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Effect of Warm and Cold Compress Applications on Joint Pain Scale in Elderly Patients with Rheumatism

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ABSTRACT

Introduction : Rheumatism is a degenerative disease commonly experienced by the elderly and is characterized by chronic joint pain that can interfere with daily activities. Pain in rheumatism sufferers often fluctuates, necessitating simple, safe, and effective non-pharmacological interventions to help reduce pain levels. Warm and cold compresses are simple therapies frequently used in nursing practice to reduce pain and improve patient comfort. However, the effectiveness of these two methods in reducing pain levels still requires scientific proof
Objective:. It is known that there is a difference between warm compresses and cold compresses on the scale of joint pain in elderly rheumatism sufferers at the UPTD of the Tresna Werdha Natar Elderly Social Home, South Lampung, Lampung Province in 2025.
Method: This study used a quasi-experimental design with a two-group pretest-posttest approach. The study sample consisted of elderly patients with rheumatism, divided into two groups: a warm compress group and a cold compress group. Pain scale measurements were conducted before and after the intervention using a Numeric Rating Scale (NRS). Data analysis was performed using nonparametric tests, namely the Wilcoxon test to determine differences before and after the intervention, and the Mann-Whitney test to compare differences between the two groups.
Result The results of the study showed that both warm and cold compresses were effective in reducing pain scales in elderly rheumatic patients with a mean value of 1.27 ± 0.704 for warm compresses. The mean value for cold compresses was 1.60 ± 0.632. There was a decrease in the average pain scale after the intervention in both groups. However, the Mann-Whitney test results showed no significant difference between the two interventions with a p-value of 0.058.
Conclusion: Therefore, both can be recommended as non-pharmacological therapies in the management of rheumatic pain in the elderly.

Keywords: cold compress, elderly, pain scale, rheumatic, warm compress

Introduction

Aging is a process of gradual decline in bodily functions over time, experienced by almost all living things. This process is characterized by the emergence of physical weakness, increased susceptibility to disease and environmental changes, reduced mobility and dexterity, and various age-related physiological transformations. As the elderly age, physical complaints often arise, one of which is joint pain, commonly caused by osteoarthritis (OA), an inflammation of the joints caused, in part, by dehydration, or more commonly known as rheumatism (Wahyu Ningsih & Susmita Sari, 2024).

Rheumatism is a chronic, systemic inflammatory disease or autoimmune disease characterized by joint damage, ankylosis, and deformity. This disease belongs to the group of diffuse connective tissue diseases triggered by the immune system. Rheumatism is a chronic autoimmune inflammatory disorder or autoimmune response that causes the immune system to weaken, resulting in damage to the joints and synovial lining, especially in the hands, feet, and knees. Many people in Indonesia ignore rheumatism because it does not appear to be fatal. However, the pain it causes can significantly hinder a person's ability to carry out daily activities (Andryani & Hidayat, 2024).

According to World Health Organization (WHO) data, the prevalence of rheumatic joint pain in 2023 was 18 million people worldwide. Approximately 70% of those suffering from rheumatism were women, and 55% were over 55 years of age. The number of rheumatic sufferers is expected to continue to increase until 2030, with 25% of those suffering from it experiencing paralysis.

Basic Health Research (Riskesdas) data shows that the total population in Indonesia is approximately 278.7 million. The prevalence of rheumatic joint pain in Indonesia in 2023 was 11.9%, with a total of 33.16 million sufferers (2023 National Riskesdas Report).

According to Basic Health Research (Riskesdas), the number of cases of joint pain due to rheumatism in Lampung Province in 2021 reached 57,321, or 7.40% of cases. Since 2011, rheumatism has been one of the top 10 diseases with a total of 17,671 cases, or 5.24%. The majority of rheumatism cases are found in the age group over 60, accounting for 18.19% (Lampung Province Report, Riskesdas 2021).

