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Analysis of Lavender Aromatherapy Application to Reduce Blood Pressure with Hypertension in Patients: A Case Study

[1*]Muhammad Al-Amin R. Sapeni, [2]Minar Berliana Simanjuntak, [3]Hasriana Hasriana, [4]Irawati Anwar, [4]Suwardha Yunus, [4]Iwan Iwan, [4]Toshiyo Taniguchi, [6]Angela Smith Lillehei

[1]Department of Nursing, School of Health Science Mayapada, Jakarta, Indonesia
[2]School of Nursing, STIKes Mitra Keluarga, Jakarta, Indonesia
[3]Depatment of Nursing, Faculty of Health, Universitas Borneo, Kalimantan Utara, Indonesia
[4]School of Nursing, STIKes Graha Edukasi, Indonesia
[5]Department of Welfare System and Health Science, Okayama Prefectural University, Japan
[6]School of Nursing, University of Minnesota, Minneapolis, USA

A R T I C L E I N F O

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Correspondence :
Muhammad Al-Amin R. Sapeni

Email :
muh.alamin@stikesmayapada.ac.id

A B S T R A C T

Introduction: Hypertension is defined as a condition in which an individual has a systolic blood pressure ≥ 140 mmHg and a diastolic blood pressure ≥ 90 mmHg. Systolic blood pressure is the main measure used to diagnose hypertension. Hypertension is often referred to as a "silent killer" due to its asymptomatic nature, causing patients to be unaware of their condition. Globally, 1.28 billion people are affected by hypertension; in Indonesia, 70 million people (28%) have hypertension, with Jakarta ranking 9th among Indonesian provinces in 2017 with a prevalence of 33.43%. Methods: This study employed a descriptive narrative case study design. The subjects were three adult patients diagnosed with hypertension. Results: The case study showed a non-pharmacological effect of lavender aromatherapy in lowering blood pressure among hypertensive patients. All three patients were given lavender aromatherapy over three days. The goal was to reduce pain and stabilize blood pressure. Expected outcomes included decreased pain complaints, improved vital signs, and reduced BP. Conclusion: This study suggests that lavender aromatherapy can serve as an alternative nursing intervention for reducing blood pressure in hypertensive patients and can be independently administered by nurses as a non-pharmacological therapy.

INTRODUCTION

Hypertension is a condition characterized by elevated blood pressure, with systolic pressure above 140 mmHg and diastolic pressure above 90 mmHg. It is also one of the leading causes of morbidity worldwide. It is estimated that the number of people with hypertension will reach 1.5 billion globally by 2025, with mortality rates as high as 9.4 million (1) According to the Ministry of Health, cardiovascular disease was the main health problem in both developed and developing countries in 2019. High blood pressure is the leading cause of death worldwide each year. Hypertension is often referred to as the “silent killer” because it is usually asymptomatic, and patients are often unaware that they have high blood pressure (2).

According to World Health Organization (WHO), an estimated 1.28 billion adults aged 30 to 79 years worldwide will suffer from hypertension by 2023, with the majority (two-thirds) living in low- and middle-income countries. About 46% of adults with hypertension are unaware of their condition. Fewer than half (42%) have been diagnosed with hypertension and receive treatment. Only about one in five (21%) adults with hypertension can control their blood pressure. Hypertension is the leading cause of premature death globally. One of the global goals for non-communicable diseases is to reduce the prevalence of hypertension by 33% between 2010 and 2023 2023 (3) In Indonesia, 70 million people (28%) suffer from hypertension, but only 24% have their blood pressure under control. The prevalence of hypertension among adults is 35% in developed countries and 40% in developing countries. In adults, the prevalence ranges from 6% to 15% (4). Based on 2017 data, the prevalence of hypertension in Jakarta was 33.43%, ranking ninth among ten provinces with the highest cases of hypertension (5). At Mitra Keluarga Kelapa Gading Hospital, 50 patients were recorded with hypertension over three months (March–May).

Hypertension is often caused by lifestyle factors. These include sedentary behavior, smoking, stress, obesity, coffee and alcohol consumption, poor dietary habits, and excessive psychological stress (6). Hypertension may

lead to serious complications such as heart disease, stroke, kidney disease, nephropathy, peripheral vascular disease, and neurological disorders (4). Mulyana, Sriyani, and Ipah (7) also found that uncontrolled hypertension has a greater impact on the progression to end-stage kidney disease compared to controlled hypertension. Due to these complications, patients with hypertension require attention and medical treatment. Management often involves antihypertensive medications, which must be taken carefully and usually for life or long-term, along with complementary therapies to optimize care.

Complementary therapies that may reduce blood pressure in hypertensive patients include aromatherapy, yoga, dance therapy, acupuncture, cucumber extract, foot massage, foot soaks, tomato juice, progressive muscle relaxation, acupressure, betel leaf decoction, and many others (8,9). However, not all of these treatments can be applied to hospitalized patients, since they must cooperate with doctors and nutritionists, take prescribed medications, and may experience weakness or require bed rest. Therefore, aromatherapy is considered one of the most effective and practical complementary therapies for hospital patients. It can be administered to patients in bed with minimal effort, making it simple yet effective in supporting hypertension management.

