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Research Article

Lavender Essence: Unveiling Its Potential Role in Cardiovascular Health Exploring Aromatherapy Compounds in Cardiovascular Disease Management

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ABSTRACT

Lavender essential oil has garnered increasing attention for its potential therapeutic effects beyond its traditional use in aromatherapy. This study provides an overview of the current evidence on the cardiovascular effects of lavender essential oil, highlighting its vasorelaxant, anti-inflammatory, antioxidant, and stress-reducing properties. Moreover, it discusses the mechanisms underlying these effects, including modulation of nitric oxide pathways, inhibition of inflammatory cytokines, and reduction of oxidative stress markers. Additionally, these studies also address the potential implications of lavender in various aspects of cardiovascular disease management, such as hypertension, atherosclerosis, and arrhythmias. Furthermore, it outlines the existing gaps in knowledge and proposes avenues for future research to explain the full therapeutic potential of lavender essential oil in cardiovascular health. Overall, this research underscores the promising role of lavender essential oil as a complementary approach in the prevention and management of cardiovascular diseases.

INTRODUCTION

Aromatherapy is a holistic healing practice harnessing the therapeutic properties of natural plant extracts, called essential oils, to enhance overall health and well-being. These oils are derived from various plant parts like flowers, leaves, stems, roots, or bark. Aromatherapy is commonly integrated into massage therapy or

alternative medicine approaches. Essential oils can be inhaled, applied topically, or sometimes ingested, but caution is advised, and professional guidance is recommended for ingestion due to safety concerns with certain oils. [1] Each essential oil is believed to offer unique therapeutic benefits. For instance, lavender promotes relaxation, peppermint uplifts, and eucalyptus aids respiratory

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health. While safe, individuals with specific health conditions or sensitivities should consult healthcare professionals before using essential oils. [2] "Aromatherapy" combines "aroma," referring to fragrance or smell, with "therapy," indicating treatment. Its core objective is to restore balance and harmony across body, mind, and spirit. With historical roots dating back to ancient Egypt, China, India, and other cultures, aromatherapy continues to be a respected practice for holistic wellness. [3-4].

Aromatherapy: An Overview- Aromatherapy is an alternative therapy that involves the use of plant-derived volatile extracts and essential oils, which are rich in natural chemical compounds with potential therapeutic effects. These essential oils are meticulously extracted from various parts of plants, including flowers, leaves, bark, and roots. The methods of extraction are carefully chosen to preserve the integrity and potency of these oils, often involving processes like steam distillation or cold pressing. Once extracted, essential oils can be used in a variety of forms, such as inhalation, topical application, and diffusion, each offering unique benefits and applications in promoting health and well-being. The lavender flowers utilized in this study were procured from Amazon India due to their limited availability in local markets across India. Following the acquisition, a Certificate of Analysis was obtained after the thorough testing of the lavender flowers.



Fig 1.1- Lavender

Aromatherapy in Anxiety Management- In contemporary healthcare, the reliance on synthetic drugs to manage anxiety is increasingly scrutinized due to their numerous side effects. Consequently, a growing interest in alternative and complementary medicine approaches has emerged, offering strategies that are perceived to be safer and more holistic. Among these approaches, aromatherapy has garnered significant attention worldwide for its potential to alleviate anxiety.

Mechanism of Action-Therapeutic effects of aromatherapy are primarily attributed to the interaction of plant odors with the olfactory system. When these plant-derived compounds are inhaled, they stimulate the olfactory nerve cells located in the nasal cavity. This stimulation triggers a series of neural responses, leading to the activation of the limbic system—a region of the brain that plays a critical role in regulating emotions, behavior, and memory. The limbic system is intricately connected to various other brain regions and hormonal pathways, which allows it to influence a wide range of physiological and psychological functions.

The activation of the limbic system through olfactory stimulation can lead to the secretion of various neurotransmitters, which play significant roles in mood regulation and stress response. These neurotransmitters include:

- **Enkephalin:** Known for its analgesic effects, enkephalin is a natural pain reliever. It helps in regulating pain perception and can provide relief from both acute and chronic pain conditions. Enkephalin's ability to modulate pain makes it a valuable component in therapeutic strategies aimed at pain management.
- **Endorphins:** Often referred to as "feel-good" hormones, endorphins are produced by the central nervous system and the pituitary gland. They promote a sense of well-being

and happiness, acting as natural painkillers and mood elevators. The release of endorphins can help reduce stress and anxiety, contributing to overall emotional stability and well-being.

