Original Article

To compare the effect of acupuncture and acupuncture with moxibustion on pain in patients with chronic osteoarthritis of knees: A randomized control study

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ABSTRACT

Background: Osteoarthritis is a chronic progressive musculoskeletal disorder characterized by stiffness, pain and impaired movement. Acupuncture and moxibustion has an influence on the pain management and range of motion in knee osteoarthritis patients. However, there is no study to find effectiveness between the acupuncture and moxibustion with that of acupuncture alone, this study was evaluated to find the comparison between the two interventions. Thus, the aim of the study is to compare the effect of Acupuncture with Moxibustion and only Acupuncture on pain management in chronic osteoarthritis of knees. **Materials and Methods:** 80 subjects with chronic knee osteoarthritis were randomly assigned into study and control group based on the inclusion and exclusion criteria. All the study group received treatment of acupuncture with moxibustion on acupuncture points GB-34, UB-40, K-10, St-36 and Liv-7. Control group received treatment of acupuncture points same points without moxibustion for 20 minutes 6 days in a week for 2 weeks. Baseline and post-test assessments of WOMAC (Western Ontario and Mc Master Universities index) and Range of Motion (ROM) were measured just before and immediately after 2 weeks of intervention. Statistical analysis was done using Statistical Package for Social Sciences (SPSS) software Version 21.0 (Armonk, NY: IBM Corp) value α=0.05 level was considered as significant. **Results:** Results of this study showed a significant reduction of WOMAC score and increased ROM in both study and control group. Between groups analysis showed a significant reduction in study group than control group. **Conclusion:** The present study demonstrated that acupuncture with moxibustion is effective in pain management and improving ROM than acupuncture only group KOA (knee osteoarthritis) patients.

Keywords: Acupuncture, Moxibustion, Osteoarthritis, KOA, Complementary, Alternative Medicine

Knee osteoarthritis (KOA) is a chronic degenerative joint disease commonly affects elder people as a result of wear and tear and gradual loss of articular cartilage characterized by articular cartilage degeneration, changes in subchondral bone reactivity, osteophyte formation at joint edges and joint capsular contracture [1]. The cause of knee osteoarthritis is multifactorial and complex with genetic, biological, and biomechanical factors [2]. The estimated worldwide prevalence of KOA is 22.9% in people aged 40 years and up and it is the 11th leading cause of disability [3,4]. The most common symptoms of KOA include knee tenderness and pain which are noticeable when walking down stairs or engaging in hard exercises and in later stages joint movement limitation, muscle atrophy, and knee joint inversion curvature may develop [5]. There is no cure for osteoarthritis and the management of KOA is broadly divided into two measures 1. Conservative and 2. Surgical. Conservative measures include both pharmacological and non-pharmacological treatment methods that help to relieve symptoms, delay the progression of the disease, and avoid or delay surgical management (i.e. total knee replacement) [6].

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Traditional Chinese medicine is one of the conservative methods in the management of KOA, its treatment modalities include Chinese herbal medicine and dietetics, acupuncture, and moxibustion, along with additional therapies such as "Tuina", and traditional biofeedback exercises such as "Qigong" and "Taijiquan" [7]. Acupuncture and moxibustion are the most common practice of TCM. Acupuncture involves the insertion of fine needles are applying pressure over the specific locations of the body surface called acupoints or over tender points called "Ashi" points to produce desirable therapeutic effects [8].

Moxibustion is also one of the methods of stimulation of acu-points to aid the healing process through the ignition of artemisia vulgaris leaves on (direct) or near the skin (indirect) surface [9]. There are many studies that showed that acupuncture and moxibustion at some specific and local points showed to be effective in KOA management [10-12]. This study aims to compare the effect of acupuncture alone and acupuncture along with moxibustion on KOA management.

MATERIALS & METHODS

1. Study design: A single-blinded randomized controlled trial (RCT) study design was adopted for this study where the participants were blinded to the type of intervention. The study group participants received treatment of acupuncture with moxibustion and the control group received acupuncture without moxibustion at acu-points GB-34, BL-40, KID-10, ST-36, and LR-7for 20 minutes 6 days/week for 2 weeks (12 days).

2. Study participants: The participants of this study were recruited from the outpatient department of Government Yoga and Naturopathy Medical College and Hospital, Chennai. Ethical clearance was approved by the Institutional Ethics Committee of Government Yoga and Naturopathy Medical College and Hospital. Participants included in this study were: Patients who were aged above 45 years, and diagnosed with KOA by radiographic examination; patients who fulfilled the criteria of OA according to the American College of Rheumatology; patients who have more than 3 symptoms of KOA more than 6 months and which excludes other locomotor diseases. Participants who were excluded from this study were those who were underwent knee replacement surgery; not willing to participate in the study; or participated in any other studies; psychologically ill patients; who have an allergy to acupuncture needles; patients with diabetic neuropathy; women during mensuration; patients diagnosed with any type of cancer.

Totally 90 participants with KOA were selected and screened for the study. Six participants were excluded because of not fulfilling inclusion criteria, two participants were not willing to participate in the study and two participants were discontinued during the intervention period. Thus, eighty participants were randomly assigned into either the study or control group (n=40 in each group). All the participants were informed about the procedure and duration of the intervention and written informed consent was obtained before the intervention.

