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The effect of dry cupping therapy on reducing pain in elderly osteoarthritis patients in nursing homes

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Abstract (10 pt)

Background: Osteoarthritis is a prevalent condition among the elderly, leading to joint pain. Treatment options for osteoarthritis can include both pharmacological and non-pharmacological therapies. One promising non-pharmacological approach is dry cupping therapy.
Purpose: This study aims to evaluate the effect of dry cupping therapy in reducing pain levels among the elderly in nursing homes.
Methods: The research employed a pre-experimental design utilising a one-group pre-test and post-test approach. The sample consisted of all 26 elderly residents diagnosed with osteoarthritis at the nursing home. The intervention involved administering cupping therapy to the knee for 40 minutes. Pain levels were assessed using the Bourbanis scale before and after the intervention, and data were analysed using the Wilcoxon Signed Rank Test.
Results: The findings revealed a significant reduction in pain levels following the cupping therapy, with a p-value of 0.000, below the significance threshold of 0.05. This indicates that dry cupping therapy may be an effective complementary treatment for alleviating pain in elderly individuals suffering from osteoarthritis in the nursing home.
Conclusion and recommendation: This study concludes that dry cupping therapy effectively reduces pain in elderly patients with osteoarthritis. Therefore, this therapy can be considered a safe and practical non-pharmacological method for managing joint pain related to osteoarthritis.

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1. Introduction

Osteoarthritis (OA), referred to as "*pengapuran sendi*" in Indonesian, is a prevalent degenerative joint disorder marked by the gradual deterioration of articular cartilage. This condition results in joint stiffness, inflammation, and pain, predominantly affecting the hands, cervical spine, lumbar region, hips, and knees, impairing mobility and quality of life (Allen et al., 2022).

OA primarily impacts the elderly due to the physiological and compositional changes accompanying ageing. These alterations disrupt the balance between the body's regenerative and degenerative processes, leading to cumulative damage to joint-supporting structures, particularly within the musculoskeletal system (Putri, 2019; Gravallese & Firestein, 2023).

In Indonesia, OA is emerging as a significant public health concern. The demographic shift toward an ageing population is expected to contribute to a rise in OA prevalence. National projections from Badan Pusat Statistik (BPS) estimate that by 2045, Indonesia will have around 63.31 million elderly individuals, accounting for nearly 20% of the national population (Putra, 2022). Epidemiological data indicate a substantial increase in OA prevalence with age: approximately 5% in individuals aged 40 years, rising to 30% in those aged 40–60, and peaking at 65% in individuals over 61.

Given these statistics, osteoarthritis presents a critical and escalating burden on the Indonesian healthcare system. Without effective preventive and therapeutic strategies, the rising prevalence among the elderly could significantly affect national productivity, economic resources, and geriatric health outcomes.

Osteoarthritis is one of the most prevalent degenerative diseases affecting the elderly population, significantly influencing mobility, quality of life, and contributing to the strain on healthcare systems. In Indonesia, the rising prevalence of this disease parallels the growth of its elderly demographic. Notably, the Province of West Nusa Tenggara (NTB) reports the highest national prevalence rate at 33.1% (Wahyu Ningsih & Susmita Sari, 2024). These findings underscore the considerable challenges that NTB faces in managing age-related chronic diseases.

This study is essential for evaluating potential and cost-effective non-pharmacological interventions, such as cupping therapy, to alleviate pain in osteoarthritis patients. Cupping, a form of traditional complementary medicine, offers a relatively affordable treatment option widely accepted within the community. Although several preliminary studies have suggested the therapeutic advantages of cupping in reducing inflammation and pain through mechanisms such as endorphin release and the reduction of prostaglandins (Pontes et al., 2020; Manurung, 2022), further research is needed in local contexts, especially among elderly individuals residing in nursing homes. This study aims to assess the effectiveness of dry cupping therapy in alleviating pain levels among elderly residents in the nursing home.

2. Methods

2.1 Research design

This study adopts a quasi-experimental design, employing a one-group pre-test and post-test methodology. The aim is to assess the effectiveness of dry cupping therapy in reducing pain levels among elderly individuals suffering from osteoarthritis by comparing pain scores before and after the intervention within the same group. This design was chosen because it is appropriate for situations where establishing a control group is neither ethical nor logistically feasible.

2.2 Setting and samples

The study was conducted at a nursing home in Mataram City, West Nusa Tenggara, Indonesia, from February 2 to March 2, 2025. This location was selected because it serves a target population with a relatively high prevalence of osteoarthritis.

The participants in this study were elderly individuals diagnosed with osteoarthritis, as documented in their medical records from the nursing home, and 26 individuals. Given that the population size was under 100, a total sampling technique was utilised, including all eligible individuals in the research (n = 26).

