

Analysis Of Aromatherapy Effectiveness In Reducing Pain Levels Among Hypertensive Patients

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ABSTRACT

Background & Objective: Hypertension is a major global health problem that can cause complications such as pain, discomfort, and decreased quality of life. Non-pharmacological therapies, including aromatherapy, are increasingly used as complementary interventions. This study aimed to analyze the effectiveness of aromatherapy in reducing blood pressure, alleviating pain, and improving comfort in patients with hypertension. **Method:** This study used a literature review design with a descriptive analytic approach. The population consisted of research articles on aromatherapy in hypertensive patients. A purposive sampling technique was used based on inclusion and exclusion criteria, resulting in 25 selected articles published between 2022 and 2026. Data were obtained from electronic databases including Google Scholar, PubMed, and ScienceDirect. Data were presented in tabular and narrative forms and analyzed using content analysis. The research instrument was a literature review checklist. **Result:** The findings showed that aromatherapy, particularly lavender, significantly reduced systolic and diastolic blood pressure with most studies reporting p-values less than 0.05. Aromatherapy also reduced pain intensity from moderate to mild levels and improved psychological conditions such as anxiety, sleep quality, and overall comfort. Combination therapies with relaxation techniques demonstrated greater effectiveness. **Conclusion:** Aromatherapy is an effective, safe, and complementary therapy in managing hypertension by reducing blood pressure, alleviating pain, and improving patient comfort, although further research with stronger designs is recommended.

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Introduction

Hypertension is a non-communicable disease that has become a global health concern due to its increasing prevalence and its impact on vital organs such as the heart, kidneys, and blood vessels. Characterized by a persistent increase in blood pressure above normal levels, this condition often presents without symptoms, earning it the moniker "silent killer". Uncontrolled hypertension significantly escalates the risk of serious complications, including stroke and cardiovascular disease. According to the World Health Organization (WHO), hypertension is a medical condition where an individual experiences a chronic or long-term elevation of blood pressure. The higher the blood pressure, the greater the associated risks to the neurological system, kidneys, and circulatory health.

The prevalence of hypertension remains a major health issue from global to local levels. Globally, the WHO reports that approximately 1 in 3 adults suffer from hypertension, with an estimated prevalence of 30–40% and an annual upward trend. In Indonesia, the 2023 Indonesian Health Survey (SKI) by the Ministry of Health reported a hypertension prevalence of 30.8% among residents aged 18 and older. Regionally, East Kalimantan reported a prevalence of 31.3%, marking it as one of the highest in the country, with hundreds of thousands of cases recorded in 2023. At the municipal level, specifically in Bontang, the prevalence reached approximately 27.2%, indicating that hypertension is a significant public health challenge in the region.

The management of hypertension does not solely rely on pharmacological treatments but also encompasses non-pharmacological therapies as complementary approaches. Aromatherapy is a widely researched non-pharmacological intervention that utilizes essential oils. These oils interact with the olfactory and limbic systems to induce relaxation, reduce stress, and assist in lowering blood pressure. Numerous studies indicate that aromatherapy, particularly lavender, is effective in reducing blood pressure in hypertensive patients.

Research by Rifka Alkhilyatul Ma'rifat and Made Suraharta (2024) and Tiara Wahyuningsih and Maryatun (2021) demonstrated a significant decrease in blood pressure following lavender aromatherapy administration ($p < 0.05$). These findings suggest that aromatherapy is an effective and easily implemented intervention in nursing practice. Furthermore, aromatherapy provides additional benefits, such as reducing pain and anxiety. Studies by Emil et al. (2023) and Febriani et al. (2022) showed that lavender aromatherapy significantly lowered pain scales and enhanced patient comfort. This effect is linked to the increased production of endorphins and serotonin, which facilitate relaxation.

