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Article

The Influence of Acupuncture Therapy and Dry Cupping Therapy on Decreasing Knee Pain Scale in Jabung Village, Gantiwarno, Klaten

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ABSTRACT

Knee pain is a musculoskeletal disorder characterized by degenerative joint disease due to damage to the joint cartilage and bone spur growth. This condition causes knee joints to feel painful, swollen, and stiff. Acupuncture therapy and cupping therapy can alleviate knee pain complaints through stimulation at acupuncture points. Acupuncture therapy can provide analgesic effects to reduce pain, and dry cupping therapy can relax muscle tension and improve blood flow, thus reducing pain. By reducing pain, it is expected to provide comfort for knee pain sufferers.This study used a pre-experimental design with a two-group pretest-posttest design. The study was conducted from October 2021 to April 2022 in Jabung Village, Jabung Wetan Hamlet, Gantiwarno, Klaten. The study involved a sample of 32 subjects who met the inclusion and exclusion criteria, divided into 2 groups: acupuncture therapy and dry cupping therapy. The Mann-Whitney test result was 0.049, which means $\rho < 0.05$, indicating that H0 is rejected and Ha is accepted, indicating an influence of acupuncture therapy and dry cupping therapy on reducing knee pain scale in Jabung Village, Gantiwarno, Klaten. The mean rank of knee pain scale reduction for acupuncture therapy was 19.59 and for dry cupping therapy was 13.41, indicating that acupuncture therapy has a greater effect on reducing knee pain scale.There is an influence of acupuncture therapy and dry cupping therapy on reducing knee pain scale in Jabung Village, Gantiwarno, Klaten, but acupuncture therapy has a greater effect on reducing knee pain scale.

I. INTRODUCTION

Pain is the main symptom that prompts someone to seek treatment. Pain is an unpleasant sensation due to injury within the body and damage to nerve tissue that releases chemical mediators, causing pain and discomfort. These chemical mediators include H+, K+, ATP, substance P, prostaglandin, bradykinin,

serotonin, cytokines, and histamine [1]. Joint pain is also caused by a decline in the musculoskeletal system [2].

Knee pain is a musculoskeletal disorder that is a degenerative disease of the joints due to damage to joint cartilage (cartilage) and the growth of bone edges (osteophytes). This condition can cause the knee joints to feel painful, swollen, and stiff [3,4]. Trauma factors causing knee joint pain are excessive daily activities and one of the supports for body weight[5]. As a person ages, their physical abilities decrease, leading to various complaints within the body[6].

WHO[7] states that worldwide, around 1.71 billion people have Musculoskeletal disorders, with osteoarthritis affecting 343 million people. The 2018 Riskesdas stated that the Indonesian population suffering from joint pain reached 7.30% of the total Indonesian population[8]. The 2018 Riskesdas stated that in Central Java Province, those suffering from joint pain reached 6.78%, and in Klaten Regency reached 5.18% [9].

Treatment for knee pain can be done with pharmacological therapy (using medication) and non-pharmacological therapy (without medication) [10]. Non-pharmacological therapies that can be used include acupuncture and cupping therapy, both of which have been proven effective in treating knee pain cases. Zhang et al., [11] showed that acupuncture and cupping therapy can alleviate knee pain complaints by stimulating acupuncture points and meridians to improve blood flow and Qi flow, thus reducing pain. Stimulation of acupuncture points can induce pain and provide analgesic effects. Acupuncture therapy is safe, effective, and cost-effective for managing chronic pain cases [12]. Meanwhile, cupping therapy can relax muscle tension and improve blood circulation, thus accelerating healing and reducing pain [13,14]. Dry cupping is a cupping method that does not involve bloodletting or cause bleeding [15].