The UPTD PSLU Tresna Werdha Natar, South Lampung, is a social home for the elderly located in the Natar District of South Lampung. It has been operating since 1980. The number of elderly people currently residing in the social care facility is 85: 41 men and 44 women. The elderly at the Natar Social Welfare Home are not only from Lampung Province, but also from outside Lampung Province, such as Palembang, Padang, and other areas. Currently, the main issue at the Natar Social Welfare Home is rheumatic pain. Eight complaints are currently being experienced by the elderly, one of which is rheumatic pain. The incidence of rheumatic disease is the highest in the Natar Social Welfare Home (Management of the Natar Social Welfare Home UPTD 2025).

Several factors can cause rheumatic pain, including individual factors such as aging (age), gender, genetics, environmental factors, obesity, use of salicylate drugs, smoking, and excessive coffee consumption. If left untreated, rheumatic joint pain can result in discomfort (pain), impaired mobility, which can lead to disability, paralysis, impaired activity, and even life-threatening conditions. There are several ways to manage rheumatic pain, including pharmacological and non-pharmacological therapies (Biology,2025).

Pain management for rheumatic patients can be carried out using pharmacological and non-pharmacological techniques. Pharmacologically, pain can be reduced or eliminated by taking analgesic medications such as NSAIDs, opiates, or adjuvants. Non-pharmacological

techniques include anticipatory guidance, hot and cold compresses, distraction, relaxation, guided imagery, self-hypnosis, acupuncture, and biofeedback (Widiastuti, 2022).

Warm compresses are a method that can trigger several physiological effects. The therapeutic benefits of applying warm compresses include reducing pain, improving blood circulation, relieving muscle spasms, and reducing joint stiffness. Warm compresses can relax the muscles in the blood vessels and dilate the blood vessels, thereby increasing the supply of oxygen and nutrients to the brain tissue (Valerian Fx Oscar et al., 2021).

This finding is supported by research (Widiastuti, 2022) on the effect of warm and cold compresses on joint pain in the elderly. This study used a quasi-experimental design with pre- and post-test nonequivalent control groups. The sampling method used was non-probability sampling with purposive sampling. Each intervention was conducted twice a week. Hypothesis testing using a paired t-test revealed a more significant effect of warm compresses on reducing joint pain (a difference of 2.45 points) compared to cold compresses (a difference of 0.90 points) with a p-value of 0.000. The cold compress intervention also had a significant effect on pain reduction, with a p-value of 0.000. Both warm and cold compresses had a significant effect on pain reduction. However, based on the mean difference, warm compresses had a greater effect, with a reduction of 2.45 points, than cold compresses, with a reduction of only 0.90 points.

Pre-survey data from the Tresna Werdha Natar Social Home for the Elderly in South Lampung, on October 7, 2025, revealed that the population of the elderly was 85, with 35 suffering from rheumatism. Although the incidence of rheumatism in the Natar Social Welfare Home (PSLU Tresna Werdha Natar) ranks first, health workers at the Natar Social Welfare Home (Panti Tresna Werdha Natar) have made significant efforts, including administering Vitamin B Complex and conducting regular exercise sessions every Friday. Ultraviolet light therapy was also used to reduce pain in the elderly, but this has been discontinued due to reluctance on the part of the elderly to participate in therapy (Manager of the UPTD Panti Tresna Werdha Natar 2025).

Based on interviews and pain measurement using the Numeric Rating Scale (NRS) on October 25, 2025, for 10 elderly rheumatism patients, 7 experienced moderate pain, and 3 experienced mild pain. Two reported pain relief by applying massage oil, four by massaging the affected area, two by applying warm compresses, and two by letting the pain subside on its own.

Based on the above background, numerous previous studies have been conducted on warm and cold compresses in rheumatism patients to assess pain levels. However, in this study, researchers implemented a warm compress intervention using an electric heating pad and a cold compress using a gel ice pack. This study concerns 2 groups that will receive the intervention.

Objective

It is known that there is a difference between warm compresses and cold compresses on the scale of joint pain in elderly rheumatism sufferers at the UPTD of the Tresna Werdha Natar Elderly Social Home, South Lampung, Lampung Province in 2025.

