

Warm red-ginger foot soaking for headache relief: A case study among hypertensive elderly

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ABSTRACT

Headache is a clinically relevant complaint among elderly people with hypertension, yet evidence regarding simple culturally familiar complementary nursing interventions such as warm red-ginger foot soaking remains limited. This study aimed to evaluate the effectiveness of warm red-ginger water foot-soaking therapy in reducing headache intensity among elderly patients with hypertension. A descriptive case-study design was conducted at Puskesmas Tamalanrea Jaya, Makassar City, involving two participants aged ≥ 60 years with physician-diagnosed hypertension and headache complaints. Data were collected through interviews, observation, questionnaires, and repeated pain assessment using the Verbal Descriptor Scale supported by the Numeric Rating Scale. The intervention consisted of soaking both feet in warm red-ginger water for 15–30 minutes over a 3–5-day period. Before the intervention, the first participant reported a pain score of 6, categorized as moderate pain, while the second participant reported a score of 7, categorized as severe pain. Following the intervention, pain scores decreased to 3 and 2, respectively, both categorized as mild pain. These findings suggest that warm red-ginger foot soaking may serve as a simple, accessible complementary nursing intervention to reduce headache complaints and improve comfort among elderly patients with hypertension. Further controlled studies with larger samples are required to confirm effectiveness and determine its broader clinical applicability.

ABSTRAK

Sakit kepala merupakan keluhan klinis yang cukup penting pada lansia dengan hipertensi. Namun, bukti mengenai intervensi keperawatan komplementer yang sederhana dan familiar secara budaya, seperti terapi rendam kaki menggunakan air hangat jahe merah, masih terbatas. Penelitian ini bertujuan untuk mengevaluasi efektivitas terapi rendam kaki dengan air hangat jahe merah dalam menurunkan intensitas sakit kepala pada pasien lansia dengan hipertensi. Penelitian menggunakan desain studi kasus deskriptif yang dilaksanakan di Puskesmas Tamalanrea Jaya, Kota Makassar, dengan melibatkan dua peserta berusia ≥ 60 tahun yang telah didiagnosis hipertensi oleh dokter dan mengalami keluhan sakit kepala. Data dikumpulkan melalui wawancara, observasi, kuesioner, serta penilaian nyeri berulang menggunakan Verbal Descriptor Scale yang didukung oleh Numeric Rating Scale. Intervensi dilakukan dengan merendam kedua kaki dalam air hangat jahe merah selama 15–30 menit selama periode 3–5 hari. Sebelum intervensi, peserta pertama melaporkan skor nyeri 6 yang dikategorikan sebagai nyeri sedang, sedangkan peserta kedua melaporkan skor nyeri 7 yang dikategorikan sebagai nyeri berat. Setelah intervensi, skor nyeri menurun masing-masing menjadi 3 dan 2, yang keduanya termasuk dalam kategori nyeri ringan. Temuan ini menunjukkan bahwa terapi rendam kaki dengan air hangat jahe merah berpotensi menjadi intervensi keperawatan komplementer yang sederhana, mudah diterapkan, dan terjangkau untuk membantu mengurangi keluhan sakit kepala serta meningkatkan kenyamanan pada lansia dengan hipertensi. Penelitian terkontrol lebih lanjut dengan jumlah sampel yang lebih besar diperlukan untuk mengonfirmasi efektivitas serta menentukan penerapannya secara lebih luas dalam praktik klinis.

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INTRODUCTION

Hypertension remains one of the most important noncommunicable diseases worldwide and contributes substantially to cardiovascular morbidity, disability, and premature mortality. Earlier estimates predicted a continuing increase in hypertension alongside population growth (World Health Organization, 2013). More recent WHO data indicate that approximately 1.4 billion adults aged 30–79 years were living with hypertension in 2024, with approximately two-thirds residing in low- and middle-income countries, confirming that hypertension continues to impose a disproportionate burden on resource-constrained populations. In Indonesia, the 2023 Indonesian Health Survey (Survei Kesehatan Indonesia, SKI) demonstrated a marked age-related pattern: medically diagnosed hypertension reached 23.8% among individuals aged 65–74 years, compared with only 0.3% among those aged 15–24 years (Kementerian Kesehatan Republik Indonesia, 2023). National surveillance also confirms that hypertension remains highly prevalent across Indonesian provinces and requires sustained prevention, detection, and management through primary health-care services.

