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Research/Review

Application of Lavender Aromatherapy and Warm Water Foot Soak Therapy in Hypertensive Patients: A Case Report

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Abstract: Hypertension is a chronic increase in blood pressure that serves as one of the leading causes of cardiovascular disease and mortality in Indonesia. Management of hypertension not only focuses on pharmacological therapy but also involves non-pharmacological interventions such as complementary therapy. The combination of lavender aromatherapy and warm foot soak therapy is believed to reduce blood pressure through physiological and psychological relaxation effects. Objective: To describe changes in blood pressure among hypertensive patients after receiving a combination of lavender aromatherapy and warm foot soak therapy. Method: This study employed a case report design on Mr. E, a 52-year-old patient with mild to moderate hypertension in Balikpapan, East Kalimantan. The intervention was conducted for five consecutive days, with each session lasting 15–20 minutes. Blood pressure was measured before and after the therapy using a digital sphygmomanometer. Data were analyzed descriptively by comparing pre-test and post-test results. Results: A gradual decrease in blood pressure was observed, from 139/98 mmHg to 120/85 mmHg, with an average reduction of 19 mmHg in systolic and 13 mmHg in diastolic pressure. The patient also reported increased relaxation, reduced headache, and improved sleep quality after the intervention. Conclusion: The combination of lavender aromatherapy and warm foot soak therapy effectively reduces blood pressure through synergistic mechanisms, namely peripheral vasodilation and activation of the parasympathetic nervous system, which induce relaxation effects. This therapy can be applied as a safe, simple, and holistic complementary non-pharmacological nursing intervention to support hypertension management.

Keywords: Blood Pressure; Complementary Therapy; Hypertension; Lavender Aromatherapy; Warm Foot Bath.

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1. Introduction

Hypertension is one of the most common chronic conditions characterized by persistently elevated blood pressure, with systolic levels above 140 mmHg and diastolic levels above 90 mmHg. When left uncontrolled, this condition can gradually damage blood vessels and vital organs, increasing the risk of stroke, coronary heart disease, heart failure, and kidney complications (Noni et al., 2023). Globally, hypertension remains a leading cause of cardiovascular morbidity and mortality, affecting about 22% of the world's population, with an even higher prevalence—around 36%—in Southeast Asia (WHO, 2019).

In Indonesia, hypertension continues to pose a major public health concern. The Ministry of Health (2018) reported a significant increase in prevalence, reaching 34.1%, while further data (Kemenkes RI, 2019) estimated that approximately 24.49 million elderly individuals are living with hypertension. The majority belong to the young elderly group (60–69 years), followed by the middle and older elderly groups. Hypertension often develops silently and, for many, remains undetected until complications occur. Common complaints include headache, neck stiffness, dizziness, fatigue, and difficulty sleeping (Fernanda et al., 2021).

The causes of hypertension are multifactorial, often involving a combination of genetic predisposition, aging, obesity, stress, and unhealthy lifestyle habits such as excessive salt intake, poor diet, lack of exercise, and inadequate rest (Kumala Sari et al., 2023). Because symptoms may not always appear, hypertension is often called the "Silent Killer." Many patients remain unaware of their condition until serious complications arise (Fatmawati et al., 2023).

Managing hypertension requires a comprehensive approach that integrates both pharmacological and non-pharmacological strategies. Drug therapy is effective, yet it can be limited by side effects and poor adherence. Therefore, non-drug interventions have become an essential complement to medical treatment. These may include diet modification, weight control, stress reduction, physical activity, relaxation techniques, and complementary therapies (Margiyati & Setiawan, 2023).

Among the non-pharmacological approaches, lavender aromatherapy (*Lavandula angustifolia*) and warm foot bath therapy have shown promising results. Lavender essential oil is known for its relaxing and sedative properties, primarily due to compounds such as *linalool* and *linalyl acetate*, which help regulate the autonomic nervous system by lowering sympathetic activity and enhancing parasympathetic function (Rahmadhani, 2022). Meanwhile, warm foot bath therapy—a simple form of hydrotherapy—promotes peripheral vasodilation, improves blood circulation, and supports overall relaxation through thermal stimulation (Murniati & Aminy, 2023).

Several studies have reported the individual benefits of these two therapies. Wahyuningsih and Maryatun (2022) found that inhaling lavender essential oil for 15 minutes daily over three consecutive days significantly reduced both systolic and diastolic blood pressure among elderly hypertensive patients. Similarly, Efliani et al. (2023) demonstrated that soaking the feet in warm water for 15 minutes could effectively reduce blood pressure levels in older adults. However, research combining both interventions remains limited. The combination of lavender aromatherapy and warm foot bath therapy is believed to create a synergistic relaxation effect—lavender reduces stress and calms the mind, while warm water enhances circulation and lowers vascular resistance. Together, these mechanisms may promote better hemodynamic balance and more stable blood pressure (Vikantara & Wedri, 2023).

