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Efficacy of Warm Ginger Water Foot Soak Therapy on Hemodynamic Parameters and Chronic Pain in an Elderly Patient with Hypertension: A Case Study

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ABSTRACT

Background: Hypertension remains a prevalent cardiovascular condition among the elderly, often accompanied by chronic pain and suboptimal medication adherence. Non-pharmacological interventions, such as relaxation therapy, serve as essential adjuncts to standard pharmacological management. **Objective:** This study aimed to analyze the efficacy of warm ginger water foot soak relaxation therapy on hemodynamic parameters and chronic pain in an elderly patient with hypertension. **Methods:** A single-case study design was employed involving a 78-year-old female with Grade 2 hypertension and chronic occipital headache. The participant exhibited baseline blood pressure of 170/90 mmHg and a Numeric Rating Scale (NRS) pain score of 5. The intervention consisted of warm ginger water foot soak therapy combined with deep breathing exercises, administered for 15–30 minutes twice daily over six sessions within two weeks. Outcome measures included systolic and diastolic blood pressure, pulse rate, and NRS pain scale assessed before and after each session. **Results:** Following six therapy sessions, the patient demonstrated a reduction in blood pressure from 170/90 mmHg to 140/80 mmHg and a decrease in pain intensity from NRS 5 to 1. The patient reported subjective improvement in headache symptoms and enhanced relaxation. **Conclusion:** Warm ginger water foot soak therapy combined with deep breathing relaxation is an effective, safe, and affordable non-pharmacological nursing intervention for reducing blood pressure and alleviating chronic pain in elderly patients with hypertension. This therapy can be integrated into comprehensive geriatric nursing care.

Keywords: Hypertension, Ginger, Foot Bath, Pain Management, Non-Pharmacological Therapy

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1. INTRODUCTION

Aging is characterized by progressive physiological decline, particularly in the cardiovascular system, marked by decreased aortic elasticity, endothelial dysfunction, and increased collagen accumulation. These structural changes significantly elevate the risk of

hypertension, a major modifiable risk factor for cardiovascular morbidity and mortality, including stroke, coronary artery disease, and heart failure (Li et al., 2021; Paneni et al., 2017). Globally, the World Health Organization (WHO) estimates that 1.28 billion adults aged 30–79 have hypertension, with the majority residing in low- and middle-income countries (WHO, 2021). In Indonesia, the prevalence of hypertension remains alarmingly high, particularly among the elderly population, necessitating urgent and effective management strategies to prevent severe complications (Kemenkes RI, 2019).

The management of hypertension in geriatric populations primarily relies on pharmacological therapy. However, medication adherence is a persistent challenge due to polypharmacy, cognitive decline, and medication fatigue, often leading to uncontrolled blood pressure and secondary complications such as chronic headaches (Massa et al., 2021). Consequently, non-pharmacological interventions are strongly recommended as essential adjuncts to standard care. Relaxation therapies have been shown to modulate the autonomic nervous system, shifting the balance from sympathetic overactivity to parasympathetic dominance, thereby promoting hemodynamic stability and reducing pain perception (Saputra et al., 2020).

Among various non-pharmacological modalities, warm water foot soak therapy is a simple, cost-effective, and safe intervention. The application of warm water induces peripheral vasodilation, which decreases peripheral vascular resistance and subsequently lowers blood pressure (Rofacky & Faridah, 2015). The addition of ginger (Zingiber officinale) significantly enhances this therapeutic effect. Ginger contains bioactive compounds, such as gingerols and shogaols, which possess potent anti-inflammatory and vasodilatory properties. Furthermore, the aromatic profile of ginger acts as an olfactory stimulant to the limbic system, which regulates emotions and autonomic responses, thereby reducing stress, anxiety, and the perception of chronic pain (Arca & Rashmi, 2019).