3. Intervention: The intervention was performed by the corresponding author for all the study participants. The study group participants received acupuncture with moxibustion and the control group participants received acupuncture without moxibustion at GB-34, BL-40, KID-10, ST-36, and LR-7 bilaterally for 20 minutes, 6 days in week for 2 weeks (12 days). 0.25×13 mm size stainless sterile single-use needles were used for intervention. The study group participants received indirect moxibustion by moxa stick at all the punctured points for 20 mins. Participants were in a sitting position with the ankle joint supported by the pillow for the posterior aspect of the knee joint should be 5cm up from the floor during the intervention.

4. Assessment

i. **Primary outcome**

ii. **WOMAC scale:** The WOMAC osteoarthritis index is a three-dimensional, disease-specific, self-administered health status measure. It evaluates clinically important, patient-relevant symptoms in the areas of pain, stiffness, and physical function in patients with osteoarthritis of the hip and/or knee. The index consists of 24 questions in three subscales (5- pain, 2- stiffness, 17- physical function) [13]. The Likert method was used for the assessment of the WOMAC scale. Pre and post-assessments were taken before and after the last day of intervention.

Secondary outcome

Goniometry: A goniometer is an instrument used to measure angles that qualify the amount of available motion at a specific joint. A universal long-arm goniometer was used to measure both the active and passive range of motions of the knee joint. The participant was positioned in a supine position with the hip in zero degrees of extension, adduction, and abduction for knee flexion assessment, and the participant was positioned prone for knee extension assessment. The goniometer location was 1. Axis location-

lateral epicondyle of femur, 2. Stationary arm along the femur to the greater trochanter and 3. Movement arm- along the fibula to the lateral malleolus [14]. Pre and post-assessments were taken before and after the last day of intervention.

Data analysis: Data were analyzed using Statistical Package for Social Sciences (SPSS) software Version 21.0 (Armonk, NY: IBM Corp). The Shapiro–Wilk tests were used to test the hypothesis of normal distribution. Parametric Variables were analyzed through the Independent Samples test. The paired t-test was used to assess the pre and post-measurements. Bar charts and confidence interval plots were prepared to present the data graphically. For all the analyses, we present 95% confidence intervals and considered $p < 0.05$ as significant.

RESULTS

Results of this study showed study group showed a significant reduction in WOMAC score and increased ROM in knee flexion when compared with CG. In comparison with pre and post-assessment, both SG and CG showed a reduction of WOMAC and an improvement of ROM after intervention. Moreover, none of the subjects reported any adverse events during or after the intervention. The pre-test and post-test assessment between the study and control group is mentioned **(Table 1)**.

Table 1: Pre and post-test assessments

Variable		Study Group(n=40)	Control Group(n=40)	P VALUE
		Mean (SD)	Mean (SD)	
WOMAC	Pre test	63.25(12.362)	63.85(13.134)	0.834
	Post test	56.32(13.277)	37.90(12.459)	0.000
Rt. Knee Flexion (Degree)	Pre test	124.98(7.105)	119.15(10.270)	0.004
	Post test	127.85(6.518)	126.92(8.592)	0.589
Rt. Knee Extension (Degree)	Pre test	13.55(13.479)	19.10(16.843)	0.108
	Post test	10.23(11.838)	9.18(10.325)	0.674
Lt. Knee Flexion (Degree)	Pre test	126.30(7.394)	119.65(10.364)	0.001
	Post test	128.62(6.566)	125.78(9.791)	0.130
Lt. Knee Extension (Degree)	Pre test	13.85(13.779)	19.20(17.895)	0.138
	Post test	11.85(12.773)	10.52(11.662)	0.629

DISCUSSION

Results of this study showed study group showed a significant reduction in WOMAC score and increased ROM in knee flexion when compared with CG. When compared with pre and post assessment both SG and CG showed a reduction of WOMAC and improvement of ROM after 2 weeks of intervention. The possible mechanism of action of the selected acupuncture points might be due to activation of cholinergic anti-inflammatory pathway [15]. Inhibition of inflammatory M1 macrophages and promotion of anti-inflammatory M2 macrophages; reduction of macrophage inflammatory protein (MIP-1α), MIP-2 in synovial fluid which results in down regulation of inflammatory changes in arthritis [16]. Diffuse noxious inhibitory control through activation of larger afferent fibers [17]. Inhibition of microglia activation, down regulation of calcitonin gene-related peptide (CGRP), COX-2, IL-1β and TNF-α levels [16,18].

These possible mechanisms either alone or in combination might contribute to the positive effect on participants in the control group. Moxibustion helps in the reduction of cartilage damage and inhibits the expression of inflammatory mediators TNF, IL-6, and mast cell cyclooxygenase [19]. It facilitates the repair of articular chondrocytes [20]. Moxibustion helps regulate insulin-like growth factors and transformed growth factors. Thus, helps in increasing limb strength [21]. These mechanisms could contribute to the additional significant reduction of WOMAC score and increase of ROM in the study group.

CONCLUSION

Acupuncture along with moxibustion is more effective in the management of pain and improvement of ROM in patients with KOA than only acupuncture.

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