The inclusion criteria were as follows: Age 60 years or older; diagnosed with osteoarthritis based on a medical examination; willingness to participate in the complete series of interventions and evaluations; no contraindications for cupping therapy.

The exclusion criteria included the presence of open wounds or skin disorders in the area designated for cupping, blood clotting disorders or current usage of anticoagulants, and lack of cooperation in adhering to the intervention guidelines.

2.3 Intervention

The study subjects underwent an intervention involving dry cupping therapy administered by trained personnel according to the Standard Operating Procedure (SOP) for cupping therapy. The therapy specifically targeted areas associated with osteoarthritis pain, primarily around the knee joint and its vicinity. The sessions were held at a frequency of twice a week over two weeks, and all procedures adhered to sterile techniques and stringent safety protocols.

2.4 Measurement and data collection

Pain intensity was assessed using the Bourbanis Pain Scale, a clinically validated ordinal scale frequently utilised for subjective pain evaluations. This scale categorises pain into three levels: mild, moderate, and severe. Assessments were conducted at two distinct time points: Pre-test, before the initiation of cupping therapy, and Post-test, following the completion of the entire therapy cycle.

2.5 Data analysis

Data were analysed using the Wilcoxon Signed Rank Test, a non-parametric method that compares two paired conditions (pre-test and post-test) on ordinal data. This test was selected due to its non-assumption of normal distribution and its suitability for small sample sizes. The analysis was conducted with a significance level of $\alpha = 0.05$ using SPSS statistical software, version 29.

2.6 Ethical considerations

This study used ethical health research principles outlined in the Declaration of Helsinki and relevant national guidelines. Ethical considerations were integrated throughout all stages, from planning to reporting.

Before the study commenced, all participants were provided with a clear and accessible explanation of the study's objectives, benefits, procedures, and potential risks. Upon fully understanding this information, participants signed an informed consent form to indicate their voluntary participation.

We employed anonymisation techniques and secure storage methods to ensure data confidentiality, granting access only to authorised research personnel. The report will contain no personal information, and participants can withdraw without facing any consequences.

3. Results

3.1. Sociodemographic characteristics of the study participants

Table 1. Demographic Data (n=26)

Variables	Numbers (n)	Percentage (%)
Gender		
Male	11	42,4
Female	15	57,6
Total	26	100
Age (Years)		
60 - 74 years old	21	80,8
75 – 90 Years old	5	19,2
>90 years old	0	0
Total	58	100
Level of Education		
Low	20	76,8
Moderate	5	19,2
High	1	4
Total	26	100

This study included 26 elderly participants, whose sociodemographic profiles are outlined in Table 1. Most participants were female (57.6%), which aligns with global trends, as women typically have longer life expectancies. Most participants (80.8%) were categorised as young-old (ages 60–74), while 19.2% fell into the middle-old category (ages 75–90). Regarding education, a significant majority (76.8%) had low educational attainment, with only 4% possessing high-level qualifications, such as secondary or tertiary degrees. These educational disparities may influence health literacy and the effectiveness of non-pharmacological interventions, such as cupping therapy. The sample comprises predominantly female, young-old adults with limited formal education, which is essential for assessing community-based geriatric interventions.

3.2. Distribution of Respondents Based on Pain Scale Before and After Cupping Therapy for Elderly Patients with Osteoarthritis in Nursing Homes in Mataram City

Table 2. Distribution of Respondents Based on Pain Scale Before and After Cupping Therapy for Elderly Patients with Osteoarthritis in Nursing Homes in Mataram City (n=26).

Pain Scale Pre-test and Post-test of Cupping Therapy for Elderly Patients with Osteoarthritis				
Pain Scale	**Pre-test**		**Post test**	
	n	%	n	%
Mild	2	7,7	16	61,5
Moderate	6	23	10	38,5
Severe	18	69,2	0	0
Total	**26**	**100**		**100**

Based on Table 2, prior to cupping therapy, the pain levels among 26 elderly participants suffering from osteoarthritis were predominantly severe, with 69.2% (n=18) reporting severe pain while only 7.7% (n=2) characterised their pain as mild. Following cupping therapy, none reported experiencing severe pain, and the proportion of participants

reporting mild pain rose to 61.5% (n=16), while 38.5% (n=10) reported moderate pain. This indicates a notable improvement in pain levels after the therapy.

3.3. Analysis of the effect of cupping therapy on elderly people with osteoarthritis in nursing homes in Mataram City

Tabel 3. Analysis of the effect of cupping therapy on elderly people with osteoarthritis in nursing homes in Mataram City (n=26).