Despite the known benefits of relaxation therapies, the specific application of warm ginger water foot soaks combined with deep breathing techniques for managing concurrent chronic occipital pain and Grade 2 hypertension in long-term care elderly remains underreported in clinical case studies. Preliminary observations at the Jember Nursing Home revealed a high

prevalence of uncontrolled hypertension among residents, largely attributed to irregular medication adherence. Specifically, patients frequently presented with chronic occipital headaches and elevated hemodynamic parameters. Therefore, this study aims to analyze the efficacy of warm ginger water foot soak relaxation therapy on hemodynamic parameters and chronic pain in an elderly patient with hypertension. This case study provides clinical evidence for integrating this low-cost, non-invasive nursing intervention into comprehensive geriatric care.

2. METHODS

A single-case study design with a quantitative approach was employed to evaluate the efficacy of warm ginger water foot soak relaxation therapy on hemodynamic parameters and chronic pain in an elderly patient with hypertension. This design allows for in-depth examination of the intervention's effects on an individual patient within a real-life clinical context.

The participant was a 78-year-old female residing at the Seruni Ward of Jember Nursing Home, Indonesia. The patient was selected based on the following inclusion criteria: (1) aged ≥60 years, (2) diagnosed with Grade 2 hypertension (blood pressure ≥160/100 mmHg according to ACC/AHA guidelines), (3) experiencing chronic occipital headache for at least 6 months, (4) irregular adherence to antihypertensive medication, and (5) willing to participate in the study. Exclusion criteria included open wounds on the feet, peripheral neuropathy, or severe cardiovascular complications.

Written informed consent was obtained from the participant after explaining the study's purpose, procedures, potential benefits, and the right to withdraw at any time without affecting standard care. Patient confidentiality was maintained by using the pseudonym "Mrs. J" throughout the study.

The intervention consisted of warm ginger water foot soak therapy combined with deep breathing relaxation techniques, administered twice daily (morning at 08:00 AM and evening at 04:00 PM) for six sessions over two weeks (March 27 - April 7, 2023). Each session lasted 15-30 minutes.

Preparation of Ginger Solution:

Fresh ginger (*Zingiber officinale*) weighing approximately 50 grams was cleaned, sliced thinly, and boiled in 2 liters

of water for 15 minutes. The solution was then cooled to a temperature of 40-42°C (measured using a digital thermometer) before use.

Blood Pressure measured using a calibrated mercury sphygmomanometer (Alpk2, Japan) with an appropriate adult cuff size. Measurements were taken on the right arm after 5 minutes of rest in a seated position, following standard protocols. Two readings were taken 2 minutes apart, and the average was recorded. Pulse Rate measured manually at the radial artery for 60 seconds using a digital stopwatch. Pain Intensity assessed using the Numeric Rating Scale (NRS), an 11-point scale ranging from 0 (no pain) to 10 (worst imaginable pain). The NRS has demonstrated good validity and reliability for assessing chronic pain in elderly populations.

Data were collected over a two-week period from March 27 to April 7, 2023. Baseline measurements (blood pressure, pulse rate, and NRS pain score) were obtained 30 minutes before the first intervention session. Subsequent measurements were taken immediately before and after each of the six therapy sessions. All measurements were performed by the same researcher to ensure consistency.

Descriptive statistics were used to analyze the data. Changes in hemodynamic parameters (systolic and diastolic blood pressure, pulse rate) and pain intensity (NRS score) were presented as absolute values and percentages of change from baseline. Data were tabulated and visualized to demonstrate trends across the six intervention sessions.

3. RESULTS

3.1 Participant Characteristics

Patient a 78-year-old female, had a 2-year history of Grade 2 hypertension with chronic occipital headache. At baseline, she presented with blood pressure of 170/90 mmHg, pulse rate of 88 beats/min, and NRS pain score of 5 (moderate pain). She reported irregular adherence to antihypertensive medication and described her headache as "heavy pressure at the nape of the neck," particularly upon waking.

