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EFFECT OF THE COMBINATION OF STRETCHING AND RED GINGER HYDROTHERAPY ON PAIN REDUCTION IN ELDERLY PATIENTS WITH GOUT ARTHRITIS IN BENGKULU, INDONESIA

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Abstract

Gout arthritis is a metabolic disorder characterized by elevated uric acid levels that trigger the formation of crystals in the joints, resulting in pain, inflammation, and limited mobility, particularly in the elderly. Non-pharmacological interventions offer an effective alternative for pain relief without the side effects of medication. The combination of stretching exercises and red ginger hydrotherapy offers an innovative, safe, and practical approach. Stretching improves flexibility and blood circulation, while red ginger provides a natural warming and anti-inflammatory effect. The synergy between the two has the potential to be an effective strategy for reducing gouty arthritis pain and enhancing independence in self-care among the elderly. This study aimed to determine the effect of combined stretching and red ginger hydrotherapy on pain levels among elderly patients with gout arthritis at Nusa Indah Public Health Center, Bengkulu City, Indonesia. This study used a quantitative pre-experimental design with a one-group pretest-posttest approach. Participants were selected through purposive sampling based on specific inclusion and exclusion criteria, resulting in a total of 39 elderly respondents. Pain levels were measured using the Numeric Rating Scale (NRS) before and after the intervention. The results of the normality test, using the Shapiro–Wilk test, showed an abnormal distribution. Therefore, the researcher then used the Wilcoxon Signed Rank Test with a 95% confidence level ($\alpha = 0.05$). The mean pain score decreased from 4.79 before to 2.05 after the intervention. The results demonstrated a significant effect of stretching and red ginger hydrotherapy on reducing pain intensity ($p = 0.000$; $p < 0.05$). Regular implementation of these therapies is recommended to promote comfort and independence in managing gout-related pain among the elderly.

Keywords: Gout, Arthritis, Hydrotherapy, Red Ginger, Stretching

INTRODUCTION

Indonesia is one of the five countries with the largest elderly populations in the world. According to estimates from the World Health Organization (WHO), by 2030, one in six people globally will be over 60 years old, with the number of older adults projected to increase from 1 billion in 2020 to 1.4 billion (WHO, 2022). This growing elderly population has become a global concern, as it is closely associated with the rising prevalence of non-communicable diseases, including metabolic disorders such as gout

and arthritis. WHO reports that the global prevalence of gout arthritis ranges between 1% and 4%, and this rate tends to increase with advancing age and lifestyle changes in the population (Aupia 2021).

The highest prevalence of clinically diagnosed joint diseases in Indonesia is found in Aceh (13.26%), followed by Bengkulu (12.11%) and Bali (10.46%) (Kemenkes, 2018). Gout arthritis is among the ten most common diseases in Bengkulu City, with cases predominantly occurring among older adults aged 60–80 years across several community health centers: Nusa Indah (41%), Sukamerindu (27%), Sawah Lebar (17%), and Lempuing (14%). These data indicate that gout arthritis represents a significant community health problem requiring careful attention to pain management, particularly among the elderly population.

Gout arthritis is a metabolic disorder caused by the deposition of monosodium urate (MSU) crystals in the joints, bones, and soft tissues. This condition occurs when blood uric acid levels exceed normal limits, which range from 2.4 to 6.0 mg/dL in women and 3.4 to 7.0 mg/dL in men. The accumulation of urate crystals triggers severe pain, swelling, inflammation, warmth, and joint stiffness, particularly in the toes, knees, heels, wrists, fingers, and elbows (Ningrum et al., 2023).

Pain management in gout arthritis can be approached through both pharmacological and non-pharmacological methods. The pharmacological approach typically involves the use of nonsteroidal anti-inflammatory drugs (NSAIDs) and xanthine oxidase inhibitors (XOIs) to lower uric acid levels. However, long-term use of these medications may lead to serious side effects such as gastric irritation, liver damage, constipation, and even depression (Ilham 2020). Therefore, non-pharmacological interventions serve as safer and more sustainable alternatives.
Several studies have identified effective non-pharmacological interventions for reducing joint pain. Sunaringtyas et al. (2019) reported that stretching exercises and acupressure can decrease pain intensity in patients with joint disorders (Sunaringtyas, Afrian Nuari, and Widhianto 2019). Similarly, (Ilham 2020) found that warm compresses, distraction techniques, relaxation, massage, and transcutaneous electrical nerve stimulation (TENS) are also effective in alleviating musculoskeletal pain.