This research was conducted in Jabung Village, Jabung Wetan Hamlet, Gantiwarno, Klaten, which has a total population of 518 people. After conducting a preliminary study, data was obtained from 40 individuals with knee pain complaints. Based on this description, the researchers were interested in conducting research on the "Effect of Acupuncture Therapy and Dry Cupping Therapy on Decreasing Knee Pain Scale in Jabung Village, Gantiwarno, Klaten". Acupuncture at acupuncture points can provide analgesic effects that can reduce pain, while cupping therapy with dry cupping method can relax muscle tension and improve blood flow, which can reduce pain. By reducing pain, it is hoped to provide comfort for patients with knee pain.

II. METHODS

This study used a pre-experimental design with a two-group pretest-posttest design. The research was conducted in Jabung Village, Jabung Wetan Hamlet, Gantiwarno, Klaten from October 2021 to April 2022. The population in this study was 518 people, with 40 individuals experiencing knee pain. A total of 32 individuals who met the inclusion and exclusion criteria were selected as the sample. The researchers then divided them into two intervention groups, namely the first group receiving acupuncture therapy at the EX-LE 2 Heding, ST 34 Liangqiu, SP 6 Sanyinjiao, and ST 41 Jiexi points, and the second group receiving dry cupping therapy at the EX-LE 4 Neixian and ST 35 Dubi points. The dependent variable of this study was the reduction in knee pain scale, while the independent variables were acupuncture therapy and dry cupping therapy.

Operational definitions in this study included: 1) Acupuncture therapy at the EX-LE 2 Heding, ST 34 Liangqiu, SP 6 Sanyinjiao, and ST 41 Jiexi points, performed accurately and eliciting de qi sensation, 2) Dry cupping therapy at the

EX-LE 4 Neixian and ST 35 Dubi points, performed accurately, 3) Knee pain measured using the Numeric Rating Scale (NRS). The measurement was described on a scale of 0: No pain, 1-3: Mild pain, 4-6: Moderate pain, 7-9: Severe pain, 10: Uncontrollable pain.

This research obtained primary data from interviews with potential research subjects and secondary data from the population data of Jabung Village. The tools and materials used in this study included: acupuncture needles sized 1 cun, cotton balls, 70% sterile alcohol, cotton swabs, bent needles, tweezers, needle disposal container, cupping tools, tissues, olive oil, plastic waste bin, gloves, hand sanitizer, subject data assessment sheets, and writing materials.

The univariate analysis in this study was based on age, gender, occupation, and pain scale before and after therapy. Meanwhile, bivariate analysis for testing data normality used the Shapiro Wilk Test, and for hypothesis testing, the Mann-Whitney test was employed.

III. RESULT

Table 1. Characteristics of research subjects based on age

Age	Acupuncture Therapy		Dry Cupping Therapy		Total	
	N	%	N	%	N	%
41 – 45	3	18,8	2	12,5	5	15,6
46 – 50	1	6,3	3	18,8	4	12,5
51 – 55	4	25	1	6,3	5	15,6
56 – 60	2	12,5	4	25	6	18,8
61 – 65	6	37,5	6	37,5	12	37,5
Total	16	100	16	100	32	100

Source: Results of the research by Erlina Sekar Jati Kusuma, 2022

The research sample consisted of 32 individuals, divided into 2 intervention groups: 16 participants received acupuncture therapy, while the other 16 received dry cupping therapy. Both interventions were administered twice a week for a total of 6 sessions, with acupuncture therapy lasting 20 minutes and dry cupping therapy lasting 15 minutes each session. The research outcomes from the 32 subjects included univariate and bivariate analyses. The characteristics of the research subjects, including age, gender, occupation, and pain scale before and after therapy, were analyzed.

Based on Table 1, the data shows that the age range with the highest number experiencing knee pain is in the 61-65 age group, with 12 people (37.5%), and the least in the 46-50 age group, with 4 people (12.5%).

