compress, aromatherapy massage, ginger oil massage, lavender oil massage, sensorimotor exercise, application of heat, exercises with elastic bands, ultrasound therapy, geotherapy combination kinesiotherapy, phonophoresis therapy, and stimulation of compression.

In addition, the effects of pharmacological therapy are also one of the factors that influence the condition of osteoarthritis patients. Consumption of NSAID drugs in the long term will have side effects on the liver and kidneys. The mildest side effects that may occur are nausea, stomach pain and dyspepsia while the most serious are lesions, bleeding and even perforation in the digestive tract (Tosun et al., 2017).

A decrease in the Lequesne index score, WOMAC scale, pain scale, and increased joint function explain that complementary therapy has an influence on osteoarthritis patients. Complementary therapy is expected to benefit all patients with osteoarthritis to better understand the strength and effects of therapy that must be undertaken.

Osteoarthritis measurement tools

Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) is a tool that assesses the functional disability related to OA. It consists of three parts and 24 items. Pain is assessed in the first part, stiffness in the second and physical functioning in the third. Five-point Likert scales (0 none, 1 light, 2 mild, 3 severe, 4 and 5 very severe) are used in item scoring. The total possible scores in each part are, 20, 8, and 68, respectively. The total scores of each part are calculated separately; total score of the first part (Pain 5 0–20) is multiplied by 0.5, total score in the second part (Stiffness 5 0–8) is multiplied by 1.25,

and total score of the third part (Functioning 5 0–68) is multiplied by 0.147. In the end, the adjusted scores of each part are calculated to range between 0 and 10. The total WOMAC score is calculated by summing the adjusted scores of each part. A higher score means that higher pain, more stiffness, and more functional loss in activities of daily living were experienced by the participants (Nasiri & Mahmodi, 2018).

Visual Analogue Scale (VAS) is a commonly used assessment instrument to measure variables ranging across a continuum of values, such as pain severity. Two extreme descriptions of the parameter are written on the two ends of a 10cm line, and the patient is asked to mark where his or her state is on the line. For instance, “no pain” and “severe pain” can be written on the two ends of a line as extreme descriptions of the amount of pain felt by the patient, and the patient is then asked to indicate his or her pain experience. The VAS score is determined by measuring the distance from no pain to the point that the patient has marked (Nasiri & Mahmodi, 2018).

DISCUSSION

Changes in scores in the experimental and control groups occurred significantly. This means that the experimental group was given complementary therapy to reduce the severity of osteoarthritis, whereas in the control group that was not given complementary therapy there was no decrease in the severity of osteoarthritis.

There are two mechanisms of osteoarthritis pain involved, namely the mechanism of peripheral osteoarthritis pain and the mechanism of central OA pain that involves changes in the brain and spinal cord. As with other pain conditions, there is an increasing amount of evidence that the central mechanism of pain and sensitization plays an important role. In fact, in chronic conditions and advanced disease, there are interactions between the central and peripheral systems of the nociceptive system in OA pain. Clinically, central mechanism sensitization is associated with joint pain that induces pain in response to stimuli that normally do not induce pain (allodynia), with activation of a wider area of pain and longer duration of pain. Sensitization of this central mechanism has been confirmed by quantitative sensory testing (QST) and MRI analysis. Several studies have analyzed pain thresholds and pain sensitivity to different stimuli, which produce positive results for central sensitization. Conversely, the stimulus that causes pain is more related to the part of the brain that processes somatosensory nociception. Other findings show that different types of osteoarthritis pain can be related to activation of different brain regions. Spontaneous and spontaneous pain can be related to the medial-prefrontal limbic cortex area, the area of the brain involved with emotional conditions (Alfredo, Junior, & Casarotto, 2020).

Effect of flaxseed poultice compress application on pain and hand functions of patients with hand

osteoarthritis: The flaxseed plant contains a significant amount of alpha-linolenic acid and omega-3 fatty acids. These fatty acids inhibit arachidonic acid and prevent the inflammatory response of neutrophils. Thus, flaxseed causes a reduction in the synthesis of prostaglandin and leukotriene. The use of flaxseed plants for patients with arthritis is thought to be important in reducing OA symptoms because of these effects of flaxseed (Savaş, Alparslan, & Korkmaz, 2019).

The effect of acupressure and acupuncture therapy on pain, stiffness and physical functioning of knee osteoarthritis: Acupuncture and acupressure are different types of complementary and alternative medicine and are used for management of OA of the knee [16]. Regarding the pathobiology of the acupuncture, it is stated that acupressure stimulates the triggers in immune system and results in the secretion of β endorphin, which, in turn, induces vasodilation and decreases the pain. Acupressure follows the same mechanism that acupuncture does, since the pressure is applied to the same body points used in acupuncture. By applying pressure to specific points on the body, improvement in the body systems functioning is stimulated [15].

The effect of black cumin oil on pain in osteoarthritis: Studies on the analgesic effect of nigella sativa (black cumin) oil have shown that the use of the oil may have an effect on the pain. In a randomized controlled trial, named the effectiveness of topical black cumin oil in the treatment of cyclic mastalgia, it has been found that black cumin oil is significantly effective in reducing the pain compared to placebo. In this trial, 2g of black cumin oil have been topically applied to mastalgia area. It has been observed that the oil has no side effect on patients (Tuna et al., 2018).

Effect of sensorimotor training on balance in knee osteoarthritis: Sensorimotor training is a special form of proprioceptive and balance exercise that was designed for management of patients with chronic musculoskeletal pain syndromes. It is based on the concept that, instead of emphasizing the isolated strength of a group of muscles around a joint, we should realize the importance of the central nervous system in regulating movement in order to reach proper firing patterns for maintaining joint stability (Ahmed, 2011).