		PRE-BEKAM	POST-BEKAM
N		26	26
Normal Parameters[a,b]	Mean	1.38	2.62
	Std. Deviation	.637	.496
Most Extreme Differences	Absolute	.419	.396
	Positive	.419	.277
	Negative	-.273	-.396
Kolmogorov-Smirnov Z		2.138	2.021
Asymp. Sig. (2-tailed)		.000	.001

		N	Mean Rank	Sum of Ranks		POSTBEKAM - PREBEKAM
POSTBEKAM - PREBEKAM	Negative Ranks	0[a]	.00	.00	Z	-4.463[b]
	Positive Ranks	24[b]	12.50	300.00	Asymp. Sig. (2-tailed)	.000
	Ties	2[c]				
	Total	26				

The results of the Kolmogorov-Smirnov normality test presented in Table 8 indicate that the data collected before and after cupping therapy do not follow a normal distribution, with significance values of 0.000 and 0.001, respectively, both falling below the 0.05 threshold. Consequently, the Wilcoxon Signed-Rank Test, a non-parametric statistical method, will be employed for the subsequent hypothesis testing.

According to the results of the Wilcoxon test, the Negative Ranks value is 0, indicating that no respondents experienced an increase in pain after cupping therapy. The Positive Ranks value is 24, meaning that 24 respondents reported decreased pain levels following the therapy. Additionally, the ties value is 2, indicating that two respondents experienced no change in pain levels before and after the therapy. These results suggest that most respondents felt less pain after cupping therapy, with no increased pain reported.

The statistical test results yielded a negative Z value of -4.463, indicating a reduction in the pain scale following cupping therapy. Additionally, the significance value (p-value) was 0.000, less than the significance level of 0.05. As a result, the null hypothesis (Ha) was

accepted, confirming that cupping therapy significantly reduces the pain scale in elderly patients with osteoarthritis at PSLU Mandalika Mataram.

4. Discussion

4.1. Pain Scale Before Cupping Therapy in Elderly Patients with Osteoarthritis in Nursing Homes

The distribution of respondents based on the severity of osteoarthritis pain experienced before undergoing cupping therapy revealed that the majority, 18 individuals (69.2%), reported severe pain. Additionally, six individuals (23%) experienced moderate pain, while two (7.7%) reported mild pain. No respondents fell into the "no pain" category before the therapy. These findings indicate that most respondents were experiencing a high level of pain before receiving cupping therapy.

The results of pain scale measurements using the Bourbanis scale indicated that most elderly participants in this study experienced high-intensity pain, rated between 7 and 10, before undergoing cupping therapy. This finding suggests that their osteoarthritis is in an advanced stage. This is consistent with the study by Allen et al. (2022), which states that advanced osteoarthritis is associated with more significant damage to joint cartilage and increased inflammation, leading to intense pain. Additionally, the theory proposed by Bolds and Nori (2022) explains that osteoarthritis is a degenerative disease characterised by decreased production of synovial fluid, cartilage degradation, and increased joint bone friction. These factors ultimately contribute to chronic pain and limited mobility.

The majority of respondents reported experiencing severe pain on a scale exceeding 7. Among the 26 individuals who provided pain measurements, 10 indicated a pain level of 7, while 8 reported pain levels ranging from 8 to 9. The high incidence of severe pain among the elderly in this study can be attributed to several factors, including advanced age, patterns of physical activity, and a history of joint injuries. According to the findings of Wahyu Ningsih and Susmita Sari (2024), as individuals age, the structure of their joints tends to lose elasticity and resilience, rendering them more vulnerable to inflammation and persistent pain. This aligns with the study by Pontes et al. (2020), which noted that joint pain is prevalent with age and can result from various factors, such as injury, overuse, or genetic predispositions.

4.2. Pain Scale After Cupping Therapy in Elderly Patients with Osteoarthritis in Nursing Homes

Respondents who received cupping therapy reported a significant decrease in pain levels. The average pain scale was initially rated at 7, indicating severe pain. After treatment, the average pain scale dropped to 3, which falls under the mild pain category. Specifically, 13 individuals noted a reduction to mild pain at a scale of 3, 4 respondents experienced pain at levels 1 to 2, while the remaining participants reported pain levels between 4 and 6.

Out of the 26 respondents, the average decrease in pain was four levels, moving from the severe to the mild pain category. Although no respondents reached a pain-free status, the elimination of severe pain demonstrates that cupping therapy is effective in gradually reducing pain intensity. These findings align with research conducted by Pringgayuda et al. (2020), which suggests that cupping therapy may enhance blood circulation, reduce inflammation, and influence the nervous system's role in pain perception.

One of the primary mechanisms responsible for changes in pain levels after cupping therapy is the increased blood flow to the affected area. According to Made et al. (2022), enhanced

blood supply to the joints impacted by osteoarthritis reduces pressure on the joint structure, which directly contributes to decreased pain sensation reported by participants. While the study's results indicated a significant reduction in pain levels following cupping therapy, it is important to acknowledge that other factors may also influence the pain experienced by individuals.