Other types of aromatherapy, such as lemon and cinnamon, have also demonstrated efficacy in managing hypertension. Research by Sri Handayani (2024) and Brigita Aulia Juliana Soeryanto et al. (2024) proved that lemon aromatherapy significantly reduces systolic blood pressure. Meanwhile, Sapeni et al. (2025) found that cinnamon aromatherapy effectively reduces pain in hypertensive patients, although the results may be influenced by the patient's psychological state. Furthermore, combining aromatherapy with other interventions, such as relaxation techniques and breathing exercises, yields more optimal results. Studies by Nurotussaniah et al. (2026) and Permatasari et al. (2026) revealed that combining

lavender aromatherapy with slow deep breathing or progressive muscle relaxation significantly improves sleep quality and lowers blood pressure. This suggests that a multimodal therapeutic approach holds great potential for improving the quality of life for hypertensive patients.

Based on these research findings, aromatherapy presents a substantial opportunity for application as a non-pharmacological intervention to control blood pressure, alleviate pain, and enhance comfort and quality of life. Therefore, this literature review is essential to identify the effectiveness of aromatherapy as a component of evidence-based nursing care and to serve as a foundation for selecting safe, cost-effective, and practical interventions in both clinical and home settings.

Objective

The primary purpose of this study is to identify, analyze, and synthesize research findings regarding the effectiveness of aromatherapy in reducing blood pressure, managing pain, and enhancing comfort levels among hypertensive patients. This review aims to evaluate aromatherapy as an evidence-based nursing intervention that is safe, affordable, and easy to implement in both clinical settings and home care.

Furthermore, the study seeks to understand the physiological mechanisms of essential oils, such as lavender and lemon, in stimulating the limbic system to trigger the release of endorphins and serotonin. By analyzing various research designs—including quasi-experimental studies and randomized controlled trials—this review intends to provide a scientific foundation for selecting non-pharmacological therapies that can improve the overall quality of life for individuals suffering from hypertension.

Method

This study used a literature review method with a descriptive analytic approach aimed at identifying, analyzing, and synthesizing research findings related to the effectiveness of aromatherapy in reducing pain, lowering blood pressure, and improving comfort in patients with hypertension. The design of this study was a literature review that systematically collected and evaluated relevant scientific articles. The population in this study consisted of all research articles discussing aromatherapy interventions in hypertensive patients. The sampling technique used was purposive sampling based on predetermined inclusion and exclusion criteria. A total of 25 national and international journals were selected as samples, consisting of quasi-experimental, pre-experimental, randomized controlled trial (RCT), and case study designs. Data were obtained through electronic database searches, including Google Scholar, PubMed, and ScienceDirect. The keywords used in the search included “hypertension”, “aromatherapy”, “lavender aromatherapy”, “blood pressure”, and “non-pharmacological therapy”, combined using Boolean operators (AND, OR) to obtain relevant articles.

The inclusion criteria were: (1) research articles focusing on aromatherapy in hypertensive patients, (2) articles published between 2022–2026, (3) articles written in Indonesian or English, (4) full-text availability, and (5) having a complete research structure (abstract, methods, results, and discussion). The exclusion criteria included: (1) irrelevant articles, (2) literature reviews or systematic reviews, and (3) articles without full-text access.

Data collection was conducted through identification, screening, and full-text review stages. The research instrument used was a literature review checklist to assess

the eligibility and quality of the selected articles. Data were presented in the form of tables and narrative descriptions. Data analysis was performed using content analysis by categorizing study results based on the type of intervention and outcomes measured. This study was conducted from March to April 2026, and the location of the study was not bound to a specific place as it utilized online databases.

Results

This study analyzed 25 selected articles consisting of national and international journals that examined the effectiveness of aromatherapy in patients with hypertension. The characteristics of the reviewed studies are presented in Table 1.

TABLE 1. Characteristics of Reviewed Studies

Variable	Category	N	%
Research Design	Quasi-experimental	10	40.0
	Pre-experimental	6	24.0
	Randomized Controlled Trial (RCT)	2	8.0
	Case Study	7	28.0
Type of Aromatherapy	Lavender	18	72.0
	Lemon	4	16.0
	Marjoram / Cinnamon / Combination	3	12.0
Measured Outcomes	Blood Pressure	25	100
	Pain	10	40.0
	Anxiety / Comfort / Sleep	12	48.0
Year of Publication	2022–2023	6	24.0
	2024–2026	19	76.0