The burden is also evident at the local level. In Makassar City, 290,247 individuals with hypertension were reported in 2020, representing the highest number of recorded cases in South Sulawesi Province at that time (Dinas Kesehatan Provinsi Sulawesi Selatan, 2020). At Puskesmas Tamalanrea Jaya, 683 hypertension cases were recorded in 2024 among a population of 20,441 people (Puskesmas Tamalanrea Jaya, 2024). Older adults constitute an especially vulnerable group because ageing is accompanied by progressive changes in cardiovascular function, muscle mass, physical capacity, cognition, and the ability to maintain physiological homeostasis (Stanhope & Lancaster, 2016). Ageing is also commonly associated with multimorbidity, which can complicate symptom assessment and disease management. Although hypertension is frequently asymptomatic, older patients with hypertension may present with complaints such as headache or neck discomfort, particularly in clinical situations requiring further assessment (Smeltzer & Bare, 2018).

Headache in older adults with hypertension is an important nursing concern because pain may interfere with comfort, sleep, mobility, daily activities, and overall quality of life. Pain is defined as an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage, and its impact is influenced by biological, psychological, and social factors (IASP, 2020). Headache disorders in later life may coexist with multimorbidity and can contribute to impaired physical functioning, emotional disturbances, sleep problems, and reduced participation in daily activities (Tana et al., 2026). Hypertension and its treatment may further increase self-management demands among older adults (Chantakeeree et al., 2021; Kumar et al., 2023). Chronic or recurrent pain can also reduce independence and quality of life, highlighting the importance of systematic nursing assessment and individualized symptom management (Markovics et al., 2025; Afshar et al., 2025; Pendet et al., 2024). Therefore, complementary non-pharmacological interventions that are simple, acceptable, and feasible within primary-care or household settings warrant further investigation as adjuncts to standard hypertension management.

One complementary intervention that can be implemented with minimal equipment is warm-water foot-soaking hydrotherapy. Thermal stimulation from warm water may promote peripheral vasodilation, increase local circulation, reduce muscular tension, and facilitate relaxation through physiological thermoregulatory responses (Guyton & Hall, 2017). Warm footbaths have consequently been explored for relaxation, thermal comfort, sleep, and cardiovascular-related outcomes. Evidence from experimental studies indicates that footbaths can increase subjective warmth and influence physiological responses, supporting their potential as a low-intensity complementary intervention.

The intervention may be combined with ginger (*Zingiber officinale*), particularly red ginger, which is commonly used as a traditional medicinal plant in Indonesia. Red ginger contains relatively abundant volatile and pungent bioactive compounds and is widely utilized in traditional health practices (Kementerian Pertanian Republik Indonesia, 2018). Gingerols and related constituents have demonstrated biological activities relevant to inflammation, circulation, and pain mechanisms (Ali et al., 2008). Studies of ginger footbaths have shown enhanced warmth perception compared with warm water alone, while research in hypertensive populations has reported reductions in blood

pressure following warm ginger foot-soaking interventions. Nevertheless, the evidence is not entirely consistent; a clinical study of ginger footbaths for insomnia found no clear superiority of ginger over warm water alone for several outcomes, suggesting that the specific therapeutic contribution of ginger requires further investigation.

Existing studies on warm-water or ginger footbaths have predominantly focused on blood pressure, peripheral warmth, relaxation, and sleep-related outcomes. Evidence specifically examining headache reduction among older adults with hypertension remains limited, particularly in Indonesian primary health-care settings. Moreover, findings on the physiological and analgesic properties of ginger cannot automatically establish that adding red ginger to warm-water foot soaking will reduce headache intensity. This gap is clinically important because non-pharmacological pain-management strategies may complement pharmacological treatment while supporting comfort and self-care among multimorbid older adults.