Given these considerations, the present study aims to describe changes in blood pressure following the combined use of lavender aromatherapy and warm foot bath therapy in a hypertensive patient. It is expected that the findings will provide additional evidence to support the use of complementary and holistic nursing interventions in hypertension management, particularly within primary and community healthcare settings.

2. Preliminaries or Related Work or Literature Review

Lavender Aromatherapy in Blood Pressure Reduction

Aromatherapy is a complementary therapy that utilizes essential oils from aromatic plants for therapeutic purposes. Lavender essential oil (Lavandula angustifolia) has long been recognized for its sedative and calming properties. Its major active compounds—linalool and linalyl acetate—modulate the autonomic nervous system by suppressing sympathetic activity and enhancing parasympathetic function, resulting in muscle relaxation, decreased vascular tension, and lower blood pressure (Rahmadhani, 2022).

Several studies support the antihypertensive effect of lavender aromatherapy. Wahyuningsih and Maryatun (2022) demonstrated that inhalation of lavender essential oil for 15 minutes daily over three consecutive days reduced systolic and diastolic blood pressure by an average of 13 mmHg and 6 mmHg, respectively, among elderly patients with hypertension

at Puskesmas Ngoresan, Surakarta. This reduction was attributed to decreased cortisol levels and improved sleep quality. Similarly, Sari and Marlina (2024) reported that consistent use of lavender aromatherapy for seven days significantly reduced blood pressure in hypertensive patients at Puskesmas Yosomulyo. These findings indicate that lavender aromatherapy exerts both physiological and psychological benefits by promoting relaxation, alleviating stress, and stabilizing cardiovascular parameters.

Warm Foot Bath Therapy and Its Physiological Mechanism

Warm foot bath therapy is a simple form of hydrotherapy in which the feet are soaked up to the ankles in warm water (37–40°C) for approximately 15–20 minutes. This therapy stimulates peripheral vasodilation, reduces total peripheral resistance, and increases blood flow to the extremities. The process facilitates a decrease in systemic vascular resistance and cardiac workload, thereby lowering blood pressure naturally (Murniati & Aminy, 2023).

Empirical evidence supports the efficacy of this method. Efliani et al. (2023) found that a 15-minute warm foot bath produced a significant reduction in both systolic and diastolic blood pressure among elderly hypertensive patients at the Lubuk Alung Health Center. Similarly, Murniati and Aminy (2023) reported a statistically significant improvement ($p < 0.05$) in blood pressure readings before and after the warm foot bath intervention. The sensation of warmth also activates the parasympathetic nervous system, promoting relaxation, slowing the heart rate, and improving emotional well-being. Therefore, this therapy can be applied as a safe, low-cost, and effective non-pharmacological intervention to regulate hypertension, particularly in community-based nursing care.

Combined Therapy: Synergistic Effects of Lavender Aromatherapy and Warm Foot Bath

Recent studies have explored the synergistic potential of combining aromatherapy with hydrotherapy to enhance therapeutic effects. The combination of lavender aromatherapy and warm foot bath therapy targets both physiological and psychological pathways: lavender aroma induces relaxation and decreases stress hormone levels, while warm water immersion improves peripheral circulation and reduces vascular resistance. Together, these mechanisms create a balanced hemodynamic state that promotes blood pressure stability.

Vikantara and Wedri (2023) at Poltekkes Kemenkes Denpasar reported that combining lavender aromatherapy with hydrotherapy produced a more substantial reduction in blood pressure than using either therapy alone. The integrated approach enhanced patient relaxation, improved sleep quality, and decreased sympathetic nervous activity. This aligns with the mind–body connection theory, which posits that relaxation-based interventions help stabilize blood pressure through neuroendocrine regulation (Kim et al., 2023).

Although both interventions have demonstrated individual efficacy, limited case-based research has examined their combined effects within the context of nursing care. Therefore, the present study aims to provide additional evidence on the effectiveness of combined lavender aromatherapy and warm foot bath therapy in reducing blood pressure among hypertensive patients, contributing to evidence-based and holistic nursing practice.