Table 2. Characteristics of research subjects based on gender

Gender	Acupuncture Therapy		Dry Cupping Therapy		Total	
	N	%	N	%	N	%
Women	11	68,8	12	75	23	71,9
Man	5	31,3	4	25	9	28,1
Total	16	100	16	100	32	100

Source: Results of the research by Erlina Sekar Jati Kusuma, 2022

Based on Table 2, the data shows that the majority of individuals experiencing knee pain are females, with a total of 23 people (71.9%), while males are 9 people (28.1%).

Table 3. Characteristics subjects based on occupation

Occupation	Acupuncture Therapy		*Dry Cupping Therapy*		Total	
	N	%	N	%	N	%
Retiree	3	18,8	0	0	3	9,4
Laborer	3	18,8	1	6,3	4	12,5
Housewife	3	18,8	7	43,8	10	31,3
Merchant	3	18,8	2	12,5	5	15,6
Bank employee	1	6,3	1	6,3	2	6,3
Teacher	2	12,5	1	6,3	3	9,4
Farme	1	6,3	4	25	5	15,6
Total	16	100	16	100	32	100

Source: Results of the research by Erlina Sekar Jati Kusuma, 2022

Based on Table 3, it was found that the occupation most commonly experiencing knee pain is Housewife (IRT) with 10 people (31.3%), and the least is bank employees with 2 people (6.3%).

Table 4. Characteristics subjects on pain scale measurement before and after acupuncture therapy.

Variable	N	*Mean*
Pre-test Acupuncture Therapy	16	5,69
Post-test Acupuncture Therapy	16	2,13
Decrease in Pain Scale	16	3,56
Pre-test Dry Cupping Therapy	16	5,50
Post-test Dry Cupping Therapy	16	2,56
Decrease in Pain Scale	16	2,94

Source: Results of the research by Erlina Sekar Jati Kusuma, 2022

Based on Table 4, the data shows that the most frequent pain scale before (pre-test) acupuncture therapy is scale 6 with 7 individuals (43.8%). The data also reveals that the most frequent pain scale after (post-test) acupuncture therapy is scale 2 with 9 individuals (56.3%).

Table 5. Characteristics subjects on pain scale measurement before and after dry cupping therapy

Pain Scale	*Pre-test*		*Post-test*	
	N	%	N	%
1	0	0	2	12,5
2	0	0	4	25
3	0	0	9	56,3
4	4	25	1	6,3
5	3	18,8	0	0
6	6	37,5	0	0
7	3	18,8	0	0
Total	16	100	16	100

Source: Results of the research by Erlina Sekar Jati Kusuma, 2022

Based on Table 5, it was found that the frequency data before (pre-test) dry cupping therapy was most frequently at scale 6 with 6 people (37.5%). The frequency data after (post-test) dry cupping therapy was most frequently at scale 3 with 9 people (56.3%).

Based on Table 6, it can be seen that the most significant reduction in pain scale occurred in the acupuncture therapy group with a mean of 3.56.

Table 6. Characteristics of pain scale reduction before and after therapy

Pain Scale	*Pre-test*		*Post-test*	
	N	%	N	%
1	0	0	3	18,8
2	0	0	9	56,3
3	0	0	3	18,8
4	2	12,5	1	6,3
5	4	25	0	0
6	7	43,8	0	0
7	3	18,8	0	0
Total	16	100	16	100

Source: Results of the research by Erlina Sekar Jati Kusuma, 2022

Based on Table 7, the normality test results for all four datasets showed $\rho < 0.05$, indicating that the data in this study is not normally distributed.

Table 7. Results of Data Normality Test

Treatment	Variable	N	p
Acupuncture Therapy	Pre-test Acupuncture	16	0,046
	Post-test Acupuncture	16	0,012
Dry Cupping Therapy	Pre-test Dry Cupping	16	0,025
	Post-test Dry Cupping	16	0,006

Source: Results of the research by Erlina Sekar Jati Kusuma, 2022

Based on Table 8, the Mann-Whitney test a significant value (sig.) of 0.049, indicating that $\rho < 0.05$. Thus, the null hypothesis (H0) is rejected and the alternative hypothesis (Ha) is accepted.