In addition to stretching, red ginger compresses are known to have therapeutic effects in relieving joint pain. Red ginger (*Zingiber officinale* var. *rubrum*) contains active compounds such as gingerol and shogaol, which possess anti-inflammatory and analgesic properties. The warming effect of ginger enhances blood circulation, reduces uric acid accumulation, and helps relax surrounding muscles (A Anggreini, S.N., and Novry, F.Y. 2018).

To date, few studies have specifically investigated the combined effect of stretching exercises and red ginger hydrotherapy as a method for reducing gout arthritis pain in the elderly, particularly in Bengkulu.

If proven effective, this combination could serve as a reference for primary healthcare facilities, such as community health centers (*puskesmas*), to implement simple, safe, and practical non-pharmacological therapies that older adults can perform independently at home. This approach may provide an alternative or complementary therapy to conventional medical treatments for managing joint pain caused by gout arthritis.

The combination of stretching exercises and red ginger hydrotherapy integrates two distinct yet complementary approaches. Stretching works through mechanical mechanisms by improving muscle and joint flexibility, while red ginger hydrotherapy exerts thermal and herbal effects through its active compounds—gingerol and shogaol—which provide warmth and anti-inflammatory benefits. Together, these interventions are expected to have a synergistic effect in reducing joint pain among elderly individuals with gout arthritis. Based on this rationale, the present study aims to answer the research question: *Does the combination of stretching exercises and red ginger hydrotherapy produce a greater effect in reducing gout arthritis pain among older adults in Bengkulu City?*

MATERIALS AND METHODS

This study employed a quantitative research approach with a pre-experimental design using a one-group pretest–posttest format. The design aimed to examine the effect of stretching and red ginger hydrotherapy on changes in pain intensity among elderly patients with gout arthritis. The research was conducted within the working area of Nusa Indah Public Health Center, Bengkulu City.

The study population consisted of 43 older adults who experienced pain due to gout arthritis. The sampling technique used was purposive sampling, in which participants were selected based on predetermined inclusion and exclusion criteria. Based on these criteria, 39 respondents met the eligibility requirements and were included as research participants.

The intervention consisted of hydrotherapy using a warm red ginger compress maintained at approximately 40°C for 20 minutes, followed by a 5-minute rest period, and then stretching exercises lasting approximately 20 minutes. Pain intensity was measured before and after the intervention using the Numeric Rating Scale (NRS), which assesses pain on a scale from 0 to 10.

Data analysis was conducted in two stages. First, univariate analysis was performed to describe the average pain scale of elderly patients with gout arthritis before and after undergoing stretching and red ginger hydrotherapy. The pain scale data were analyzed to determine the mean, standard deviation, median, range (minimum to maximum), and 95% confidence interval (CI). Bivariate analysis was then conducted to test the study hypothesis by determining the effect of stretching and red ginger hydrotherapy

on changes in pain intensity among elderly patients with gout arthritis. The Shapiro–Wilk test was used to assess the normality of data distribution, which showed that the data were not normally distributed (*p* < 0.05). Therefore, the Wilcoxon Signed Rank Test was applied with a significance level of α = 0.05 (*p* < 0.05).

This research underwent an ethical review and was declared ethically feasible by the Health Research Ethics Committee (KEPK) of Poltekkes Kemenkes Bengkulu, as stated in Ethical Clearance Certificate No. KEPK.BKL/046/03/2024. All respondents were protected from any physical or psychological risks during the study and were provided with complete explanations and informed consent prior to participation.

RESULTS AND DISCUSSION

Result

Table 1. Mean Pain Scale Before and After Stretching and Red Ginger Hydrotherapy

Variable	Mean	Median	Min	Max	SD	95% CI	p-value
Pre-intervention	4.79	5	4	6	0.767	4.55–5.04	
Post-intervention	2.05	2	1	3	0.724	1.82–2.29	0.000

The average pain score before the intervention was 4.79 and decreased to 2.05 after the intervention. The Shapiro–Wilk test confirmed that data were not normally distributed ($p = 0.000$).