3. Materials and Method

This study employed a case report design. This method was chosen because it allows researchers to observe an individual's physiological responses in depth to the given non-pharmacological intervention. The participant in this study was Mr. E, a 52-year-old male residing in Balikpapan, East Kalimantan, who had been diagnosed with mild to moderate hypertension. The participant was selected purposively based on specific criteria, including willingness to participate, absence of foot injuries, and not undergoing any other relaxation therapy. The study was conducted at Mr. E's home in Balikpapan, East Kalimantan, for five consecutive days in April 2025.

The instruments used in this study included a digital sphygmomanometer to measure blood pressure, a water thermometer to ensure the soaking temperature remained between 37–40°C, lavender essential oil (*Lavandula angustifolia*) used in an aromatherapy diffuser, and an observation sheet to record blood pressure measurements before and after the intervention. Prior to implementation, the researcher explained the purpose of the study to the participant and obtained voluntary informed consent.

The intervention procedure began with allowing the participant to rest for 10 minutes in a sitting and relaxed position, followed by an initial blood pressure measurement (pre-test). Next, the participant underwent a warm foot bath therapy session for 15–20 minutes while

simultaneously inhaling lavender aromatherapy through a diffuser. After the therapy session, the participant was rested for five minutes before performing a post-intervention blood pressure measurement (post-test). This procedure was repeated for five consecutive days to observe changes in blood pressure. The data obtained were analyzed descriptively by comparing the systolic and diastolic blood pressure values before and after the intervention in each session to determine the reduction trend.

4. Results and Discussion

The patient, identified by the initials Mr. E, is a 52-year-old male residing in Balikpapan, East Kalimantan, and employed as a private company worker. The patient presented with complaints of occipital headache, fatigue, and neck tension persisting for approximately two weeks. Physical examination revealed a blood pressure of 143/94 mmHg, pulse rate of 85 beats per minute, respiratory rate of 20 breaths per minute, body temperature of 36.7°C, and oxygen saturation of 98%. The patient had a medical history of hypertension for three years and type 2 diabetes mellitus for two years, but reported inconsistent medication adherence due to perceiving his symptoms as mild. Family history revealed that his mother suffered from heart disease and diabetes, while his father had a history of hypertension.

The patient's daily activities were of moderate intensity, working in an office with prolonged sitting periods and infrequent exercise. His dietary habits included high salt and fat intake, as well as a habit of drinking coffee twice daily. He also reported sleep disturbances due to work-related stress and muscle tension.

From a psychosocial perspective, the patient was cooperative and communicative. He lived with his wife and two teenage children in a supportive family environment. Spiritually, he was an active worshipper and viewed maintaining health as a part of his spiritual responsibility.

Physical examination showed overall normal general condition. The face and head were symmetrical with no wounds or swelling. Examination of the eyes, nose, mouth, and ears revealed normal findings. The neck showed no lymph node enlargement, the trachea was midline, and there was no tenderness. Thoracic examination showed a symmetrical chest shape, regular breathing, and normal breath sounds. Heart sounds S1 and S2 were normal, without murmurs or gallops, and the patient did not report chest pain or shortness of breath.

Abdominal examination showed a slightly distended contour, normal bowel sounds, and no organ enlargement. Mild tenderness was found in the upper right quadrant, possibly related to a history of gallbladder disorder. Examination of the extremities showed warm, symmetrical hands and feet, with no edema or cyanosis and normal peripheral circulation. No muscle weakness or numbness was observed.

Based on the nursing assessment, the patient's primary complaints were headache, neck muscle tension, and elevated blood pressure triggered by work stress and insufficient sleep. These findings indicate increased sympathetic nervous system activity, which contributes to elevated blood pressure.

To help reduce blood pressure, the patient was given a non-pharmacological intervention consisting of a combination of lavender aromatherapy and warm foot bath therapy. This intervention was chosen for its potential to provide both physical and mental relaxation, promote peripheral vasodilation, reduce stress and anxiety, improve sleep quality, and relieve headache symptoms. After explanation and preparation, blood pressure measurements were conducted before and after the intervention over five consecutive days. The measurement results are presented in Figure 1.

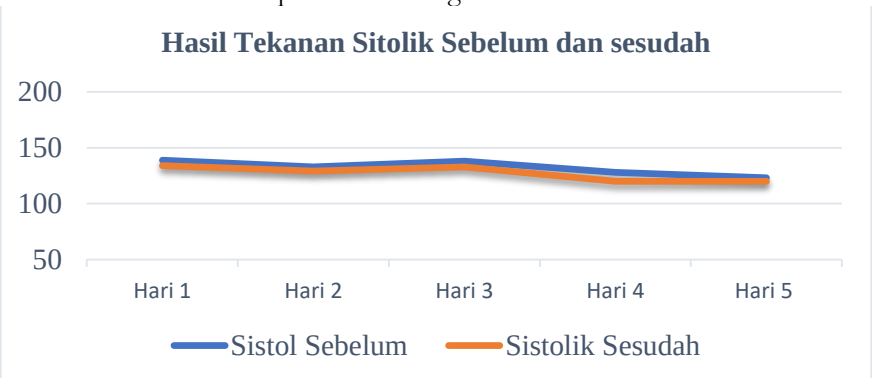

Figure 1. Systolic Blood Pressure Results Before and After the Combined Intervention of Lavender Aromatherapy and Warm Foot Bath Therapy.