Accordingly, the novelty of this study lies in evaluating warm red-ginger foot-soaking therapy specifically as a nursing intervention for headache complaints among elderly patients with hypertension in a community primary-care context. Using a descriptive case-study design at Puskesmas Tamalanrea Jaya, Makassar City, this study focuses on changes in headache complaints following the application of a simple, culturally familiar, and potentially replicable complementary intervention. The study aimed to determine the effectiveness of warm red-ginger water foot-soaking therapy in reducing headache complaints among elderly patients with hypertension.

METHODS

Study Design and Setting

This study employed a descriptive case-study design to evaluate changes in headache intensity among elderly patients with hypertension following warm red-ginger water foot-soaking therapy. The case-study approach was used to obtain a detailed description of each participant's initial clinical condition, response to the intervention, and changes in pain intensity during the observation period.

The study was conducted at Puskesmas Tamalanrea Jaya, Makassar City, South Sulawesi, Indonesia. Each participant received the intervention and was monitored for approximately 3–5 consecutive days. The intervention focused on repeated assessment of headache intensity before and after warm red-ginger water foot-soaking therapy.

Population, Sample, and Sampling Technique

The target population consisted of elderly patients with hypertension receiving health services at Puskesmas Tamalanrea Jaya. Two elderly patients who had been diagnosed with hypertension and experienced headache complaints were selected as study participants. Participants were recruited using purposive sampling, based on their suitability with the predefined clinical criteria and willingness to complete the intervention.

Participants were included if they: (1) had a physician-confirmed diagnosis of hypertension; (2) were aged ≥ 60 years; (3) experienced headache complaints associated with their hypertensive condition; (4) were willing to receive warm red-ginger water foot-soaking therapy for 3–5 days; and (5) had no wounds, skin lesions, or known allergies involving the foot area.

Participants were excluded if they were unable to complete the intervention period, developed skin irritation or other adverse reactions during therapy, or experienced clinical deterioration requiring further medical management.

Intervention Procedure

The intervention consisted of soaking both feet in warm water containing a decoction of red ginger (*Zingiber officinale* var. *rubrum*). Before each session, the participant's general condition was assessed and the feet were inspected to ensure the absence of wounds, skin irritation, or other contraindications.

The warm red-ginger water was prepared and placed in an appropriate container, after

which the participant immersed both feet in the solution. Each intervention session was conducted for approximately 15–30 minutes. Throughout the procedure, participants were observed for comfort, tolerance, dizziness, skin reactions, or other adverse responses.

Headache intensity was assessed immediately before and after each therapy session. The intervention was repeated during the planned 3–5-day observation period. Warm red-ginger foot soaking was provided as a complementary nursing intervention and did not replace prescribed antihypertensive medication or other medical treatment.

Data Collection

Data were collected using interviews, direct observation, questionnaire completion, and repeated pain assessments. Interviews were conducted to obtain information regarding patient characteristics, hypertension history, headache complaints, and subjective responses to therapy. Direct observation was used to document the patient's clinical condition and response during and after each intervention.

Pain intensity was measured before and after warm red-ginger foot soaking to identify changes associated with each intervention session. Data collection therefore included the initial clinical condition, baseline headache characteristics, pain intensity before intervention, pain intensity after intervention, and clinical responses during the intervention period.

Research Instruments

The research instruments consisted of an observation sheet and pain-assessment tools using the Verbal Descriptor Scale (VDS) supported by an explanation based on the Numeric Rating Scale (NRS). The VDS was used to categorize pain descriptively, while the NRS provided a numerical score ranging from 0 to 10, where 0 represented no pain and 10 represented the worst possible pain.

The combined use of verbal and numerical pain assessment was intended to facilitate communication with elderly participants and improve consistency in identifying changes in headache intensity. The same instrument was used before and after each intervention session.