Table 2. Wilcoxon Signed Rank Test Results for Pain Scale Changes

Variable	N	Mean Rank	Sum of Ranks	Z	p-value
Negative Ranks	0	0.00	0.00		
Positive Ranks	39	20.00	780.00	-5.680	0.000
Ties	0				

All 39 participants experienced a decrease in pain intensity after the intervention (positive ranks = 39). The Wilcoxon test yielded $Z = -5.680$ and $p = 0.000$ ($p < 0.05$), confirming a statistically significant difference in pain levels before and after treatment.

Discussion

This study examined the effect of stretching exercises combined with red ginger hydrotherapy on pain reduction among older adults with gout arthritis at the Nusa Indah Public Health Center in Bengkulu, Indonesia. Table 1 shows that the mean pain score before the intervention was 4.79, whereas the mean pain score after the intervention decreased to 2.05. The normality test using the Shapiro–Wilk method

revealed a *p*-value of 0.000 ≤ α 0.05, indicating that the data were not normally distributed.

Table 2 presents the results of the Wilcoxon Signed Rank Test used to determine the effect of stretching and red ginger hydrotherapy on changes in pain levels among elderly patients with gout arthritis. Based on the analysis, all respondents (n = 39) experienced a reduction in pain intensity after the intervention, as indicated by positive ranks for all participants (mean rank = 20.00; sum of ranks = 780.00). No negative ranks or ties were observed, meaning that none of the respondents experienced an increase or no change in pain level following the intervention.

The Wilcoxon test produced a *Z*-value of -5.680 with a *p*-value of 0.000 (*p* < 0.05), confirming a statistically significant difference in pain scores before and after the combined therapy. Thus, the combination of stretching exercises and red ginger hydrotherapy was effective in reducing pain intensity among elderly individuals suffering from gout arthritis. These findings are consistent with recent research in Indonesia showing that red ginger compresses significantly reduce pain intensity in gout arthritis patients (Handayani, S., and Sujono, R. 2022).

The results of this study are also in line with the findings of Anita et al. (2020), who reported that warm red ginger compresses effectively relieve pain due to the presence of gingerol and shogaol. These compounds possess natural nonsteroidal anti-inflammatory properties, acting by inhibiting inflammatory processes and improving blood circulation in the affected joints. The warmth and mild pungency of red ginger also provide a soothing sensation, reducing joint pain, inflammation, and stiffness. Therefore, the use of red ginger compresses represents an effective and easily applicable herbal therapy within community nursing practices (Anita et al. 2020).

This study also supports the findings of Handayani and Sujono (2022), who stated that stretching exercises improve blood circulation, strengthen bones, and maintain the flexibility of muscles and joints. Such activities play an essential role in reducing muscle stiffness and preventing the decline in joint mobility commonly observed in older adults. With improved flexibility and circulation, pain due to gout arthritis can be progressively reduced (Handayani & Sujono, 2022).

Empirically, this study demonstrates that the combination of stretching and red ginger hydrotherapy significantly influences the reduction of pain intensity among older adults with gout arthritis in the Nusa Indah Public Health Center area. Based on the Wilcoxon Signed Rank Test, the mean pain scale decreased from 4.79 before the intervention to 2.03 afterward, with a significance value of 0.000 (*p* < 0.05). These findings suggest that both therapies exert synergistic effects in reducing joint pain among elderly individuals.

Gout arthritis is a condition resulting from increased uric acid levels that lead to the deposition of monosodium urate crystals in the joints, causing pain and inflammation. Under such conditions, a combination therapy of stretching and red ginger hydrotherapy may help alleviate pain through physiological mechanisms (Doughty & Wahler, 2020). Red ginger contains essential oils, gingerol, and shogaol, which have analgesic, anti-inflammatory, antioxidant, and vasodilatory properties. These physiological effects help reduce muscle spasms, enhance blood circulation, and diminish the sensation of pain (Ilham 2020).

Stretching exercises have been proven to provide substantial benefits in reducing joint pain. Stretching increases blood flow to muscle tissues, accelerates nerve impulse transmission, and improves coordination between muscle contraction and relaxation. Consequently, stretching helps alleviate stiffness and enhances joint flexibility in older adults with gout arthritis. This finding aligns with that of Handayani and Sujono (2022), who concluded that there is a significant correlation between stretching exercises and reduced joint pain in the elderly (*p* < 0.05). After performing stretching exercises, most respondents experienced a decrease in pain level from moderate to mild categories (Handayani, S., and Sujono, R. 2022).