Method

The type of research is quantitative, namely research conducted to answer research questions by following scientific principles, namely concrete/empirical, objectively measurable, rational and systematic, with research data obtained in the form of numbers and

analysis using statistical methods (Sugiyono, 2024). The design that will be used is a Quasy Experiment, with a Two Group Pretest-Posttest Design approach, namely comparing the results of interventions carried out in two groups, namely the warm compress group and the cold compress group. Before the intervention, a pretest will be given in the form of measuring pain intensity using the Numeric Rating Scale (NRS), then the two groups will each be given an experiment, namely warm compresses and cold compresses according to the predetermined group, after which a posttest will be carried out, namely measuring pain intensity using the Numeric Rating Scale (NRS) again in both groups.

This study used a quasi-experimental design with a two-group pretest-posttest approach. The study sample consisted of elderly patients with rheumatism, divided into two groups: a warm compress group and a cold compress group. Pain scale measurements were conducted before and after the intervention using a Numeric Rating Scale (NRS). Data analysis was performed using nonparametric tests, namely the Wilcoxon test to determine differences before and after the intervention, and the Mann-Whitney test to compare differences between the two groups.

Result

Table 1. Frequency Distribution of Respondent Characteristics in Elderly People with Joint Pain

Respondent Characteristics	Warm Compress Group		Cold Compress Group	
	n	%	n	%
Gender				
Male	3	20	11	73.3
Female	12	80	4	26.7
Age				
60-70 years	9	60.0	10	66.7
71-80 years	5	33.3	2	13.3
81-90 years	1	6.7	3	20.0

Based on Table above based on gender, the warm compress group was dominated by women (12 respondents (80%), and the cold compress group was dominated by men (11 respondents (73.3%). The age group was dominated by those aged 60-70 years, with 9 respondents (60%) in the warm compress group and 10 respondents (66.7%) in the cold compress group.

Table 2. Mean Joint Pain Scale Before and After Warm Compresses in Rheumatism Patients

	n	Median (Min – Max)	Mean ± s.d
Mean Joint Pain Scale Pre-test	15	3 (2-4)	2.67 ± 0.724
Mean Joint Pain Scale Post-test	15	1 (1–3)	1.27 ± 0.704

Table above shows that there were 15 respondents in the warm compress group. The pain scale before the warm compress (pre-test) showed a median score of 3, with a minimum score of 2 and a maximum score of 4. The mean pre-test pain scale was 2.67 with a standard deviation of 0.724. After the warm compress intervention (post-test), there was a decrease

in pain scale, with a median score of 1 and a minimum score of 1 and a maximum score of 3. The mean post-test pain scale was 1.27 with a standard deviation of 0.704.

Table 3. Mean Joint Pain Scale Before and After Cold Compresses in Rheumatism Patients

	n	Median (Min-Max)	Mean ± s. d
Mean Joint Pain Scale Pretest	15	3 (2 -4)	2.60 ± 0.632
Mean Joint Pain Scale Post test	15	2 (1–3)	1.60 ± 0.632

Table shows that there were 15 respondents in the warm compress group. The pain scale before the cold compress (pre-test) showed a median score of 3, with a minimum score of 2 and a maximum score of 4. The pre-test pain scale mean score was 2.60 with a standard deviation of 0.632. After the cold compress intervention (post-test), there was a decrease in pain scale, with a median score of 2 and a minimum score of 1 and a maximum score of 3. The post-test pain scale mean score was 1.60 with a standard deviation of 0.632.

Table 4. Mean Joint Pain Scale Before and After Warm Compresses in Rheumatism Patients

	n	Median (Min– Max)	Mean ± s. d	*p-value*
Mean Joint Pain Scale Pretest	15	3 (2-4)	2.67 ± 0.724	0.000
Mean Joint Pain Scale Post test	15	1 (1–3)	1.27 ± 0.704	

Table above shows that there were 15 respondents in the warm compress group. The pain scale before the warm compress (pre-test) showed a median of 3, with a minimum range of 2 and a maximum of 4. The mean pre-test pain scale was 2.67 with a standard deviation of 0.724. After the warm compress intervention (post-test), there was a decrease in the pain scale, with a median of 1 and a minimum range of 1 and a maximum of 3. The mean post-test pain scale was 1.27 with a standard deviation of 0.704. The statistical test results showed a p-value of 0.000 ($p < 0.05$), indicating a significant difference between the pain scales before and after the warm compress.