Data Analysis

Data were analyzed using a descriptive clinical case-analysis approach. Each participant was analyzed individually by describing the baseline clinical condition, blood-pressure status, headache characteristics, intervention provided, responses during therapy, and changes in pain intensity over the observation period.

Pre- and post-intervention pain scores were compared descriptively for each session. Changes across successive intervention days were also examined to determine whether headache intensity demonstrated a consistent decreasing pattern. The findings of the two cases were then compared to identify similarities and differences in treatment response.

Because the study involved only two participants and did not include a control group, inferential statistical analysis was not performed. Therefore, the results were interpreted as descriptive case-level evidence and were not used to establish population-level effectiveness or a definitive causal relationship.

The findings were presented in narrative and tabular formats. Participant characteristics, initial blood pressure and headache conditions, and pre- and post-intervention pain scores were summarized in tables. Changes in pain intensity across the intervention period were presented sequentially to demonstrate the clinical progress of each participant.

Ethical Considerations and Informed Consent

Before participation, each participant received information regarding the purpose, procedures, potential benefits, and possible discomfort associated with the intervention. Participation was voluntary, and participants were informed that they could withdraw from the study at any time without affecting their access to health services.

Informed consent was obtained before data collection and implementation of the

intervention. Participant confidentiality was maintained by using initials or participant codes rather than identifying information in study documentation and reporting. The condition of the feet was assessed before each therapy session, and the intervention was discontinued if skin irritation, allergic reactions, excessive discomfort, dizziness, or other adverse clinical responses occurred.

RESULTS AND DISCUSSION

The findings indicate a consistent reduction in headache intensity following warm red-ginger water foot-soaking therapy among two elderly hypertensive patients at Puskesmas Tamalanrea Jaya, Makassar City. Both participants initially had markedly elevated blood pressure and moderate-to-severe headache. After three consecutive days of therapy, pain intensity progressively decreased, suggesting the potential of this intervention as complementary nursing care.

Characteristics and Initial Headache Intensity of Elderly Patients with Hypertension

The study involved two elderly female patients. Mrs. B was 65 years old, had completed junior high school, and was a housewife, while Mrs. S was 62 years old, had completed senior high school, and was also a housewife (see Table 1).

Table 1
Characteristics of Participants

Participant	Age	Sex	Educational level	Occupation
Mrs. B	65 years	Female	Junior high school	Housewife
Mrs. S	62 years	Female	Senior high school	Housewife

At baseline, Mrs. B had a blood pressure of 170/108 mmHg and a pain score of 6, categorized as moderate pain. She described a strong pulsating, hot, and pressure-like headache that interfered with daily activities. Mrs. S had a blood pressure of 180/115 mmHg and a pain score of 7, categorized as severe pain, with sharp and throbbing pain radiating toward the occipital region and accompanied by nausea (see Table 2).

Table 2
Baseline Blood Pressure and Headache Intensity

Participant	Blood pressure	Pain score	Clinical complaint
Mrs. B	170/108 mmHg	6, moderate	Pulsating and pressure-like headache
Mrs. S	180/115 mmHg	7, severe	Sharp, throbbing headache with nausea

These findings demonstrate clinically important headache in the context of poorly controlled hypertension. Ageing is associated with reduced arterial elasticity and increased vascular resistance, which may contribute to elevated blood pressure (Smeltzer & Bare, 2018; Glazier, 2022). However, headache should not automatically be attributed solely to hypertension because it may have multiple causes (Azzakiyah & Kurniawan, 2023).

The participants' characteristics are consistent with evidence that hypertension becomes more common with increasing age because of vascular stiffness and altered vascular resistance (Glazier, 2022). Older adults may also have multimorbidity and reduced physiological reserve that affect symptoms and treatment responses.

Pain is a multidimensional experience influenced by biological, psychological, and social factors (IASP, 2020). Therefore, moderate-to-severe headache may interfere with sleep, mobility, concentration, comfort, and daily activities.