Based on Figure 1, it can be seen that the average systolic blood pressure before the intervention was 132.2 mmHg, while after the intervention it decreased to 127.2 mmHg, indicating an average reduction of 5 mmHg. Overall, the graph shows a gradual downward trend from the first to the fifth day, where systolic blood pressure before the intervention was consistently higher than after the intervention. This demonstrates that the given intervention had a positive and consistent effect in reducing systolic blood pressure over time.

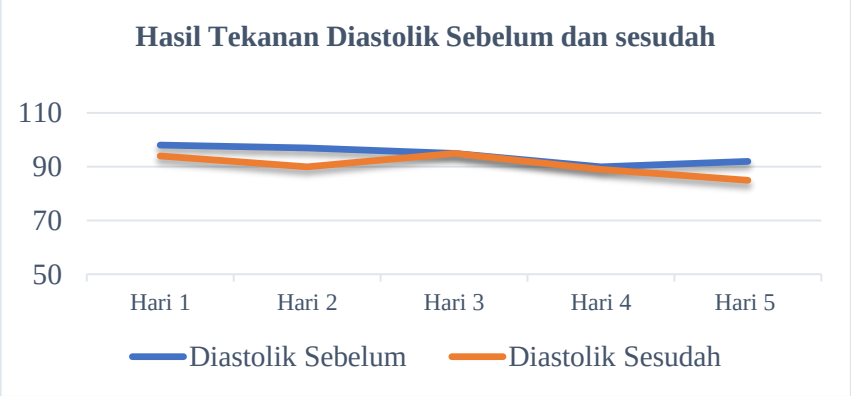

Figure 2. Diastolic Blood Pressure Results Before and After the Combined Intervention of Lavender Aromatherapy and Warm Foot Bath Therapy.

Based on Figure 2, the average diastolic blood pressure before the intervention was 94.4 mmHg, while after the intervention it decreased to 90.6 mmHg, resulting in an average reduction of 3.8 mmHg. The graph shows a clear downward trend in diastolic pressure from the first to the fifth day, where the post-intervention diastolic pressure line consistently remained below the pre-intervention line. This indicates that the applied intervention effectively contributed to a gradual and consistent reduction in diastolic blood pressure, reflecting the relaxation effect and improved blood pressure regulation following the therapy.

The results of this study showed that the combined administration of lavender aromatherapy and warm foot bath therapy over five consecutive days had a significant impact on reducing blood pressure in hypertensive patients. Based on the measurement results, the patient's blood pressure decreased from 139/98 mmHg to 120/85 mmHg, with an average reduction of 19 mmHg in systolic and 13 mmHg in diastolic pressure. This consistent reduction indicates a positive physiological response to the relaxation intervention provided.

The decrease in blood pressure observed in Mr. E was not solely due to the local effect of one therapy but rather a synergistic interaction between the physiological effects of the warm foot bath and the psychoneuroendocrine effects of lavender aromatherapy. These two therapies work complementarily to reduce sympathetic nervous system activity and enhance parasympathetic activation, which plays a crucial role in relaxation and blood pressure reduction.

Lavender aromatherapy contains active compounds such as *linalool* and *linalyl acetate*, which can reduce cortisol and catecholamine levels by inhibiting sympathetic nervous system activity (Rahmadhani, 2022). This mechanism promotes peripheral vasodilation, reduces vascular smooth muscle tension, and enhances tissue perfusion. An international study by Seifi et al. (2022) found that inhalation of lavender essential oil for 15 minutes daily for one week reduced systolic blood pressure by up to 12 mmHg and diastolic pressure by 8 mmHg in patients with primary hypertension. Similarly, Bikmoradi et al. (2023) in *Complementary Therapies in Clinical Practice* reported that lavender aromatherapy significantly decreased blood pressure, pulse rate, and anxiety levels in patients with cardiovascular diseases.