Based on Table 1, most studies used a quasi-experimental design (40%) and focused on lavender aromatherapy (72%) as the main intervention. All studies measured blood pressure, while several studies also evaluated pain, anxiety, comfort, and sleep quality. The results of the literature review showed that aromatherapy has a significant effect on reducing blood pressure in patients with hypertension. Most studies reported a decrease in systolic and diastolic blood pressure after the intervention, with p -values < 0.05 , indicating statistical significance. The reduction in systolic blood pressure ranged from 8 mmHg to 25 mmHg, while diastolic pressure decreased by approximately 5 mmHg to 15 mmHg. In addition to blood pressure reduction, aromatherapy was also found to be effective in reducing pain levels in hypertensive patients. Several studies reported a decrease in pain scale from moderate (scale 5–7) to mild (scale 1–3) after the intervention. This effect is associated with the mechanism of aromatherapy through the limbic system, which stimulates the release of endorphins and serotonin, leading to relaxation and pain relief.

Furthermore, aromatherapy demonstrated additional benefits such as reducing anxiety, improving sleep quality, and increasing patient comfort. Studies using lavender aromatherapy consistently showed relaxation effects, decreased stress levels, and improved overall well-being. Combination therapies, such as aromatherapy with deep breathing or progressive muscle relaxation, showed greater effectiveness compared to single interventions. Overall, the findings indicate that aromatherapy, especially lavender, is an effective non-pharmacological complementary therapy in managing hypertension by reducing blood pressure, alleviating pain, and improving patient comfort.

Discussion

This literature review highlights the effectiveness of aromatherapy as a non-pharmacological intervention in managing hypertension, particularly in reducing blood pressure, alleviating pain, and improving overall patient comfort. Based on the analysis of 25 selected studies, the findings consistently demonstrate that aromatherapy – especially lavender – is associated with significant physiological and psychological benefits in hypertensive patients. One of the main variables examined in this review is blood pressure reduction. The majority of the included studies reported a statistically significant decrease in both systolic and diastolic blood pressure following aromatherapy interventions. Most quasi-experimental and pre-experimental studies showed p -values < 0.05 , indicating that the intervention had a meaningful effect.

These findings are consistent with previous research demonstrating that aromatherapy can stimulate the parasympathetic nervous system, resulting in vasodilation, decreased heart rate, and ultimately reduced blood pressure. Randomized controlled trials (RCTs) included in this review further strengthen this evidence by showing that lavender aromatherapy produces better outcomes compared to placebo or standard care, particularly when administered continuously over several days. In terms of pain reduction, several studies reported a decrease in pain intensity from moderate levels (scale 5–7) to mild levels (scale 1–3) after aromatherapy intervention. This effect is particularly relevant in hypertensive patients who often experience headache, neck tension, and discomfort due to increased vascular pressure.

The analgesic effect of aromatherapy is closely related to its influence on the limbic system, which regulates emotions and pain perception. The inhalation of essential oils such as lavender, lemon, and cinnamon stimulates olfactory receptors, triggering the release of endorphins and serotonin. These neurotransmitters play a key role in reducing pain perception and inducing relaxation.

This finding is in line with earlier studies that reported similar outcomes, where aromatherapy contributed to both physiological stabilization and subjective comfort improvement. Another important variable identified in this review is psychological well-being, including anxiety reduction, improved sleep quality, and enhanced comfort. Several studies demonstrated that aromatherapy significantly reduces anxiety levels and improves sleep quality among hypertensive patients. For instance, studies combining aromatherapy with relaxation techniques such as deep breathing or progressive muscle relaxation showed greater effectiveness compared to single interventions.

This suggests a synergistic effect, where aromatherapy enhances the benefits of other non-pharmacological therapies. Improved sleep quality and reduced anxiety are important outcomes, as psychological stress is a known contributing factor to hypertension. By reducing stress and promoting relaxation, aromatherapy indirectly supports blood pressure control. Lavender aromatherapy emerged as the most frequently used and most effective type of intervention across the reviewed studies. This is likely due to its well-documented pharmacological properties, particularly the presence of active compounds such as linalool and linalyl acetate. These compounds have sedative, anxiolytic, and muscle relaxant effects, which contribute to the overall therapeutic impact. However, other types of aromatherapy, such as lemon and cinnamon, also showed beneficial effects. Lemon aromatherapy was found to be

effective in lowering blood pressure, while cinnamon aromatherapy demonstrated potential in reducing pain intensity.