The coexistence of high blood pressure and headache highlights the importance of assessing both symptoms and cardiovascular status. Although an association between blood pressure and headache has been reported (Azzakiyah & Kurniawan, 2023), severe or changing headache

characteristics require careful clinical evaluation, particularly when accompanied by nausea, neurological symptoms, or visual disturbances.

Pain scores of 6 and 7 indicate the need for active symptom management alongside routine hypertension care. Nurses should assess headache systematically using standardized pain scales while simultaneously monitoring blood pressure and other clinical manifestations.

Combined pain and blood-pressure assessment provides a more comprehensive clinical picture, particularly in older adults who may experience medication effects, dehydration, orthostatic changes, and age-related cardiovascular alterations (El-Saidy et al., 2022). Medication use, hydration, functional condition, and warning signs should therefore be assessed before complementary therapy.

Changes in Headache Intensity Following Warm Red-Ginger Foot-Soaking Therapy

Warm red-ginger foot soaking was performed for three consecutive days, lasting approximately 15–30 minutes per session. Pain intensity was measured immediately before and after each intervention.

Both participants demonstrated progressive reductions in headache intensity. Mrs. B's pain decreased from 6 at baseline to 2 after the final intervention, while Mrs. S's pain decreased from 7 to 3. Both participants therefore moved from moderate-to-severe pain to mild pain.

Pre-intervention scores also decreased across the three days, from 6 to 5 to 4 in Mrs. B and from 7 to 5 to 4 in Mrs. S. This suggests improvement both immediately after therapy and across the intervention period. However, because only two cases were studied without a comparison group, the improvement cannot be attributed exclusively to the intervention (see Table 3).

Table 3

Headache Pain Scores Before and After Therapy

Participant	Day 1 Pre	Day 1 Post	Day 2 Pre	Day 2 Post	Day 3 Pre	Day 3 Post
Mrs. B	6	5	5	3	4	2
Mrs. S	7	6	5	4	4	3

The reduction in headache is consistent with previous studies on warm-water and ginger-based complementary therapies. Warm red-ginger foot soaking has been reported to improve comfort, circulation, blood pressure, and headache complaints among hypertensive patients (Nurpratiwi et al., 2021), while warm-water foot soaking has also been applied as a non-pharmacological component of hypertension care (Rahmawati & Gunawan, 2022).

Warm water may promote peripheral vasodilation, improve local circulation, reduce muscular tension, and produce relaxation (Guyton & Hall, 2017). These physiological and sensory effects may contribute to reduced pain perception and greater comfort.

Red ginger contains gingerols and shogaols, which have demonstrated anti-inflammatory and analgesic properties (Ali et al., 2008; Zhang et al., 2022). Its warming sensation and characteristic aroma may complement thermal stimulation (Batubara et al., 2023; Yanti et al., 2024). Nevertheless, effects identified from oral or topical ginger preparations cannot be assumed to operate identically during foot soaking. The observed improvement may therefore reflect combined effects of warmth, relaxation, rest, sensory stimulation, and potentially ginger-derived compounds.

The four-point reductions observed in both patients are clinically relevant because headache can directly affect comfort and daily functioning. Mrs. B improved from a pain score of 6 to 2, while Mrs. S improved from 7 to 3.

From a nursing perspective, warm red-ginger foot soaking may be considered an adjunctive comfort intervention for selected elderly hypertensive patients. Other non-pharmacological interventions, including progressive muscle relaxation, deep-breathing exercises, and acupressure, have also demonstrated potential benefits in older adults with hypertension (Susyanti & Rahayu, 2022; Permatasari et al., 2023; Krisnadeva & Hidayah, 2023; Mukaromah & Kurdi, 2024).

However, the therapy should not replace antihypertensive medication or clinical evaluation. Because both participants had markedly elevated baseline blood pressure, medication adherence,

regular monitoring, lifestyle modification, and professional medical management remain essential (Putri et al., 2021; Glazier, 2022).