Meanwhile, the warm foot bath therapy produces physiological effects through peripheral vasodilation induced by increased local temperature. This process decreases systemic vascular resistance and improves blood flow from the periphery to the heart, thereby reducing cardiac workload and lowering blood pressure (Murniati & Aminy, 2023). A study by Handayani et al. (2023) in Indonesia also demonstrated that performing warm foot bath therapy for 15–20 minutes daily can lower systolic blood pressure by an average of 10–15 mmHg in elderly hypertensive patients.

When both therapies are combined, the effects become mutually reinforcing (*synergistic effect*). The warm foot bath improves circulation and reduces vascular resistance, while

lavender aromatherapy suppresses sympathetic activity and provides psychological relaxation. Together, these mechanisms produce optimal physiological and psychological homeostasis, resulting in gradual vascular pressure reduction and increased comfort and relaxation in patients. This finding aligns with Vikantara and Wedri (2023), who reported that the combination of aromatherapy and hydrotherapy resulted in greater blood pressure reduction compared to either therapy alone.

In addition to physiological effects, both therapies provide significant psychological benefits. The patient reported feeling more relaxed, calm, and experiencing improved sleep quality after undergoing therapy for five days. This is particularly important since psychological stress and sleep disturbances are known contributors to elevated blood pressure. According to Wahyuningsih and Maryatun (2022), lavender aromatherapy can reduce blood pressure while enhancing sleep comfort in hypertensive patients, with effects comparable to relaxation breathing exercises. The relationship between psychological and physiological effects illustrates the holistic concept in nursing care, where blood pressure reduction is not only due to biological changes but also due to improved emotional balance and autonomic regulation. These results support the mind–body connection theory, which explains that relaxation-based therapies stabilize blood pressure through integrated neuroendocrine and vascular responses (Kim et al., 2023).

Overall, the combination of lavender aromatherapy and warm foot bath therapy can be considered an effective and safe non-pharmacological complementary nursing intervention for lowering blood pressure in hypertensive patients. The therapy is low-cost, simple to implement, and has minimal side effects, making it suitable for both community and clinical nursing practice. Therefore, the findings of this study strengthen the importance of nurses' roles in applying evidence-based complementary nursing interventions to support holistic hypertension management.

5. Conclusion

This case study shows that the combined application of lavender aromatherapy and warm foot bath therapy, when performed regularly for five consecutive days, has a significant effect on lowering blood pressure in patients with hypertension. During the intervention process, the patient's blood pressure gradually but consistently decreased from 139/98 mmHg to 120/85 mmHg, indicating an improvement in physiological condition. In addition to achieving more stable blood pressure, the patient also reported feeling more relaxed, experiencing fewer headaches, less neck tension, and better sleep quality. These findings suggest that the combination therapy not only benefits physical health but also has a positive impact on the patient's psychological well-being.

The effectiveness of these two therapies can be explained through the interrelated mechanisms of the body and mind. Lavender aromatherapy works by stimulating the olfactory system and the limbic area of the brain, which is associated with emotional regulation and autonomic nervous system function. The main components of lavender, linalool and linalyl acetate, help reduce stress hormone (cortisol) levels and suppress sympathetic nervous activity, allowing the body to relax and the blood vessels to dilate. Meanwhile, warm foot bath therapy directly affects the body by widening peripheral blood vessels due to heat exposure. This helps improve blood circulation in the lower limbs, reduce vascular resistance, and normalize cardiac workload. When used together, these two therapies complement each other—lavender promotes mental relaxation, while warm water enhances blood circulation.

Overall, the findings of this study strengthen the concept of the mind–body connection, where emotional balance plays a key role in maintaining physiological stability. Regular exposure to calming sensory stimuli such as aroma and warmth has been shown to activate the parasympathetic nervous system, helping to restore the body's natural balance and lower blood pressure naturally. Beyond physical changes, the patient also reported feeling calmer, more optimistic, and more motivated to adopt a healthier lifestyle, indicating the long-term potential benefits of this therapy.

From a nursing perspective, the results of this study emphasize the importance of complementary and non-pharmacological approaches as part of holistic nursing care. The combination of lavender aromatherapy and warm foot bath therapy is an effective, safe, practical, and low-cost intervention that can be applied in both healthcare settings and community environments. Nurses play a crucial role in educating and empowering patients to actively participate in their own care through simple yet effective relaxation techniques.

In conclusion, this study provides strong evidence that the combination of lavender aromatherapy and warm foot bath therapy can serve as an alternative nursing intervention for managing hypertension. In addition to lowering blood pressure, this therapy also enhances comfort, emotional stability, and overall well-being. Further research with larger sample sizes and controlled experimental designs is recommended to strengthen these findings and support the integration of this therapy into standard nursing care protocols for hypertension management.

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