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Article

Effectiveness of Local Point Acupuncture and Ear Acupuncture in Patients with Knee Pain at Sehat Bugar Akupunktur, Bandung

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ABSTRACT

Knee pain is a common complaint in adults and the elderly. Treatment for osteoarthritis patients includes non-pharmacological, pharmacological, and surgical therapies. Nonsteroidal anti-inflammatory drugs (NSAIDs) are used, but NSAIDs cause side effects on the gastrointestinal and cardiovascular systems, limiting their use among patients with OAC. One such non-pharmacological therapy is acupuncture and ear acupuncture. To determine the difference in effectiveness between local acupuncture and ear acupuncture on the WOMAC (Western Ontario and McMaster Universities Arthritis Index) score of knee pain patients at Sehat Bugar Akupunktur, Bandung. A quasi-experimental study design with a two-group pre- and post-test design was used. A sample of 38 individuals experiencing knee pain who met the inclusion and exclusion criteria were divided into two treatment groups of 19 individuals each. The first group received local acupuncture, and the second group received ear acupuncture. The intervention was carried out 10 times twice a week, for five weeks. Pain was assessed using the WOMAC questionnaire. Data were analyzed using paired sample t-tests and independent sample t-tests at a significance level of 0.05. Both local acupuncture and ear acupuncture have been shown to reduce WOMAC scores, but there was no significant difference between the two.

I. INTRODUCTION

Knee pain is a commonly encountered health problem and constitutes a musculoskeletal disorder affecting the bones, patella, knee joint, and surrounding soft tissues, including blood vessels, nerves, ligaments, muscles, and tendons. Knee pain can occur in individuals of all ages but is most commonly observed in adults and older adults [(1)].

In 2020, it was estimated that approximately 654.1 million people worldwide aged over 40 years were affected by knee osteoarthritis (OA), of whom 16.0% were individuals aged 15 years and older and 22.9% were those aged over 40 years [(1,2)]. In Indonesia, the prevalence of OA in

2018 reached 24.7% and was predominantly observed in individuals aged 61 years [3]. In West Java, the prevalence of osteoarthritis was reported to be 8.86%, while in Bandung City the prevalence reached 9.35% [4]. A study conducted at Hasan Sadikin Hospital between January 1, 2019, and February 1, 2020, found that knee pain due to osteoarthritis was more prevalent among women (71.6%) than among men (28.4%) [5].

Acupuncture is a non-pharmacological therapy that is effective in reducing pain associated with knee pain. Studies have demonstrated that acupuncture can improve both short and long-term physical function in patients with chronic knee pain through three sessions of manual acupuncture per week for four weeks (a total of 12 sessions), and is effective and safe in patients with knee osteoarthritis (KOA) [6]. The mechanisms by which acupuncture reduces pain and promotes functional recovery in patients with KOA include inhibition of inflammatory factors, suppression of pain signaling pathways, increased release of opioids that exert anti-inflammatory effects, and inhibition of hypertrophic chondrocyte differentiation [7]. Local acupuncture at knee points elicited a response in 85.29% of study subjects and resulted in a significant reduction in VAS and WOMAC scores at the fourth week of therapy ($p = 0.003$) [6].

Auricular acupuncture (AA) is an acupuncture technique that has been used for more than 2,000 years, with its application increasing significantly in recent decades, particularly for conditions characterized by pain. Auricular acupuncture is effective in reducing knee pain, as reflected by decreases in Visual Analog Scale (VAS) scores and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores [7]. Auricular acupuncture points function as holographic targets that, when stimulated, can produce therapeutic effects through feedback mechanisms that activate analgesic structures in the brain, including the release of endorphins and enkephalins [7]. This study aimed to determine the difference in effectiveness between local acupuncture and ear acupuncture on the WOMAC (Western Ontario and McMaster Universities Arthritis Index) score of knee pain patients at Sehat Bugar Akupunktur, Bandung

II. METHODS

This study employed a quasi-experimental two-group pretest–posttest design. Participants were allocated into two intervention groups and assessed before and after treatment to evaluate the effectiveness of each therapy in reducing knee pain. The first group received local point acupuncture, while the second group received auricular acupuncture.

The study was conducted from February to October 2025 at Sehat Bugar Acupuncture Clinic, Bandung. The study population consisted of all patients presenting with knee pain at the clinic during the study period. A preliminary survey conducted from February to March 2025 through questionnaires and interviews identified 60 individuals reporting knee pain. Based on predetermined inclusion and exclusion criteria, 38 eligible participants were selected using purposive sampling and enrolled in the study.