3.2 Hemodynamic and Pain Outcomes

Table 1. Hemodynamic Parameters and Pain Intensity Before and After Intervention

Session	Time Point	Systolic BP (mmHg)	Diastolic BP (mmHg)	Pulse (beats/min)	NRS Pain Score (0-10)

Baseline	Pre-Session 1	170	90	88	5
Session 1	Pre	168	88	86	5
	Post	160	86	82	4
Session 2	Pre	162	88	84	4
	Post	156	84	80	3
Session 3	Pre	158	86	82	3
	Post	150	82	78	3
Session 4	Pre	152	84	80	3
	Post	146	80	76	2
Session 5	Pre	148	82	78	2
	Post	142	80	74	2
Session 6	Pre	144	82	76	2
	Post	140	80	72	1
Total Change		-30 mmHg	-10 mmHg	-16 bpm	-4 points
Percentage Change		-17.6%	-11.1%	-18.2%	-80%

Table 1 presents the progression of hemodynamic parameters (systolic blood pressure, diastolic blood pressure, and pulse rate) and pain intensity (Numeric Rating Scale) measured before and after each of the six intervention sessions conducted over a two-week period. Baseline measurements revealed elevated blood pressure of 170/90 mmHg, pulse rate of 88 beats/min, and moderate pain intensity (NRS = 5). Following the first session, immediate reductions were observed in all parameters, with systolic BP decreasing to 160 mmHg, diastolic BP to 86 mmHg, pulse to 82 beats/min, and NRS to 4. A consistent downward trend was maintained throughout subsequent sessions, with the most substantial improvements occurring between Sessions 1-3. By the completion of Session 6, the patient achieved a clinically significant reduction in systolic blood pressure of 30 mmHg (17.6% decrease), diastolic blood pressure of 10 mmHg (11.1% decrease), pulse rate of 16 beats/min (18.2% decrease), and pain intensity of 4 points on the NRS scale (80% reduction). The data demonstrate both immediate post-intervention effects and cumulative therapeutic benefits across the treatment period, indicating the efficacy of warm ginger water foot soak therapy combined with deep breathing relaxation in managing hypertension and chronic occipital pain in this elderly patient.

3.3 Blood Pressure Reduction

Following six sessions of warm ginger water foot soak therapy, the patient demonstrated a clinically significant reduction in blood pressure. Systolic blood pressure decreased from 170 mmHg at

baseline to 140 mmHg post-Session 6, representing a reduction of 30 mmHg (17.6% decrease). Diastolic blood pressure decreased from 90 mmHg to 80 mmHg, a reduction of 10 mmHg (11.1% decrease). The most substantial reduction occurred between Sessions 1-3, with gradual stabilization observed in Sessions 4-6.

3.4 Pain Intensity Reduction

Pain intensity, as measured by the NRS, showed marked improvement throughout the intervention period. The baseline NRS score of 5 (moderate pain) decreased to 1 (mild pain) following Session 6, representing an 80% reduction. The patient reported subjective improvement in headache symptoms, describing the sensation as "much lighter" and "more comfortable" by the fourth session.

3.5 Pulse Rate Changes

Pulse rate decreased from 88 beats/min at baseline to 72 beats/min post-intervention, a reduction of 16 beats/min (18.2% decrease). This reduction indicates decreased sympathetic nervous system activity and enhanced parasympathetic tone following the relaxation therapy.

3.6 Patient's Subjective Feedback

Throughout the intervention, Mrs. J reported positive experiences with the therapy. She stated: "After soaking my feet, I feel more relaxed and the heaviness in my neck decreases." By the final session, she expressed willingness to continue the therapy independently, noting improved sleep quality and reduced morning headache intensity.

4. DISCUSSION

The present case study demonstrates that warm ginger water foot soak therapy, combined with deep breathing relaxation, significantly improved hemodynamic parameters and alleviated chronic occipital pain in a 78-year-old female with Grade 2 hypertension. Following six sessions over a two-week period, the patient's blood pressure decreased from 170/90 mmHg to 140/80 mmHg, pulse rate declined from 88 to 72 beats/min, and pain intensity dropped from moderate (NRS 5) to mild (NRS 1). These findings highlight the efficacy of this non-pharmacological intervention as a safe, low-cost, and effective complementary approach to standard hypertension management in geriatric care.

