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Effectiveness of Jin's 3 Needle Acupuncture Therapy Combined with Topical Clove Oil (*Syzygium aromaticum*) on Knee Pain Scale at Praktik Mandiri Akupunktur Mentari Ngaringan, Grobogan

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ABSTRACT

Knee pain, a prevalent musculoskeletal condition, often necessitates pharmacological management with associated long-term risks, underscoring the need for safer non-pharmacological alternatives. This quasi-experimental study evaluated the effectiveness of Jin's 3 Needle acupuncture combined with topical clove oil (*Syzygium aromaticum*) for reducing knee pain intensity. 32 participants from a specified practice were purposively selected and allocated into two groups: one receiving the combined therapy and the other receiving acupuncture alone. Interventions were administered twice weekly for three weeks. Pain was assessed using the Numeric Rating Scale (NRS). Results demonstrated a significant reduction in pain intensity for both groups, with a statistically greater decrease ($p < 0.05$) observed in the combination therapy group. The findings indicate that Jin's 3 Needle acupuncture synergized with the analgesic eugenol in clove oil provides a significantly more effective intervention for alleviating knee pain, offering a viable and safe non-pharmacological treatment option.

I. INTRODUCTION

Knee pain is a common Musculoskeletal disorder resulting from structural damage or inflammation caused by traumatic injury or degenerative conditions such as osteoarthritis (OA)⁽¹⁾. Its global burden is substantial, with a reported prevalence of 73% among adults aged ≥ 55 years, particularly higher in women^(2, 3). Knee OA affects approximately 16% of individuals aged ≥ 15 years and 22.9% of those aged ≥ 40 years, representing an

estimated 654 million people worldwide^(4, 5). In Indonesia, diagnosed radiological knee OA prevalence is 15.5% for men and 12.7% for women aged 40-60 years with local data from Grobogan Regency indicating a rising risk among its aging population⁽⁵⁾.

Primary pharmacological management using NSAIDs and analgesics carries risks of long-term adverse effects, creating a need for safer alternatives. Non-pharmacological approaches, including

complementary therapies like acupuncture, offer potential. Jin's 3 Needle acupuncture targets specific points (EX-LE 05 Xiyang, SP 10 Xuehai, ST 34 Liangqiu) to stimulate β -endorphin release and reduce cortisol, thereby inhibiting knee pain⁽⁶⁾. Its effect may be enhanced by combination with topical clove oil (*Syzygium aromaticum*), whose primary bioactive component, eugenol, possesses natural analgesic properties⁽⁷⁾. Preliminary research supports the efficacy of both multi-point needle techniques and topical clove oil application for pain reduction⁽⁸⁾. However, formal data on knee pain prevalence in Grobogan is lacking. Therefore, this study aims to determine the effectiveness of combining Jin's 3 Needle acupuncture with topical clove oil in reducing knee pain intensity at a local practice.

II. METHODS

This study used a quantitative quasi-experimental design with a pretest-posttest control group approach. The research was conducted at Mentari Independent Acupuncture Practice, Ngarangan, Grobogan, Indonesia, from August to September 2025. A total of 32 patients with knee pain were recruited using purposive sampling and divided equally into two groups.

Group I received Jin's 3 Needle acupuncture at EX-LE 05 (Xiyang), SP10 (Xuehai), and ST34 (Liangqiu) combined with topical clove oil (*Syzygium aromaticum*), while Group II received Jin's 3 Needle acupuncture only at the same points. The interventions were administered twice weekly for three weeks (six sessions). Acupuncture needles were retained for 15 minutes, and clove oil (0.2–0.5 mL) was applied topically after acupuncture in Group I.

Knee pain intensity was measured using the Numerical Rating Scale (NRS)

before and after treatment. Data were analyzed using independent t-test with a significance level of $p < 0.05$.

III. RESULT

The main study was conducted from August 27 to September 17, 2025, involving 32 subjects who met the inclusion criteria, all of whom were treated in the practice's treatment room. Data were analyzed using univariate analysis to describe participant characteristics (sex, age, highest educational attainment, occupation, and syndrome classification) and bivariate analysis to assess changes in pain intensity following acupuncture therapy.

Table 1. Characteristics of Respondents

Characteristics	Group I		Group II	
	n	%	n	%
Gender				
Female	11	68.8	16	100
Male	5	31.3	-	0.0
Age (years)				
25-44	5	31.3	4	25.0
45-59	6	37.5	4	25.0
60-74	5	31.3	8	50.0
Educational Level				
Primary School	4	25.0	7	43.8
Junior High School	7	43.8	2	12.5
Senior High School	2	12.5	5	31.3
Vocational High School	3	18.8	2	12.5
Occupation				
Laborer	2	12.5	1	6.3
Teacher	2	12.5	2	12.5
Housewife	3	18.8	3	18.8
Merchant	2	12.5	7	43.8
Farmer	7	43.8	3	18.8
Syndrome Differentiation				
Qi and Blood stagnation	5	31.3	4	25.0
Wind, dampness, heat, and cold pathogens	4	25.0	4	25.0
Kidney and liver deficiency	3	18.8	3	18.8
Qi and Blood deficiency	4	25.0	3	18.8
Other syndromes	-	0.0	2	12.5
Pain Scale (Pretest)				
3	-	-	1	6.3
4	1	6.3	3	18.8

Characteristics	Group I		Group II	
	n	%	n	%
5	3	18.8	4	25.0
6	4	25.0	6	37.5
7	6	37.5	2	12.5
8	2	12.5	-	-
Pain Scale (Posttest)				
0	3	18.8	-	-
1	5	31.3	3	18.8
2	6	37.5	4	25.0
3	2	12.5	6	37.5
4	-	-	2	12.5
5	-	-	1	6.3

Table 1 presents the distribution of research subjects in both groups. Group I was predominantly female, consisting of 11 participants (68.8%), with the majority aged 45–59 years, totaling 6 participants (37.5%). Group II was entirely composed of female participants, totaling 16 participants (100%), most of whom were aged 60–74 years, amounting to 8 participants (50.0%). In Group I, most participants had a junior high school education with 7 participants (43.8%), worked as farmers with 7 participants (43.8%), and most commonly experienced Qi and Xue stagnation syndrome with 5 participants (31.3%). In Group II, the majority had a primary school education with 7 participants (43.8%), were employed as merchants with 7 participants (43.8%), and most frequently experienced Qi and Xue stagnation syndrome with 4 participants (25.0%) as well as wind, dampness, heat, and cold pathogen syndromes with 4 participants (25.0%).