- **Noradrenaline:** A key neurotransmitter in the body's stress response, noradrenaline prepares the body to respond to stressors by increasing alertness and arousal. It helps in enhancing cognitive functions, improving focus, and maintaining energy levels during stressful situations. Noradrenaline's role in stress modulation makes it essential for maintaining emotional balance and resilience.

The combined effect of these neurotransmitters leads to a significant reduction in anxiety and stress levels in patients, promoting overall emotional well-being. By modulating the activity of the limbic system and its associated pathways, aromatherapy can provide a holistic approach to mental health and emotional regulation.

Application of Aromatherapy

Clinical Applications- Numerous studies have demonstrated the efficacy of aromatherapy in reducing anxiety and stress in various clinical settings. Essential oils such as lavender, chamomile, and bergamot are particularly noted for their calming and anxiolytic properties. These oils have been extensively researched and have shown promising results in clinical trials, indicating their potential as complementary therapies for anxiety and stress-related disorders.

Inhalation Therapy- Inhalation therapy is a widely used method in aromatherapy, where therapeutic compounds are delivered directly to the olfactory system. This can be achieved using diffusers, which disperse the essential oils into the air, allowing for continuous inhalation. Diffusers are designed to create a fine mist of essential oil particles, which can be easily inhaled and absorbed through the respiratory system. Alternatively, direct inhalation involves breathing in the aroma

from a few drops of essential oil applied to a tissue, cotton ball, or inhaler stick. Inhalation therapy is particularly effective for quick relief of stress and anxiety, as it allows the compounds to rapidly reach the brain and exert their effects.

Topical Application- Another common method in aromatherapy is topical application. Essential oils are incorporated into massage oils, lotions, or creams, and then applied to the skin. This method not only allows for the absorption of the oils through the skin but also provides the additional benefit of inhaling the aroma. The combined effect of skin absorption and inhalation enhances the therapeutic benefits. Topical application is often used in massage therapy, where the physical act of massage, combined with the properties of the essential oils, provides a relaxing and healing experience. The essential oils penetrate the skin, entering the bloodstream and delivering their therapeutic effects throughout the body.

Baths- Adding essential oils to bath water is a method that combines the benefits of hydrotherapy with aromatherapy. When essential oils are added to a warm bath, the heat helps to vaporize the oils, creating a fragrant and therapeutic steam. This method allows for the simultaneous absorption of the oils through the skin and inhalation of the aromatic compounds. Aromatherapy baths are particularly beneficial for relaxation, stress relief, and promoting a sense of well-being. The warm water enhances the absorption of the essential oils through the skin, while the aromatic steam provides respiratory benefits.

Background For generations, traditional medicine has explored the potential of aromatherapy and medicinal plant oils as remedies for reducing anxiety. Several studies have demonstrated that the aromas of medicinal plants are effective in enhancing hemodynamic variables and alleviating stress and anxiety. Cardiovascular disease (CVD) poses a substantial health burden, accounting for half of all non-communicable diseases [6]. The



rising incidence of cardiovascular disease (CVD) is linked to the growing prevalence of stressful lifestyles. Stress and anxiety can lead to various physiological responses including tachypnea, hypothermia, elevated blood pressure, arterial vasoconstriction, reduced tissue perfusion, and prolonged health condition [7], Anxiety is also associated with heightened cardiovascular responses, increased myocardial oxygen consumption, and elevated plasma levels of epinephrine and norepinephrine [8]. Aromatherapy harnesses essential oils extracted from a variety of popular plants to enhance well-being and address various health issues, including anxiety, with plants from the Lamiaceae family like *Lavandula angustifolia*. Lavender aromatherapy, one of the most popular complementary treatments, is recognized as a beneficial mental relaxation therapy being utilized in complementary medicine for managing a spectrum of conditions. Clinical trials have shown that aromatherapy using essential oils from these plants elicits positive psychological effects and enhances vital signs like pulse rate, respiratory rate, and blood pressure [4-8]. Considering that some studies have not consistently reported positive effects of aromatherapy on the vital signs of cardiovascular disease (CVD) patients, despite numerous others indicating benefits, a systematic study was undertaken to comprehensively explore the impact of plant aromas on vital signs in individuals with CVDs.