The independent variables were local point acupuncture therapy and auricular acupuncture therapy. The dependent variable was knee pain intensity, measured using the Visual Analogue Scale (VAS) and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). The local point acupuncture intervention was administered at ST34 (Liangqiu), ST36 (Zusanli), EX-LE5 (Neixiyan), ST35 (Dubi), SP9 (Yinlingquan), SP10 (Xuehai), GB34 (Yanglingquan), and BL40 (Weizhong). The auricular acupuncture intervention was applied at Shenmen (TF4), Knee (AH4), Spleen (CO13), Liver (CO12), Kidney (CO10), and Subcortex (AT4).

III. RESULT

This study involved 38 subjects with knee pain who met the inclusion and exclusion criteria. The subjects were divided into two groups, consisting of 19 participants in the local-point acupuncture group (Group I) and 19 participants in the auricular acupuncture group (Group II). Both groups received therapy eight times with a frequency of two sessions per week. Data analysis included univariate and bivariate analyses.

Table 1. Characteristics of Respondents

Characteristics	Group I n (%)	Group II n (%)
Age (years)		
40–50	3 (15.8)	4 (21.1)
51–60	10 (52.6)	9 (47.4)
>60	6 (31.6)	6 (31.6)
Gender		
Female	13 (68.4)	12 (63.2)
Male	6 (31.6)	7 (36.8)
Occupation		
Retired	3 (15.8)	3 (15.8)
Housewife	6 (31.6)	7 (36.8)
Civil servant	3 (15.8)	2 (10.5)
Private employee	4 (21.1)	4 (21.1)
Lecturer	1 (5.3)	0 (0.0)
Self-employed	2 (10.5)	3 (15.8)
Syndrome		
Qi and Blood Stagnation	3 (15.8)	3 (15.8)
Qi and Blood Deficiency	6 (31.6)	7 (36.8)
Bi Syndrome	10 (52.6)	9 (47.4)

Table 1 shows that the largest age group was 51 to 60 years (50.0%). Most participants were female (65.8%). The most common occupation was housewife (34.2%), and the predominant syndrome classification was Bi syndrome (50.0%).

Table 2. WOMAC Scores Before and After Intervention

Pain Category	Group I n (%)	Group II n (%)
Before Intervention		
Mild	0 (0.0)	0 (0.0)
Moderate	16 (84.2)	17 (89.5)
Severe	3 (15.8)	2 (10.5)
Very severe	0 (0.0)	0 (0.0)
After Intervention		
Mild	13 (68.4)	12 (63.2)
Moderate	6 (31.6)	7 (36.8)
Severe	0 (0.0)	0 (0.0)
Very severe	0 (0.0)	0 (0.0)

Based on Table 2, it can be explained that before treatment, most participants in both groups were classified as having moderate pain. The mean WOMAC score was 39.58 in Group I and 38.11 in Group II. After treatment, WOMAC scores decreased in both groups. Mild pain became the dominant category, with mean scores of 22.16 in Group I and 24.05 in Group II.

Table 3. Normalitiy Test

Variable	n	p-value
Pre-test Group I	19	0.866
Post-test Group I	19	0.318
Pre-test Group II	19	0.193
Post-test Group II	19	0.204

Based on Table 3 it can be explained Homogeneity testing using Levene's test showed a significance value of p=0.432 (>0.050), indicating homogeneous variance between groups. Therefore, parametric tests were applied.

Table 4. Paired Sample Test

Group	MD	p
Local-point acupuncture	17.42	<0.001
Auricular acupuncture	14.05	<0.001

Table 4 explains that the results of the paired sample t-test demonstrated significant reductions in WOMAC scores in both groups ($p < 0.001$). This indicates that both local-point acupuncture and auricular acupuncture were effective in reducing knee pain.

Table 5. Independent T-Test

Comparison	MD	p
Group I vs Group II	-1.895	0.476

Table 5 explains the independent sample t-test showed no significant difference between the two groups (p = 0.476). Although both interventions significantly reduced WOMAC scores, local-point acupuncture and auricular acupuncture demonstrated comparable effectiveness in reducing knee pain.

IV. DISCUSSION

Osteoarthritis is the most commonly encountered form of arthritis in adults and is typically characterized by impaired mobility and chronic pain. The age range of the study participants indicates that the majority belonged to the middle-aged to older adult group, which is biologically more susceptible to degenerative changes in the knee joint. This finding is consistent with the literature, which reports that the prevalence of knee osteoarthritis (KOA) increases with advancing age [8,9].