The combined therapy of red ginger compresses and stretching exercises is proven effective because each component provides complementary mechanisms. Red ginger compresses promote vasodilation and local blood circulation, whereas stretching improves joint mobility and muscle elasticity. These mechanisms work synergistically to reduce inflammation, enhance tissue oxygenation, and minimize uric acid buildup in the affected joints. Hence, this combined therapy can serve as a safe, inexpensive, and widely applicable non-pharmacological approach at the primary healthcare level.

This study possesses several strengths that reinforce its contribution to nursing science, particularly in community and geriatric nursing. First, it introduces an innovative combination of non-pharmacological interventions—stretching exercises and red ginger hydrotherapy—methods that are simple yet rarely studied together in managing gout arthritis pain. The combination provides a synergistic effect, wherein stretching improves muscular flexibility and joint relaxation, while red ginger offers natural anti-inflammatory and analgesic benefits through its bioactive compounds (Almar, Winarto, & Eka, 2023). Second, the interventions used are highly relevant to community and geriatric nursing practice, as they are easy to implement, require no sophisticated equipment, and carry minimal risk of side effects, making them ideal for application in primary health centers, elderly community programs, and home visits.

However, this study also has several limitations. The absence of a control group limits the ability to differentiate the intervention effects from external factors such as daily activities, medication intake, or environmental conditions. The relatively small sample size and restricted geographical scope (39 respondents from a few community health centers) limit the generalizability of the findings. Furthermore,

the use of the Numeric Rating Scale (NRS) as a pain assessment tool is subjective and can be influenced by psychological factors, mood, and individual pain tolerance. The short intervention duration also restricts the evaluation of long-term effects on pain recurrence and joint function improvement. Lastly, confounding variables such as physical activity level, purine-rich diet, medication adherence, and body weight were not fully controlled, potentially affecting the results.

Based on these findings and limitations, it is recommended that future studies adopt a true experimental design such as a randomized controlled trial (RCT) to obtain stronger comparative evidence between intervention and control groups. Moreover, extending the duration and frequency of interventions will enable the evaluation of long-term effects on joint function and quality of life among older adults. Future research should also incorporate both subjective and objective measurements, such as serum uric acid levels or joint range of motion assessments. Expanding study coverage to include broader populations and areas will enhance external validity, while training community health workers may help ensure that stretching and red ginger hydrotherapy interventions can be implemented independently, sustainably, and integrated within public health services.

In summary, the combined intervention of stretching and red ginger hydrotherapy shows promise as a practical, safe, and effective complementary therapy for reducing gout arthritis–related pain in older adults. If validated through more rigorous trials, this approach could be incorporated into primary care and community-based pain management protocols for the elderly.

CONCLUSION

Based on the results and analysis, the mean pain score before the intervention was 4.79, which decreased to 2.05 after the intervention. The Wilcoxon test yielded a *p*-value of 0.000 (*p* < 0.05), indicating a significant effect of stretching and red ginger hydrotherapy on reducing pain among elderly patients with gout arthritis. It is recommended that stretching exercises and red ginger hydrotherapy be practiced regularly by older adults and their families as supportive therapies to enhance comfort and promote independence in pain management. Furthermore, healthcare professionals at community health centers (*puskesmas*) are encouraged to provide education and guidance on the proper techniques of these therapies to the community, both through elderly health programs (*posyandu lansia*) and within broader health promotion and preventive care activities.

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DECLARATION OF INTEREST STATEMENT

The author(s) declare that there is no conflict of interest related to the conduct, analysis, or publication of this research. All stages of the study—including data collection, interpretation, and manuscript preparation—were carried out independently and objectively, without any influence from external parties, funding bodies, or commercial entities.

This research was conducted solely for academic and scientific purposes, aiming to contribute to the advancement of nursing science, particularly in the area of nonpharmacological interventions for managing gout arthritis pain in the elderly.

If any potential conflict of interest arises in the future, the author(s) commit to disclosing it transparently in accordance with academic and ethical publication standards.

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