In this study, we investigate the *Lavandula angustifolia* variety native to Australia. The flower heads of this plant are subjected to hydro distillation to extract its essential oil. The resulting oil is characterized by a delightful scent profile, featuring sweet, floral, and herbaceous notes. Renowned for its calming properties, this oil is believed to have potential in reducing anxiety and heart rate. Chemical analysis reveals key constituents of this lavender oil. Linalyl acetate,

known for its sweet and fruity aroma, is identified for its calming effects. 1,8-Cineole, also known as Eucalyptol, imparts a fresh scent with slight camphoraceous undertones, common in many essential oils. Additionally, trace amounts of camphor contribute to the overall aroma and properties of this lavender oil. Through this study, we aim to further understand the therapeutic potential of *Lavandula angustifolia* (Australian variety) essential oil, particularly in its application for promoting relaxation and potentially influencing physiological responses such as anxiety and heart rate.

AIM AND OBJECTIVES

1. Investigate the Extraction of Lavender Oil:

The primary objective of this study was to meticulously examine the process of extracting lavender oil from lavender flowers using hydro distillation. This involved a detailed analysis of the steps required to obtain high-quality essential oil, ensuring the preservation of its natural chemical compounds. By standardizing the extraction process, we aimed to achieve consistency and reproducibility in the yield and quality of the lavender oil. This objective included determining the optimal conditions for extraction, such as the duration of distillation and the appropriate amount of plant material to use in each batch.

2. Assessing the Effects of Lavender Oil on Mitigating Stress and Anxiety:

Another key objective was to explore the therapeutic effects of lavender oil in alleviating symptoms of stress and anxiety. This involved conducting aromatherapy sessions where participants were exposed to lavender oil through various methods, including inhalation and topical application. The study aimed to measure the changes in participants' stress and anxiety levels before and after the aromatherapy sessions, using both subjective



assessments and objective physiological markers. By doing so, we sought to validate the calming properties of lavender oil and its potential as a complementary treatment for anxiety disorders.

3. Evaluate the Potential of Lavender Oil in Lowering Hypertension and Offering Cardiovascular Health Benefits:

The study also aimed to investigate the impact of lavender oil on blood pressure regulation and overall cardiovascular health. Given the close link between stress, anxiety, and cardiovascular conditions such as hypertension, this objective focused on examining whether the relaxation effects of lavender oil could translate into measurable improvements in cardiovascular parameters. Participants' blood pressure readings were monitored throughout the study to determine if consistent use of lavender oil in aromatherapy sessions could contribute to lowering hypertension and promoting heart health.

4. Examine the Calming Effects of Aromatherapy Sessions with Lavender Oil and Their Role in Regulating Blood Pressure

To specifically assess the potential of lavender oil aromatherapy sessions in providing a calming effect that helps regulate blood pressure. This involved detailed observations and measurements of participants' physiological responses during and after exposure to lavender oil. By analyzing these data, the study aimed to establish a clear connection between the calming influence of lavender oil and its efficacy in managing blood pressure.

MATERIALS AND METHOD

The process of hydro distillation was utilized to extract lavender essential oil from *Lavandula angustifolia*, a process that is known for its efficiency and ability to preserve the delicate

compounds within the plant. This intricate procedure involved a series of specific steps and required a variety of apparatus, chemicals, and instruments to ensure its successful completion.

The apparatus used in this process included several essential components. The round bottom flask, which served as the primary container, was used to hold the plant material and the distilled water. This flask is ideal due to its shape, which allows for even heating and minimizes the risk of material loss. A condenser was employed to cool and condense the steam that carried the essential oil vapor. This component is crucial as it converts the vapor back into liquid form, making it possible to collect the essential oil. Tubes were used to facilitate the movement of steam between the flask and the condenser, ensuring a smooth flow of vapor. Stands and bends were necessary to securely hold and support the various components of the setup, ensuring stability and proper alignment during the distillation process. The proper arrangement of these parts is essential for maintaining the integrity and efficiency of the distillation. A separating funnel was used to isolate the essential oil from the water after condensation. This step is vital as it allows for the collection of pure essential oil, free from any aqueous content. Additionally, a beaker was used to collect the condensed liquid, providing a receptacle for the final product. Filter paper was employed to remove any remaining impurities, ensuring that the essential oil was of the highest possible purity. The tripod stand provided a stable base for heating, which is necessary for maintaining consistent temperatures throughout the distillation process. A gravity bottle was used to add distilled water as needed, ensuring that the system remained hydrated and functional. A weighing balance was essential for accurately measuring the quantities of plant material and water, which is critical for maintaining the correct proportions and ensuring the efficiency of the extraction process. The