Table 5. Mean Joint Pain Scale Before and After Cold Compresses in Rheumatism Patients

	n	Median (Min – Max)	Mean ± s. d	*p-value*
Mean Joint Pain Scale Pretest	15	3 (2-4)	2.60 ± 0.632	0.000
Mean Joint Pain Scale Posttest	15	2 (1–3)	1.60 ± 0.632	

Table shows that there were 15 respondents in the warm compress group. The pain scale before the cold compress (pre-test) showed a median of 3, with a minimum range of 2 and a maximum of 4. The mean pre-test pain scale was 2.60 with a standard deviation of 0.632. After the cold compress intervention (post-test), there was a decrease in the pain scale, with a median of 2 and a minimum range of 1 and a maximum of 3. The mean pain scale (post-test) was 1.60 with a standard deviation of 0.632. The statistical test results showed a P-value of 0.000 ($p<0.05$), indicating a significant difference between the pain scales before and after the warm compress.

Table 6. The Difference Between Warm and Cold Compresses on Joint Pain Scales In Elderly Patients with Rheumatism

	n	Median (Min – Max)	Mean ± s. d	*p-value*
Mean Joint Pain Scale Pretest	15	3 (2-4)	2.63 ± 0.669	0.000
Mean Joint Pain Scale Posttest	15	1 (1–3)	1.60 ± 0.679	

Based on Table above there were 15 respondents in the warm compress group and 15 in the cold compress group. In the warm compress group, the median score was 3 with a range of 2-4 and a mean of 2.63 ± 0.669. Meanwhile, in the cold compress group, the median score was 1 with a range of 1-3 and a mean of 1.43 ± 0.679. The Mann-Whitney statistical test showed a p-value of 0.058. Since the p-value (0.058) is greater than (P < 0.05), it can be concluded that there is no significant difference between the application of warm and cold compresses on joint pain scales in elderly patients with rheumatism.

Discussion

It was found that the number of respondents in the warm compress group was 15. The pain scale before the warm compress (pretest) showed a median score of 3, with a minimum score of 2 and a maximum score of 4. The mean score for the pain scale in the pretest was 2.67 with a standard deviation of 0.724. After the warm compress intervention (posttest), there was a decrease in the pain scale, with a median score of 1 and a minimum score of 1 and a maximum score of 3. The mean score for the posttest was 1.27 with a standard deviation of 0.704. The statistical test results showed a p-value of 0.000 (p<0.05), indicating a significant difference between the pain scale before and after the warm compress.

Pain is a sensation of discomfort manifested by the sufferer, caused by a real, psychological perception of threat. According to the theory of the International Pain Association, the understanding of pain emphasizes that pain is a physical event, which naturally emphasizes physical manipulation for pain management. Pain is recognized as an emotional experience whose management involves more than just physical intervention; it is also important to employ psychological manipulation (Agustina et al., 2023).

There were 15 respondents in the warm compress group. The pain scale before the cold compress (pre-test) showed a median score of 3, with a minimum score of 2 and a maximum score of 4. The mean score for the pre-test pain scale was 2.60 with a standard deviation of 0.632. After the cold compress intervention (post-test), there was a decrease in pain scale, with a median score of 2 and a minimum score of 1 and a maximum score of 3. The mean score for the post-test pain scale was 1.60 with a standard deviation of 0.632. The statistical test showed a p-value of 0.000 (p<0.05), indicating a significant difference between the pain scales before and after the cold compress.