Effectiveness and Acceptability of Warm Red-Ginger Foot Soaking

The intervention was feasible to administer for three consecutive days and was associated with pain reduction in both participants. Red ginger is familiar in Indonesian traditional health practices, which may increase the cultural acceptability of this intervention.

Ginger and other Zingiberaceae plants are widely used in Indonesian communities as traditional medicines and health-promoting ingredients (Sayuti & Rusita, 2023; Lestari et al., 2022). This familiarity may support patient participation because complementary interventions are influenced not only by perceived effectiveness but also by cultural beliefs, convenience, and accessibility.

The present findings are consistent with literature supporting non-pharmacological interventions for hypertension and pain management among older adults. Progressive muscle relaxation, slow deep-breathing, and acupressure have been explored as complementary strategies for reducing pain or improving blood-pressure-related outcomes (Susyanti & Rahayu, 2022; Permatasari et al., 2023; Krisnadeva & Hidayah, 2023; Mukaromah & Kurdi, 2024).

These approaches, like warm red-ginger foot soaking, require little complex equipment and may encourage patient involvement in symptom management. The distinctive feature of the present intervention is its combination of thermal stimulation and a culturally familiar herbal ingredient.

Nevertheless, the specific contribution of red ginger cannot be determined because there was no warm-water-only comparison group. Improvements may also have resulted from warm water, rest, relaxation, nursing attention, natural fluctuations in headache, or concurrent therapy. Future studies should therefore compare warm water alone, warm water with red ginger, and standard care.

Warm red-ginger foot soaking may serve as a simple, inexpensive, and culturally acceptable complementary intervention for selected elderly patients with hypertension. It may also be suitable for supervised home use after appropriate education.

Careful nursing assessment remains necessary because older adults may be vulnerable to altered thermoregulation, peripheral neuropathy, skin injury, orthostatic hypotension, and cardiovascular instability. Nurses should monitor water temperature, skin condition, sensation, patient tolerance, and blood pressure when clinically indicated (El-Saidy et al., 2022; Glazier, 2022).

Several limitations should be considered. First, only two participants were included, limiting generalizability. Second, there was no control group, preventing causal conclusions. Third, the intervention was conducted at different times of day, which may have influenced symptoms. Fourth, serial pre- and post-intervention blood-pressure measurements were unavailable for all treatment days. Medication use, hydration, sleep, stress, comorbidities, and natural variations in pain may also have influenced the findings.

Despite these limitations, both participants showed consistent reductions in pain: Mrs. B from 6 to 2 and Mrs. S from 7 to 3 after three days of therapy. Thus, the study objective was achieved at the descriptive case level. Future research should involve larger samples, standardized intervention protocols, control groups, repeated blood-pressure measurements, and longer follow-up to clarify the magnitude and mechanism of the effect and its potential role in gerontological, community, and primary-care nursing.

CONCLUSION

Warm red-ginger foot-soaking therapy was associated with reduced headache intensity in two elderly patients with hypertension. Pain scores decreased from 6 and 7 before the intervention to 3 and 2 after 15–30 minutes of therapy, with both respondents categorized as having mild pain afterward. The intervention may serve as a simple complementary nursing approach to improve comfort because it is easy to administer and uses accessible materials. However, the findings are limited by the descriptive case-study design, the inclusion of only two respondents, and the absence of a control group. Future studies should involve larger samples, comparison groups, standardized procedures, repeated blood-pressure measurements, and longer follow-up. Further research is also

needed to distinguish the effects of warm water from red ginger and evaluate additional outcomes such as blood pressure, sleep, functional status, and quality of life.

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AUTHORS' CONTRIBUTION

Nur Andani conceptualized the study, conducted the intervention and participant assessments, analyzed the findings, and prepared the original manuscript. Rasdiyanah contributed to the study methodology, supervised the implementation of the intervention, and critically reviewed the manuscript. Yohan T. L. Djaha contributed to the interpretation of the findings and revision of the manuscript. All authors read and approved the final version of the manuscript.

COMPETING INTEREST

The author(s) declare no potential conflict of interest with respect to the research, authorship, or publication

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