Table 8. Uji *Mann-Whitney*

Pain Scale Reduction	N	*Mean Rank*	Z	p
Acupuncture Therapy	16	19,59	-1.970	0,049
Dry Cupping Therapy	16	13,41		

Source: Results of the research by Erlina Sekar Jati Kusuma, 2022

Therefore, in this study, acupuncture therapy and dry cupping therapy have an effect on reducing the knee pain scale in Jabung Village, Gantiwarno, Klaten. It can be observed that the mean rank reduction for acupuncture therapy is 19.59 and for dry cupping therapy is 13.41, indicating that acupuncture therapy has a greater effect on reducing knee pain scale

IV. DISCUSSION

The results of this study indicate that the majority of subjects experiencing knee pain are in the age range of 61 – 65 years, totaling 12 individuals (37.5%). Age is one of the risk factors contributing to knee pain due to degenerative processes. As individuals age, their physical abilities decline, and various bodily complaints begin to emerge [(6)]. Knee pain typically occurs in individuals over the age of 50, attributed to the decreased water content in cartilage as one age, leading to weakened joints that are less resilient to load and more prone to degradation[(16)]. Additionally, aging results in decreased cellularity, reduced proteoglycan concentration, and loss of joint elasticity. According to Traditional Chinese Medicine (TCM), advanced age leads to Qi and blood deficiency, resulting in inadequate nutrition to tendons, muscles, and joints, thus causing knee pain [(18)].

The study findings also reveal that the majority of subjects experiencing knee pain are females, totaling 23 individuals (71.9%). This aligns with the findings of a study conducted by Risqi et al., [(19)] which reported that females have a significantly higher risk of developing knee pain, amounting to 84.21%. Women have twice the risk of developing knee pain due to significant changes in estrogen hormone levels between the ages of 50-80 years [(20)].

The results of this study indicate that the majority of subjects experiencing knee pain are housewife, totaling 10 individuals (31.3%). This finding is consistent with the results of a study conducted by Adani et al., [(21)] which reported that the highest number of patients were homemakers, comprising 59.2%. Homemakers are at risk of developing knee pain due to the extensive household chores they perform. They routinely engage in household chores from waking up until going to bed. Common tasks include washing, sweeping floors, cleaning the house, and taking care of children. Continuously performing these activities can lead to physical fatigue, such as joint pain, muscle weakness, joint stiffness, and more [(22)]. Additionally, manual labor performed in improper body positions can also pose injury risks, leading to pain [(23,24)].

All research subjects who underwent acupuncture therapy, totaling 16 individuals, experienced a decrease in pain scale with a mean of 3.56 after undergoing therapy 6 times. This aligns with a study conducted by Teixeira et al., [(25)] involving 2 patients who received acupuncture therapy 6 times and experienced a decrease in pain scale with an average of 84%. Similarly, all research subjects who underwent dry cupping therapy, also totaling 16 individuals, experienced a decrease in pain scale with a mean of 2.94 after undergoing therapy 6 times. This is consistent with a study conducted by Islam et al., [(26)] where both gentle massage and dry cupping interventions for knee osteoarthritis were found to be safe and effective after 10 sessions.

In this study, the Mann-Whitney test resulted in a significant value (sig.) of 0.049, indicating $\rho < 0.05$, which means H0 is rejected and Ha is accepted. Therefore, in this study, there is an influence of acupuncture therapy and dry cupping therapy on the reduction of knee pain scale in the Jabung Village, Gantiwarno, Klaten. The decrease in mean rank for acupuncture therapy was 19.59, and for dry cupping therapy was 13.41, indicating that acupuncture therapy has a

greater impact on reducing knee pain scale.