There were 15 respondents in the warm compress group and 15 in the cold compress group. The warm compress group had a median score of 3 with a range of 2-4 and a mean of 2.63 ± 0.669. Meanwhile, the cold compress group had a median score of 1 with a range of 1-3 and a mean of 1.43 ± 0.679. The Mann-Whitney statistical test showed a p-value of 0.058. Since the p-value (0.058) is greater than (p < 0.05), it can be concluded that there is no significant difference between the application of warm and cold compresses on joint pain scores in elderly patients with rheumatism.

The findings of this study have significant clinical implications for reducing pain scores in patients with joint pain. The results of pain scale measurements after the intervention

indicated that both warm and cold compresses reduced pain intensity. The resulting reduction in pain scores indicates that both modalities are effective as non-pharmacological therapies in joint pain management. Physiologically, warm compresses work through vasodilation, increasing blood flow to the painful area, thereby helping to reduce joint stiffness, improve tissue elasticity, and provide muscle relaxation. This contributes to a gradual decrease in pain perception. Meanwhile, cold compresses work through vasoconstriction, temporarily reducing blood flow to the inflamed area, slowing the transmission of nerve impulses, and reducing the inflammatory process, making them effective in reducing acute pain and swelling.

Comparison of pre- and post-intervention results showed significant changes in the respondents' pain scales. This confirms that both warm and cold compresses can be used as safe, easy-to-administer, and economical self-administered interventions in nursing practice. The choice of compress type can be tailored to the patient's clinical condition, pain characteristics, and individual temperature tolerance.

However, during the study in the cold compress group, researchers also found variations in pain scale changes in some respondents. Two elderly men initially showed a gradual decrease in pain scale each day after being given a cold compress. However, at some point, their pain scale increased again. After interviews, both elderly men explained that the increased pain occurred because they continued to engage in physical activities to earn a living, such as cutting trees grass and assisting with other strenuous tasks. These activities cause excessive joint stress and muscle fatigue, triggering recurrence of pain despite previous cold compress intervention. This suggests that the effectiveness of cold compresses in reducing pain may be influenced by the respondents' level of physical activity. In rheumatic patients, strenuous activity or overuse of joints can trigger inflammation and pain recurrence. Therefore, the fluctuations in pain levels in these two elderly individuals were not solely due to the ineffectiveness of cold compresses, but were also influenced by daily activity factors that persisted throughout the study period.

Conclusion

Respondent characteristics based on gender: In the warm compress group, 12 respondents (80%) were female, and in the cold compress group, 11 respondents (73.3%) were male. The age group was dominated by 60-70 year olds, with 9 respondents (60%) in the warm compress group and 10 respondents (66.7%) in the cold compress group.

The average pain scale before the warm compress (pre-test) showed a median of 3, with a minimum range of 2 and a maximum of 4. The mean pre-test pain scale was 2.67 with a standard deviation of 0.724. After the warm compress intervention (post-test), there was a decrease in pain scale, with a median of 1 and a minimum range of 1 and a maximum of 3. The mean post-test pain scale was 1.27 with a standard deviation of 0.704.

The mean pain scale before the cold compress (pre-test) showed a median of 3, with a minimum range of 2 and a maximum of 4. The mean pre-test pain scale was 2.60 with a standard deviation of 0.632. After the cold compress intervention (post-test), there was a decrease in the pain scale, with a median of 2 and a minimum range of 1 and a maximum of 3. The mean pain scale (post-test) was 1.60 with a standard deviation of 0.632.

The results showed that in the warm compress group, a median of 3 was obtained with a range of 2-4 and a mean of 2.63 with a standard deviation of 0.669. Meanwhile, in the cold compress group, a median of 1 was obtained with a range of 1-3 and a mean of 1.43 with a standard deviation of 0.679. The results of the statistical test using the Mann-Whitney test

showed a p-value of 0.058. Because the P-value (0.058) is greater than (P < 0.05), there is no difference between warm and cold compresses.

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Authors' contribution

Each author contributed equally in all the parts of the research. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

Conflict of interest

No declare.

Ethical consideration

Not applicable.

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