The substantial reduction in systolic and diastolic blood pressure, alongside a decreased pulse rate, can be attributed to

the synergistic physiological effects of thermal therapy and the bioactive compounds of ginger. Warm water immersion induces peripheral vasodilation, which decreases systemic vascular resistance and reduces cardiac afterload, thereby lowering blood pressure (Rofacky & Faridah, 2015). Furthermore, ginger (Zingiber officinale) contains potent bioactive constituents, primarily gingerols and shogaols. These compounds exhibit calcium channel-blocking properties and anti-inflammatory effects, which further promote vasodilation and inhibit the synthesis of pro-inflammatory prostaglandins. The thermal and chemical stimulation also modulates the autonomic nervous system, shifting the balance from sympathetic overactivity to parasympathetic dominance. This autonomic shift explains the significant reduction in the patient's pulse rate and overall hemodynamic stability observed throughout the intervention.

Concurrently, the marked reduction in chronic occipital headache aligns with the Gate Control Theory of pain and the physiological effects of relaxation. Chronic hypertension is frequently associated with occipital headaches due to increased vascular pressure and muscle tension in the cervical and occipital regions. The warm foot soak promotes systemic muscle relaxation, while the deep breathing exercises reduce respiratory and muscular tension. Additionally, the aromatic profile of ginger acts as an olfactory stimulant to the limbic system, particularly the amygdala and hippocampus, which regulate emotional responses and stress. This olfactory stimulation triggers the release of endorphins and enkephalins, the body's natural analgesics, thereby elevating the pain threshold and reducing the subjective perception of pain (Arca & Rashmi, 2019). The patient's subjective report of the head feeling "lighter" corroborates the objective reduction in vascular pressure and muscle tension.

This intervention is particularly relevant for the elderly population, who often face challenges with pharmacological adherence due to polypharmacy, cognitive decline, or medication fatigue (Massa et al., 2021). The patient in this study had a history of irregular antihypertensive medication intake, which likely contributed to her uncontrolled Grade 2 hypertension and chronic pain. Integrating a simple, culturally acceptable non-pharmacological therapy like ginger foot soaks can empower elderly patients, improve their sense of control over their health, and serve as a vital adjunct to

pharmacological regimens. It aligns with holistic nursing care models that address not only the physiological but also the psychological and comfort needs of geriatric patients in long-term care facilities.

5. CONCLUSION

This single-case study demonstrates that warm ginger-water foot-soak therapy combined with deep-breathing relaxation is an effective, safe, and affordable non-pharmacological nursing intervention for managing Grade 2 hypertension and chronic occipital pain in elderly patients. Following six sessions over two weeks, the patient exhibited clinically significant improvements, with blood pressure decreasing from 170/90 mmHg to 140/80 mmHg (a reduction of 30/10 mmHg), pulse rate declining from 88 to 72 beats/min, and pain intensity reducing from NRS 5 to NRS 1 (80% improvement). These findings suggest that the synergistic effects of thermal vasodilation, ginger bioactive compounds (gingerols and shogaols), and parasympathetic activation through relaxation techniques contribute to hemodynamic stability and pain relief.

The integration of this therapy into geriatric nursing care is particularly valuable for elderly patients with medication adherence challenges, offering a complementary approach that empowers patients and enhances their quality of life. However, given the single-case study design, these findings should be interpreted with caution regarding generalizability. Future research should employ randomized controlled trials with larger sample sizes to validate these outcomes and establish standardized protocols for warm ginger-water foot-soak therapy in hypertension management. Additionally, longitudinal studies are recommended to evaluate the long-term sustainability of hemodynamic and analgesic benefits, and cost-effectiveness analyses are recommended to support policy integration in long-term care facilities.

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AUTHOR CONTRIBUTIONS

WDSA and FK was responsible for conceptualization, data collection, data analysis, and manuscript preparation. FK

and LAS supervised the research process, contributed to the methodological design and critically revised the manuscript. WDSA and FK contributed to data interpretation and provided critical review and final approval of the manuscript.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the publication of this article.

DATA AVAILABILITY STATEMENT

The data are not publicly available due to privacy or ethical restrictions.

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