In the acupuncture therapy group, the researchers used 4 acupuncture points, namely EX-LE 2 Heding, ST 34 Liangqiu, SP 6 Sanyinjiao, and ST 41 Jiexi. This study is in line with the research conducted by Christiyawati [10],who used a combination of acupuncture points including ST 36 Zusanli, SP 6 Sanyinjiao, GB 34 Yanglingquan, and KI 3 Taixi, and found that acupuncture therapy is effective for reducing knee pain in osteoarthritis. Furthermore, it is consistent with the study by Atalay et al., [27], where the acupuncture group used 13 points consisting of local points (GB 34, SP 10, SP 9, ST 36, ST 35, ST 34, EX-LE 2, EX LE 5, EX-LE 4) and distal points (KI 3, SP 6, LI 4, ST 41), and found that acupuncture therapy is effective for knee pain treatment.

Stimulation of acupuncture points can trigger the release of adenosine triphosphate (ATP), which is enzymatically degraded into various active biological metabolites such as adenosine diphosphate (ADP), monophosphate, and adenosine. ATP can reduce pain, and ADP can induce analgesic effects (12). The mechanism of acupuncture therapy in reducing pain and improving knee pain patient function involves inhibiting excessive expression of inflammatory factors (TNF-α, IL-1β, and IL-6), stimulating Mitogen mitogen-activated protein Kinases (MAPK) to increase antioxidant release in the knee area, and inhibiting hypertrophic chondrocyte differentiation [28]. Acupuncture therapy can also inhibit cartilage degradation biomarkers (MMP-3 and MMP-13) and increase anti-inflammatory cytokine IL-13, thus reducing pain and improving knee function [29].

In the dry cupping therapy group, the researchers used 2 acupuncture points, namely EX-LE 4 Neixian and ST 35 Dubi. Practitioners tend to select fewer points for cupping therapy compared to acupuncture therapy. This is because cupping therapy often targets tender points (ashi) for cup placement[11]. This study is consistent with research that divided participants into 2 groups: a gentle massage group and a dry cupping group. In the dry cupping group, 4 suction cups were applied above the knee joint. The study found that both therapies were safe, effective, and almost equally effective in managing knee osteoarthritis cases. Research conducted by Wang et al., [30] stated that dry cupping, combined with Western treatment, was more effectt-ive than Western treatment alone in reducing pain scores.

In cases of knee pain, cupping therapy can help prevent further damage by reducing inflammation and pain in the knee area. Cupping therapy can stimulate acupuncture points to activate small-diameter nerves in muscles that send pain impulses to the spinal cord, leading to the release of neurotransmitters (endorphins, serotonin, and cortisol) that reduce pain. Additionally, cupping therapy stimulates mechanosensitive A-beta fibers to reduce pain input and stimulates C and A-delta fibers to inhibit pain [13]. Dry cupping therapy can cause hemodynamic changes, resulting in the treated area appearing bruised and blistered. The vacuum created causes muscles to extend beyond their normal elastic limits, leading to congestion in microvascular areas and hyperemia, or excess blood supply, resulting in increased blood flow to capillaries [31].

This study is in line with research conducted by Ruspawan et al., [32], which found that acupuncture and cupping therapy significantly reduce pain. Using a comparative analysis, they found that acupuncture therapy was more effective in reducing pain in cases of osteoarthritis, with a value of $\rho = 0.00$ (< 0.05).

Both acupuncture and cupping therapy can address similar complaints in reducing pain. These therapies stimulate meridians and acupuncture points to improve the flow of Qi and blood, thereby reducing pain or discomfort [11]. Acupuncture therapy may be more effective in

reducing pain because it can reach its target more quickly, namely by reducing pain through the HPA Axis or gate control system [32]. This study contradicts the findings of Zhang et al., [11], who found that acupuncture and cupping therapy had similar effects or no statistically significant differences for all pain-related conditions.

V. CONCLUSION

The study concluded that both acupuncture and dry cupping therapy had an effect on reducing knee pain in the village of Jabung, Gantiwarno, Klaten. However, acupuncture therapy was found to be more effective in reducing knee pain.

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