Aromatherapy has a calming effect by lowering stress hormone cortisol levels in the blood. Lavender aromatherapy has been shown to enhance alpha brain waves associated with relaxation (10). Aromatherapy is a therapeutic method that utilizes scents and plant-based essential oils to promote healing. It can be administered using diffusers, cotton balls, or tissues for inhalation (11,12).

Based on the above background, the prevalence of hypertension remains high, and aromatherapy offers an effective and efficient complementary treatment. Therefore, the authors are interested in applying the results of research on the use of lavender aromatherapy in managing cases, as presented in this final scientific article: "Analysis of Lavender Aromatherapy Use in Reducing Blood Pressure at X Hospital."

METHODS

This study employed a case study design**,** which is appropriate for exploring the clinical course and outcomes of individual patients in depth. The case study approach was selected to allow detailed observation of the effects of lavender aromatherapy on blood pressure reduction in hypertensive patients within a real clinical setting.The study was conducted at Hospital X, a secondary-level health facility in Jakarta, Indonesia. Three adult patients (aged 45–60 years) who had been clinically diagnosed with primary hypertension by a physician were purposively selected as participants. Inclusion criteria were: (1) systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg on at least two separate measurements, (2) not currently experiencing acute hypertensive crisis or other cardiovascular emergencies, (3) able to communicate verbally, and (4) willing to participate and provide informed consent. Patients with chronic kidney disease, heart failure, or allergy to essential oils were excluded.Each participant received lavender aromatherapy as a complementary non-pharmacological intervention in addition to their usual antihypertensive therapy. The intervention was conducted once daily for three consecutive days**.** During each session, three drops (approximately 0.15 mL) of 100% pure lavender essential oil were applied to a cotton ball placed at a distance of 2–3 cm from the patient's nose. Participants were instructed to inhale the aroma for 15 minutes while seated comfortably in a quiet room. No other relaxation techniques were provided during the sessions to ensure the observed effect was attributable to the aromatherapy.Blood pressure was measured before and 15 minutes after each aromatherapy session using a validated digital sphygmomanometer, following the guidelines of the American College of Cardiology/American Heart Association (ACC/AHA, 2017)**.** Two consecutive readings were taken at one-minute intervals, and the average was recorded to improve reliability. Additional data collected included demographic characteristics, clinical symptoms, and nursing assessments.The blood pressure measurements were analyzed descriptively by comparing the pre- and post-intervention values for each of the three days. Changes were presented in tabular and narrative form to demonstrate the trends in systolic and diastolic pressure reductions over time. Because of the small sample size (n=3), no inferential statistical tests were performed.

RESULT

Nursing Assessment:

1. Mr. T: Complained of back and neck pain, chest discomfort, and fatigue. BP: 153/90 mmHg.
2. Mrs. M: Reported dizziness, nausea, loss of appetite, and fatigue. BP: 160/95 mmHg.
3. Mrs. J: Had a fever, occipital headache, nausea, and fatigue for three days. BP: 165/94 mmHg.

Nursing Diagnoses:

1. Mr. T: Acute pain related to physiological injury agent (myocardial ischemia), ineffective peripheral perfusion.
2. Mrs. M: Acute pain, ineffective peripheral perfusion, and activity intolerance.
3. Mrs. J: Acute pain, ineffective peripheral perfusion, and risk for nutritional deficit.

Nursing Interventions:

All three patients were given lavender aromatherapy over three days. The goal was to reduce pain and stabilize blood pressure. Expected outcomes included decreased pain complaints, improved vital signs, and reduced BP.

Implementation and Evaluation Results After Three Days of Lavender Aromatherapy Implementation:

1. Mr. T
   a. Day 1: Blood pressure after lavender aromatherapy was 140/93 mmHg
   b. Day 2: Blood pressure after lavender aromatherapy was 130/80 mmHg
   c. Day 3: Blood pressure after lavender aromatherapy was 130/80 mmHg
2. Mrs. M
   a. Day 1: Blood pressure after lavender aromatherapy was 155/90 mmHg
   b. Day 2: Blood pressure after lavender aromatherapy was 147/90 mmHg
   c. Day 3: Blood pressure after lavender aromatherapy was 135/80 mmHg
3. Mrs. J
   a. Day 1: Blood pressure after lavender aromatherapy was 157/90 mmHg
   b. Day 2: Blood pressure after lavender aromatherapy was 145/90 mmHg

Table. 3 Observation Table 3 Days Lavender Aromatherapy

Patient	Day 1		Day 2		Day 3	
	Before	After	Before	After	Before	After
Tn. T	153/90m mHg	140/93 mmHg	145/85 mmHg	130/85 mmHg	136/80m mHg	130/80 mmHg
Ny.M	160/95 mmHg	155/90 mmHg	153/85 mmHg	147/90m mHg	141/85 mmHg	135/80 mmHg
Ny. J	164/95 mmHg	157/90 mmHg	162/90 mmHg	145/90 mmHg	140/80 mmHg	133/83 mmHg

DISCUSSION

The management of hypertension includes both pharmacological and non-pharmacological approaches. In this study, a non-pharmacological intervention lavender aromatherapy was applied to help reduce blood pressure in three hypertensive patients. The results showed a decrease in blood pressure values after the aromatherapy was administered.