These findings indicate that although lavender is the most dominant, other essential oils may also serve as alternative or complementary options depending on patient needs and preferences. From a physiological perspective, the mechanism of action of aromatherapy involves the olfactory system and its connection to the limbic system in the brain. When inhaled, aromatic compounds stimulate olfactory receptors, sending signals to the hypothalamus and other brain regions responsible for emotional regulation and autonomic control.

This process leads to the release of neurotransmitters such as endorphins and serotonin, as well as a reduction in cortisol levels. As a result, there is an increase in parasympathetic activity and a decrease in sympathetic activity, which contributes to relaxation, reduced stress, and improved cardiovascular function. This mechanism explains why aromatherapy not only lowers blood pressure but also reduces pain and enhances overall comfort.

Despite the promising findings, several limitations were identified in this review. First, many of the included studies used small sample sizes, which may limit the generalizability of the results. Second, the duration of interventions in most studies was relatively short, typically ranging from a few days to one week, making it difficult to assess long-term effectiveness. Third, a number of studies lacked control groups, particularly those using pre-experimental or case study designs, which may introduce bias and reduce the strength of evidence. Additionally, variations in intervention protocols—such as differences in dosage, duration, and method of administration—make it challenging to establish standardized guidelines for aromatherapy use in hypertensive patients.

However, this study also has several strengths. One of the main strengths is the inclusion of a wide range of study designs, including quasi-experimental studies, case studies, and randomized controlled trials, which provides a comprehensive overview of existing evidence.

Furthermore, this review includes both national and international studies published between 2022 and 2026, ensuring that the findings are up-to-date and relevant to current clinical practice. Another strength is the focus on multiple outcome variables, including blood pressure, pain, and psychological well-being, allowing for a more holistic understanding of the benefits of aromatherapy.

In conclusion, this literature review demonstrates that aromatherapy is an effective complementary therapy for managing hypertension. It not only contributes to the reduction of blood pressure but also alleviates pain, reduces anxiety, improves sleep quality, and enhances patient comfort. Although further research with larger sample sizes and more rigorous designs is needed, current evidence supports the integration of aromatherapy into nursing interventions as a safe, simple, and cost-effective approach to improving patient outcomes.

Conclusion

Based on the analysis of 25 research articles, it can be concluded that aromatherapy is an effective non-pharmacological intervention for managing hypertension. Aromatherapy, particularly lavender, lemon, marjoram, and cinnamon, has been shown to significantly reduce both systolic and diastolic blood pressure in hypertensive patients. The mechanism of action involves active compounds such as

linalool and linalyl acetate, which stimulate the limbic system and promote the release of endorphins and serotonin.

This process leads to relaxation, reduced cortisol levels, increased parasympathetic activity, and vasodilation, ultimately contributing to blood pressure reduction. In addition to its physiological effects, aromatherapy provides holistic benefits, including the reduction of pain intensity (especially headaches and neck pain), decreased anxiety levels, improved sleep quality, and enhanced overall patient comfort.

The findings also indicate that aromatherapy demonstrates greater effectiveness when combined with other relaxation techniques such as slow deep breathing, Benson relaxation therapy, or progressive muscle relaxation. Therefore, aromatherapy can be considered a safe, cost-effective, and easily applicable complementary therapy within nursing care, both in clinical settings and home-based care.

However, despite the promising findings, further research is recommended to strengthen the evidence base. Future studies should utilize more rigorous research designs, particularly randomized controlled trials (RCTs), with larger sample sizes and longer intervention durations to evaluate long-term effectiveness. Additionally, standardization of aromatherapy protocols, including dosage, frequency, and method of administration, is needed to ensure consistency and reproducibility of results. Exploring the comparative effectiveness of different types of essential oils and combinations of interventions is also recommended to optimize therapeutic outcomes for hypertensive patients.

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