Effect of heat and a home exercise program for pain and function level in knee osteoarthritis: Heat application has been found to have positive effects on pain, function level, and life quality in studies conducted with knee OA patients. Applying heat to the knee joint reduces stiffness and pain by increasing blood flow and creates a relaxing effect. Heat application is recommended to be conducted for 20 to 30 minutes every day of the week. When the application therapeutic effect time is exceeded, obstruction in tissues and vasoconstriction in veins develop, which leads to an adverse rather than the desired effect. Additionally, when heat application is

carried out for a long time, the risk of burns may arise (Karadağ, Taşci, Doğan, Demir, & Kiliç, 2019).

Effect of resistance exercise using elastic band: Among the treatments focused on relieving pain and improving movement function, exercise therapies are known to be effective. Among these therapies, resistance band exercises that can increase muscular strength against the retraction force of the band have been found to be effective. Resistance band exercises stimulate the proprioception and deliver information about the position and movement of joints to the cerebrum to help maintain more accurate positions. They are also good for the elderly because they are low-impact exercises (Sim, 2016).

Effect of continuous and pulsed therapeutic ultrasound: Ultrasound, with its analgesic and antispasmodic effects on muscles, is a widely used non-pharmacological treatment method for osteoarthritis. Ultrasound can be applied in two different modes: continuous and pulsed. Thermal effects are predominant with the continuous application mode, which is advised for the treatment of chronic cases. The thermal effects include increases in the blood flow, capillary permeability, tissue metabolism, fibrous tissue extensibility, muscle relaxation and the pain threshold. In the pulsed application mode, the heat that occurs within the tissue with the first stimuli by ultrasound waves disappears until the second stimuli occurs; the mechanical effect and deep penetration in the tissue provide a micromassage effect, and the degree of heat in the tissue does not change. Pulsed ultrasound is preferred for the treatment of acute and subacute cases. The non-thermal effects include increases in chemical activity and fluid flow and a change in the permeability of cell membranes, which all provide analgesic effects (Alfredo et al., 2020).

Effect geotherapy combined with kinesiotherapy: Exercise therapy has been shown to improve muscle strength, flexibility and proprioception, thus relieving the symptoms of OA. Kinesiotherapy is a therapeutic exercise including stretching, isotonic, isometric, and isokinetic strengthening. Natural products are used in herbal medicine and geotherapy and have been tested in some rheumatic diseases. Geotherapy is defined as the therapeutic use of clays and natural earth materials composed by different minerals, such as lamellar silicates of magnesium and aluminum, quartz, feldspar, carbonates, metallic oxides and calcium (Marcon et al., 2019).

Effect of phonophoresis of Phyllanthus amarus nanoparticle gel: Phonophoresis is the use of ultrasound to deliver drug therapeutics by absorption and permeation through the skin. Several studies showed that phonophoresis of NSAIDs relieved inflammation and symptoms of pain in many pathological conditions, including shoulder pain, myofascial pain, and knee OA. Many Thai herbs, including Phyllanthus amarus, have anti-inflammatory and antioxidant properties, which have been shown to reduce pain (Pinkaw, Kiattisin, Wonglangka, & Awoot, 2020).

Effect of continuous compression stimulation. Lower pressure-pain thresholds have also been correlated with higher pain intensity, higher disability scores, and poorer quality of life. These data suggest that an improvement in the pressure-pain threshold may partially relieve the pain in knee osteoarthritis. Other evidence indicates that massage therapy can improve the pressure-pain threshold and muscle spasm (Tanaka, Umehara, Kawabata, & Sakuda, 2018).

Based on a systematic review of several journals that address the effects of complementary therapy on pain, joint stiffness, and physical limitations of osteoarthritis patients, according to the authors a more effective therapy is massage therapy because complementary therapies such as massage can reduce the pain threshold (Pehlivan & Karadakovan, 2019). Components of massage that are useful for reducing pain consist of three movement techniques, namely efflorage, tapotement and friction, which have the potential to stimulate, soften, and lengthen muscle fibers. Movement stimulation in the massage technique decreases the production of inflammatory cytokines TNF- α and interleukin-6 (IL-6) and decreases heat shock protein 27 (HSP 27) phosphorylation, thereby, reducing cell stress from myofiber injury resulting from excessive use of muscle in activity (Efe Arslan, Kutlutürkan, & Korkmaz, 2019).

Massage is proven to increase pain threshold in clients who experience diototic pain. This is explained through the gate control theory of Melzack and Wall (cited in Perrot, 2015) which explains how harmless stimuli such as stroking movements or rubbing on the skin can provide pain relief (Tosun et al., 2017). Signals in thick nerve fibers are produced by stiffening which can inhibit signal delivery by nociceptive neurons (hypoalgesia). It also explains how the brain uses control of the delivery of nociceptive signals to the spinal cord through the path from the brain stem to the spinal cord (Nasiri & Mahmodi, 2018).

Massage therapy using ginger oil is considered more efficient because the costs incurred are relatively cheaper compared to essential oils or other aromatherapy oils such as lavender oil and black cumin oil, which are more expensive. The process of making raw materials is cheap and easy to obtain and the process of distillation or extraction of oil is easier.

CONCLUSION

The effect of complementary therapy has an influence on pain, joint stiffness, and physical function limitations in osteoarthritis patients. Complementary therapy is management of osteoarthritis without causing adverse effects that can harm the patient. Based on a systematic review of several journals that address the effects of complementary therapy on pain, joint stiffness, and physical limitations of osteoarthritis patients, according to the authors a more effective therapy is massage therapy because

complementary therapies such as massage can reduce the pain threshold.

CONFLICT OF INTEREST

No Conflicts of interest have been declared.

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