For Mr. T**,** his blood pressure on Day 1 was 153/90 mmHg before the intervention and decreased to 140/93 mmHg afterward. On Day 2, it dropped from 145/85 mmHg to 130/85 mmHg, and on Day 3, from 136/80 mmHg to 130/80 mmHg. These results indicate a consistent reduction in blood pressure following the lavender aromatherapy intervention.

Mrs. M**,** her blood pressure on Day 1 was 160/95 mmHg before and 155/90 mmHg after the intervention. On Day 2, it decreased from 153/85 mmHg to 147/90 mmHg, and on Day 3, from 141/85 mmHg to 135/80 mmHg. This also indicates a steady decline in blood pressure over the three-day intervention period.For Mrs. J**,** her blood pressure on Day 1 was 164/95 mmHg before the intervention and 157/90 mmHg afterward. On Day 2, it decreased from 162/90 mmHg to 145/90 mmHg, and on Day 3, from 140/80 mmHg to 133/83 mmHg. These findings suggest that lavender aromatherapy contributed to a gradual decrease in blood pressure in all three patients. The therapy was administered for three consecutive days, once per day, with each session lasting 15 minutes. Lavender essential oil was applied via inhalation using a cotton ball.

These results are supported by previous studies. Valerian et al. (13), found that after three days of lavender essential oil foot massage, patients showed reduced blood pressure values each day. Milani and Burhanto (14), also reported that after administering lavender aromatherapy for three consecutive days, with each session lasting 10–15 minutes, the average blood pressure dropped from 155/90 mmHg to 120/75 mmHg.

Rubianti and Wijayanti (12), recommended administering lavender aromatherapy using a candle diffuser or by placing 3–5 drops of essential oil on a tissue, gauze, or cotton ball for 5–30 minutes. Similarly, Mulyasari et al.

(15), demonstrated that lavender aromatherapy combined with healing touch therapy resulted in an average reduction of 10 mmHg in blood pressure.

Rahmadhani (16), applied 5–6 drops of lavender essential oil at a distance of 2–3 cm from the nose for 15 minutes over six days. Blood pressure was measured before and after each session using a digital sphygmomanometer, and the results showed a noticeable decrease.

In a study (17)**,** 12 respondents received lavender aromatherapy relaxation therapy for three days. Three drops of lavender essential oil were used for each 15-minute session, resulting in reduced blood pressure among participants.Kurniadi (18), found that a combination of warm foot soaking and lavender aromatherapy significantly reduced both systolic and diastolic blood pressure. The statistical analysis revealed a p-value of 0.000, which was below the alpha value of 0.05, indicating a significant effect. Additionally, Setiawan and Erwanto (19), concluded that a combination of lavender aromatherapy and traditional Javanese music effectively lowered both systolic and diastolic blood pressure during the first and second weeks of treatment.

The primary nursing problem in this study was acute pain. The assessment of three patients identified acute pain as a nursing problem. Acute pain is pain caused by acute illness or injury. Pain intensity varies from mild, moderate, to severe and lasts for a short period of time, not exceeding 3 months (20). Headaches are a common problem in people with hypertension. Headaches in people with hypertension are caused by vascular damage to the blood vessels. Pain occurs when tissue is damaged, causing the individual to react by shifting the painful stimulus (21).

The first symptom that often appears in patients with hypertension is a headache, which usually occurs in the back (neck and nape). Headaches caused by blood vessel damage due to high blood pressure occur in all peripheral blood vessels. Structural changes in small arteries and arterioles cause blood vessel blockage. When blood vessels narrow, arterial flow is impaired. In the affected tissue, O2 (oxygen) decreases and CO2 (carbon dioxide) increases, causing anaerobic metabolism in the body, which increases lactic acid and stimulates capillary pain in the brain (13). Hypertension sufferers who experience headaches can be a sign of a more serious illness, including heart disease, disorders of the kidney system, and even ruptured blood vessels which can cause the sufferer to experience a stroke or what is commonly called a hemorrhagic stroke (22,23).

This is supported by research Hal ini didukung dengan penelitian Hidayat (24) that headaches can occur due to increased blood pressure. This is also supported by research Febriani, Yuniati, Martini, Jawiyah, & Sari (25) states that high blood pressure is associated with discomfort, specifically headaches, experienced by hypertensive patients. Therefore, it can be concluded that headaches are a sign of increased blood pressure caused by a reduced oxygen supply to the brain, resulting in headaches in hypertensive patients.

CONCLUSION

This case study demonstrated that the application of lavender aromatherapy was associated with a consistent reduction in blood pressure among three patients with primary hypertension. The findings suggest that lavender aromatherapy can serve as a safe, simple, and effective complementary nursing intervention to support blood pressure control in clinical settings. Integrating aromatherapy into routine nursing care may enhance patient comfort and contribute to holistic hypertension management. Future studies with larger sample sizes and controlled designs are recommended to confirm these results and explore the long-term effects of this intervention.

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