Pain relief may not solely result from cupping therapy itself; it can also be affected by the use of medications taken by elderly patients, such as analgesics or nonsteroidal anti-inflammatory drugs (NSAIDS), which help alleviate pain related to osteoarthritis. Additionally, the physiological condition of older adults can play a role in changes to pain perception. As people age, they often experience decreased sensitivity to pain due to changes in the nervous system. Moreover, psychological factors such as stress levels, sleep quality, and expectations about the effectiveness of therapy can also impact how pain is perceived.

4.3. The Effect of Cupping Therapy on Elderly Patients with Osteoarthritis in Nursing Homes

The results of the Wilcoxon test showed a negative Z value of -4.463, indicating a decrease in the pain scale following cupping therapy. The significance value (p-value) was 0.000, less than the significance level of 0.05. Therefore, we accept the alternative hypothesis (Ha), which means that cupping therapy reduces the pain scale in elderly individuals with osteoarthritis in nursing homes.

The reduction in pain scale following cupping therapy aligns with the theory proposed by Setyo Wahyudi et al. (2023), which explains that the cupping process causes damage to the skin, leading to the release of various substances, including serotonin, histamine, bradykinin, and slow-reacting substances, among others that are not yet fully understood. These substances lead to the dilation of capillaries and arterioles and flare reactions in the cupped area.

Cupping on the skin stimulates the surface nerves, sending signals to the posterior horn of the spinal cord through the A-delta and C fibres, and then through the spinothalamic tract to the thalamus, which triggers the release of endorphins. These responses enhance blood flow to the cupped area, potentially accelerating healing. Additionally, cupping therapy is believed to reduce inflammation by decreasing cytokine levels, which play a critical role in the inflammatory response.

These results indicate that dry cupping therapy has a significant positive effect on reducing pain levels in elderly individuals with osteoarthritis. According to a study by Made et al. (2022), cupping therapy has positively impacted joint inflammation in osteoarthritis. However, it does not specify the extent of pain reduction achieved. The fact that there is no increase in pain following therapy further supports the notion that cupping can effectively alleviate pain in elderly individuals suffering from osteoarthritis.

Additionally, research by Pontes et al. (2020) suggests that the effectiveness of cupping therapy in lowering pain levels can be attributed to its mechanism, which involves increasing blood circulation, reducing inflammation, and stimulating the release of endorphins—natural analgesics produced by the body. Furthermore, according to Khan et al. (2013), cupping therapy enhances blood flow to the painful areas, allowing for a more optimal healing process of inflamed tissue. It can also help relieve pressure on the joints affected by osteoarthritis.

5. Implication and limitations

The study indicates that dry cupping therapy may effectively reduce pain in elderly individuals suffering from osteoarthritis. Given the high prevalence of this condition and the

potential risks associated with long-term medication use, cupping offers a culturally accepted and low-cost alternative for integrated geriatric care. This therapeutic approach could enhance the quality of life and physical functioning, particularly in resource-limited environments such as nursing homes. Furthermore, the findings underscore the importance of holistic therapies in managing pain in older adults, supporting their use alongside conventional treatments when access to medications is limited.

This research utilized a quasi-experimental design featuring a one-group pre-test and post-test without a control group, limiting the ability to establish causality. External factors, such as the placebo effect or environmental conditions, may have influenced changes in pain levels. With only 26 participants, the results may not be generalizable to the broader elderly population with osteoarthritis. The study focused exclusively on the short-term effects of cupping therapy, and long-term data are needed to determine whether pain relief is sustained over time. Pain intensity was measured using self-reported ordinal scales, which are inherently subjective and can vary based on individual perceptions, moods, or expectations. Additionally, the study did not assess or control for potential confounding factors such as physical activity levels, concurrent treatments, medication use, or comorbid conditions that could influence pain perception.

6. Conclusion

This quasi-experimental study found that dry cupping therapy significantly reduced pain intensity in elderly patients with osteoarthritis living in a nursing home in Mataram City. The pre-test and post-test measurements showed a notable shift from predominantly severe pain to predominantly mild pain after the intervention. These results suggest that cupping therapy may be an effective and low-cost supplementary treatment for managing osteoarthritis-related pain in older adults. However, due to the study's design limitations and small sample size, further research, particularly randomised controlled trials with long-term follow-up, is needed to confirm these findings and explore the underlying mechanisms.

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Author contribution

JAPE: Conceptualization, study design, and supervision; wrote and revised the manuscript. SKD: Data collection and analysis; contributed to the interpretation of results and manuscript writing. NMS: Assisted in developing the methodology and reviewed the statistical analysis; contributed to the manuscript draft. RR: Involved in data collection, literature review, and formatting of the document in adherence to journal guidelines.

Conflict of interest

There is No. a conflict of interest in this study.

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