Women exhibit a higher prevalence of osteoarthritis (OA) than men, accounting for approximately 60% of osteoarthritis cases worldwide [10]. The increased risk and prevalence of OA in women may be associated with various biological factors, including hormonal, neurological, immunomodulatory, and genetic influences, as well as differences in joint anatomy, alignment, muscle strength, ligament flexibility, and lifestyle factors between men and women [10].

High mechanical activity can accelerate joint degeneration and trigger knee pain. Therefore, occupation is one of the factors that may influence knee pain and the progression of knee osteoarthritis. Occupations involving high physical load (e.g., heavy lifting, squatting, prolonged standing) are associated with up to a 1.52-fold increased risk of knee osteoarthritis compared with light or sedentary occupations (low physical activity) [11].

Modern studies indicate that knee osteoarthritis (KOA) in Traditional Chinese Medicine (TCM) is classified under Bi syndrome, or more specifically, bone Bi, as it involves bone and joint tissues [12]. The pathological process is described as stagnation of blood flow along with weakness of the kidney and liver systems, which play key roles in the maintenance of bones and joints [13]. Bi syndrome in KOA is further divided into several subtypes, such as cold-damp Bi, wind-damp Bi, and deficiency Bi, each of which may influence therapeutic strategies, including the selection of acupuncture points and herbal formulations Osteoarthritis is explicitly categorized within Bi syndrome and bone Bi, with its primary etiology attributed to liver and kidney deficiency as well as stagnation of Qi and blood, leading to meridian obstruction and pain [12].

Knee swelling, tenderness, range-of-motion scores, C-reactive protein levels, and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) were recorded before and after treatment and served as outcome indicators in this study. The results showed that on day 5 after the initiation of treatment, Visual Analog Scale (VAS) scores and WOMAC scores in the treatment group were significantly lower than those in the control group ($p < 0.050$).

Acupuncture techniques such as manual acupuncture (MA), electroacupuncture (EA), and warm acupuncture (WA) have been shown to produce significant reductions in WOMAC functional

scores compared with sham acupuncture, with electroacupuncture demonstrating the greatest therapeutic benefit [14].

In that study, acupuncture applied to local points such as ST35 (Dubi), SP9 (Yinlingquan), GB34 (Yanglingquan), and ST36 (Zusanli) demonstrated significant reductions in pain, stiffness, and limitations in knee joint movement after several treatment sessions compared with the control group that did not receive acupuncture. These effects are presumed to be associated with peripheral nerve stimulation, leading to increased release of endorphins and serotonin, as well as inhibition of pain impulse transmission at the spinal cord level [15]. In addition to local-point acupuncture, similar outcomes have also been observed with auricular acupuncture, which provides analgesic effects through modulation of the autonomic nervous system and activation of limbic pathways involved in pain perception. Stimulation of auricular points such as Shenmen, Knee, and Subcortex over four weeks significantly reduced WOMAC and VAS scores compared with a control group receiving conventional care alone. These findings demonstrate that auricular acupuncture also contributes to pain reduction and improved joint function in patients with knee osteoarthritis [16].

The effectiveness of both acupuncture methods, local-point acupuncture and auricular acupuncture, can be explained through the underlying mechanisms of acupuncture action. Both therapies stimulate the peripheral and central nervous systems, triggering the release of neurotransmitters such as endorphins, enkephalins, and serotonin, which play key roles in pain modulation and improvement of joint function. In local-point acupuncture, stimulation is applied directly to the site of pain, thereby enhancing local blood flow, reducing inflammation, and accelerating tissue healing processes. Auricular acupuncture operates through somatotopic reflex mechanisms, whereby points on the auricle correspond to specific organs or body regions via the vagus nerve pathways and the limbic system, producing analgesic and relaxation effects [17,18].

V. CONCLUSION

Hypothesis testing in this study was conducted to analyze the effectiveness of local-point acupuncture and auricular acupuncture on WOMAC scores in patients with knee pain at Sehat Bugar Acupuncture Clinic, Bandung City. The paired t-test results showed a significance value of $p<0.001$ for Group 1 and <0.001 for Group 2. As both groups demonstrated significance values below 0.050, it can be concluded that both acupuncture interventions were effective in reducing WOMAC scores. Thus, although the independent-sample t-test results indicated no significant difference between the interventions, it can be interpreted that both local-point acupuncture and auricular acupuncture may be considered effective and relatively safe for reducing the symptoms of knee osteoarthritis.

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