The distribution of pain scale scores before therapy showed that the highest frequency in Group I was a pain score of 7, reported by 6 participants (37.5%), while in Group II the most common score was 6, reported by 6 participants (37.5%). The lowest frequencies were observed in Group I at a pain score of 4, reported by 1 participant (6.3%), and in Group II at a pain score of 3, reported by 1 participant (6.3%).

Table 2. Normality Test

Group		n	p
Group I	Pretest	16	0.161
	Posttest		0.172
Group II	Pretest	16	0.161
	Posttest		0.061

Table 2 shows that the Shapiro Wilk test results indicated normally distributed data, with significance values in Group I of 0.161 for the pre-test and 0.172 for the post-test and in Group II of 0.161 for the pre-test and 0.061 for the post-test. These results indicate that the data were normally distributed with $p > 0.05$, therefore the analysis was continued with the homogeneity of variance test.

Table 3. Homogeneity Variance Test

Therapy Results	N	Levene Statistic	p
Based on Means	32	0.172	0.915

Table 3 shows that the results of the data analysis indicated that the research data were homogeneously distributed, as evidenced by the obtained $p > 0.050$.

Table 4. The Result of the Independent T-Test

Group	Mean	p
Group I	4.88	0.000
Group II	2.69	

Table 4 shows that the reduction in pain in Group I was greater than that in Group II. Based on the Independent T-Test, the sig. (2-tailed) value was $p < 0.001$, indicating a statistically significant difference with $p < 0.05$. These findings demonstrate that Jin's 3-Needle acupuncture therapy combined with topical clove oil (*Syzygium aromaticum*) is effective in reducing the knee pain scale.

IV. DISCUSSION

This study demonstrated that both Jin's 3 Needle acupuncture alone and its combination with topical clove oil were

effective in reducing knee pain intensity; however, the combined intervention produced a significantly greater analgesic effect. The mean reduction in pain score in the combination group was 4.88, compared with 2.69 in the acupuncture-only group, with a statistically significant difference ($p < 0.001$). These findings indicate that adding topical clove oil enhances the therapeutic efficacy of Jin's 3 Needle acupuncture in managing knee pain.

Most participants were female and older adults, which is consistent with previous evidence showing that knee pain and osteoarthritis are more prevalent among women, particularly after menopause, due to hormonal changes and age-related degenerative processes affecting cartilage and joint structures^(9, 10). Increasing age is strongly associated with reduced chondrocyte activity, decreased collagen synthesis, and impaired cartilage repair mechanisms, leading to higher pain intensity and functional limitation^(10,11,12,13).

From the perspective of traditional Chinese medicine (TCM), the majority of subjects were classified as having Qi and Blood stagnation or Bi syndrome caused by external pathogenic factors. Jin's 3 Needle acupuncture at EX-LE 05 (Xiyan), SP10 (Xuehai), and ST34 (Liangqiu) is theorized to disperse stagnation, promote the circulation of Qi and Blood, and relieve pain. Neurophysiologically, acupuncture stimulation at these points induces De Qi sensation, activates afferent nerve fibers, modulates central neurotransmitters, and increases endogenous opioid release, thereby inhibiting pain transmission^(14,15,16).

The superior pain reduction observed in the combination group can be explained by the additional pharmacological effects of clove oil (*Syzygium aromaticum*). Eugenol, the main active compound in clove oil, exhibits potent analgesic and anti-inflammatory properties through inhibition of voltage-gated sodium channels, modu-

lation of TRPV1 receptors, and suppression of COX-2 and prostaglandin E2 expression^(17,18). These mechanisms reduce peripheral nociceptor excitability and local inflammation, complementing the central analgesic effects of acupuncture.

The present findings are consistent with previous studies reporting that combining acupuncture with topical herbal agents results in greater pain relief compared to acupuncture alone^(14,15). The synergistic interaction between neurophysiological modulation by acupuncture and the local anti-inflammatory effects of eugenol likely accounts for the more pronounced analgesic response observed in this study.

V. CONCLUSION

The findings of this study indicate that Jin's 3 Needle acupuncture combined with topical clove oil is more effective in reducing knee pain intensity than Jin's 3 Needle acupuncture alone. While both interventions demonstrated significant analgesic effects, the combination therapy yielded a greater magnitude of pain reduction, suggesting a synergistic benefit.

The enhanced therapeutic outcome is plausibly explained by the interaction between acupuncture induced neurophysiological modulation such as endogenous opioid release and central pain inhibition and the peripheral analgesic and anti-inflammatory effects of eugenol contained in clove oil. This combined mechanism may contribute to improved pain control in patients with degenerative knee conditions.

Overall, the results support the potential role of combined acupuncture and topical herbal therapy as a safe and effective non-pharmacological approach for knee pain management. However, given the limited sample size and short intervention duration, further randomized controlled trials with larger populations and extended follow-up periods are required to confirm these findings and evaluate long-term clinical benefits.

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