chemical used in this hydro distillation process was distilled water, which played a critical role in generating the steam needed to extract the essential oil from the lavender. The use of distilled water is important as it prevents contamination and ensures the purity of the extracted oil. In terms of instruments, a heating mantle was utilized to provide consistent and controlled heat to the round bottom flask, ensuring the efficient generation of steam. This instrument is preferred over other heating methods because it provides uniform heat distribution and minimizes the risk of overheating or burning the plant material. The weighing balance was again crucial for ensuring precise measurements throughout the process, as accurate measurement is key to achieving the desired outcome. An autoclave was included to sterilize equipment and maintain a clean environment, preventing contamination of the essential oil. The use of an autoclave ensures that all apparatus and instruments are free from microbial contamination, which is essential for producing high-quality essential oil. Overall, the hydro distillation process for extracting lavender essential oil from *Lavandula angustifolia* was a carefully orchestrated procedure involving a range of specialized equipment, chemicals, and instruments to achieve the desired outcome. The precision and attention to detail required in each step highlight the complexity of the process and the importance of using the correct apparatus and techniques to ensure the highest quality of essential oil.

Procedure: Hydro distillation is a specialized and advanced method of distilling plant materials, specifically designed to optimize the extraction of essential oils. This process is a sophisticated variation of traditional steam distillation and is distinguished by the deliberate addition of water to the still along with the plant material. The incorporation of added moisture plays a crucial role in aiding the extraction of essential oils from

plant materials, particularly those that are typically challenging to process using conventional steam distillation techniques. In this detailed study, lavender flowers were meticulously chosen for their renowned aromatic properties, and they underwent the hydro distillation process to extract their essential oil. Initially, the lavender flowers were carefully cleaned and thoroughly dried to ensure the consistency and purity of the extracted oil. This preparation step is vital as it removes any extraneous matter that could potentially interfere with the quality of the final product. For the extraction process, the dried lavender was precisely weighed, with each batch containing exactly ten grams of lavender flowers. This precise measurement was essential for maintaining the accuracy and reproducibility of the experiment, ensuring that each batch would yield comparable results. The extraction process was conducted in five separate batches to verify the consistency and reliability of the method. Each batch was subjected to hydro distillation for a duration of three hours. This consistent extraction time was meticulously chosen based on preliminary studies to optimize the yield of essential oil without compromising its quality. The three-hour duration was found to be the ideal balance, allowing for maximum extraction efficiency while preserving the delicate aromatic compounds present in the lavender oil. Over the course of these extractions, a total of 9.4 ml of lavender essential oil was obtained. Each individual batch yielded approximately 1.88 ml of essential oil, demonstrating the reliability and repeatability of the hydro distillation process. This consistent yield across all batches underscores the method's efficacy and the precise control maintained throughout the experiment. After extraction, the essential oil obtained from the lavender flowers underwent rigorous evaluation in accordance with the stringent standards set forth by the Indian Pharmacopoeia. This evaluation was crucial to ensure that the extracted oil met the



necessary quality and purity criteria, making it suitable for various high-value applications, including aromatherapy, medicinal, and cosmetic uses. The adherence to these standards guarantees that the essential oil is free from impurities and maintains its therapeutic properties. The success of this hydro distillation process highlights its significant efficacy in extracting essential oils from plant materials that are otherwise difficult to process. By incorporating additional moisture into the distillation process, hydro distillation enhances

both the overall yield and the quality of the essential oil. This method proves to be particularly beneficial for plants like lavender, where the extraction of essential oil is highly desirable but can pose challenges through traditional methods. The study's findings suggest that hydro distillation could be a preferred method for essential oil extraction, offering a reliable, efficient, and high-quality alternative to conventional distillation techniques.



Fig 2 Extraction of lavender essential oil by hydro distillation



Fig 3 Extracted, packed and labeled Lavender essential oil

Study design and Participants:

A prospective and controlled pilot study was undertaken to explore the effects of lavender essential oil aromatherapy on patients

experiencing elevated stress and anxiety, which were identified as contributing factors to their hypertension. This study was conducted at Dhadiwal Hospital in Nashik, Maharashtra, India,

over a period from May 5th, 2024, to May 10th, 2024. The primary aim of this study was to determine whether the application of lavender essential oil could have a beneficial effect on blood pressure levels in patients with hypertension, particularly those cases where hypertension was exacerbated by stress and anxiety. The study utilized a randomized controlled trial design, a rigorous methodological approach to ensure the reliability and validity of the findings. The trial enrolled five patients who had been admitted to the hospital with varying degrees of stress and anxiety, alongside a diagnosis of hypertension. These participants were carefully selected to represent a diverse range of ages and gender groups, specifically targeting individuals aged between 25 and 50 years. This demographic diversity was crucial in ensuring that the findings could be generalized across different segments of the population. All participants were fluent in the local language and able to communicate effectively with the researchers. Moreover, each participant provided informed consent, indicating their willingness to participate in the study and to receive aromatherapy as part of the intervention. Lavender essential oil, renowned for its calming and anxiolytic properties, was chosen for this study. The essential oil was applied via the dermal route, a method known to facilitate absorption and ensure the therapeutic effects of the oil. The application was conducted under the supervision of qualified physicians, who were present to ensure the safety of the participants and adherence to medical standards. Each participant underwent the aromatherapy treatment twice daily, specifically scheduled before their routine medical

checkups. This consistent timing was intended to standardize the intervention, thereby controlling for other variables that might influence blood pressure readings and ensuring that any observed effects could be attributed to the aromatherapy. The process of measuring blood pressure was conducted meticulously by the attending physicians using a digital sphygmomanometer, a reliable and commonly used instrument for such measurements. Blood pressure readings were taken at baseline, prior to the initiation of the aromatherapy treatment, and then at regular intervals throughout the study period. The recorded data were meticulously documented by the researchers, who were trained in accurate and reliable data collection methods. This careful documentation process was essential in ensuring the accuracy and reliability of the findings.

In addition to blood pressure measurements, the researchers also monitored other vital signs and collected qualitative data on the participants' subjective experiences of stress and anxiety. This comprehensive approach allowed for a more holistic understanding of the effects of lavender essential oil aromatherapy. Throughout the study, the participants were encouraged to report any adverse effects or changes in their condition, ensuring that the researchers could promptly address any issues and adjust the intervention as necessary.

RESULT AND DISCUSSION

In the present study, lavender aromatherapy was performed on patients suffering from hypertension, and satisfactory results were obtained.

Table 1 Test results of lavender aromatherapy in hypertension patients

Patient No.	Age	Sex	Day 01 (mm/Hg)	Day 02 (mm/Hg)	Day 03 (mm/Hg)	Day 04 (mm/Hg)	Day 05 (mm/Hg)
01	29	Male	95/139	98/134	95/127	92/125	90/127
02	32	Male	98/151	99/149	90/130	85/128	88/125



03	39	Female	99/149	97/150	88/143	82/130	79/119
04	42	Female	111/174	115/171	110/164	108/142	100/140
05	45	Male	105/160	102/162	99/159	100/155	100/149

The study, conducted from May 5th, 2024, to May 10th, 2024, aimed to evaluate the efficacy of lavender essential oil aromatherapy in reducing hypertension among patients suffering from elevated stress and anxiety. The study was meticulously planned and executed under the guidance of experienced physicians at Dhadiwal Hospital in Nashik, Maharashtra, India. This pilot study was designed as a prospective and controlled trial, involving a small sample of five patients to obtain preliminary data on the potential benefits of lavender aromatherapy for managing hypertension. Participants in this study were selected to represent a diverse demographic, encompassing various age groups ranging from 25 to 50 years old, and included both male and female patients. Ensuring diversity in the participant pool was crucial for assessing the generalizability of the results across different segments of the population. Prior to their inclusion in the study, all patients provided informed consent, acknowledging their voluntary participation and their understanding of the study's procedures and objectives. Additionally, a thorough assessment was conducted to confirm that none of the participants had allergies to lavender essential oil, ensuring the safety and smooth progression of the study. The intervention involved the application of lavender essential oil via the dermal route, a method chosen for its direct and controlled delivery of the therapeutic compounds present in the oil. The aromatherapy sessions were scheduled twice daily, strategically timed before the patients' routine medical checkups. This timing was intended to create a consistent framework for the intervention, thereby minimizing the influence of external variables on the study outcomes. The application of the oil was performed under the supervision of qualified physicians to ensure adherence to medical protocols and to monitor any immediate reactions. On the first day of the experiment, blood pressure measurements taken three hours after the application of lavender essential oil showed no significant changes. These initial findings

indicated that the effects of aromatherapy might not be immediate and suggested the need for sustained application to observe any potential benefits. However, from the second day onwards, gradual improvements in blood pressure readings were noted. By the fifth day, the results indicated a positive trend, with all five patients showing reduced hypertension. This progressive improvement highlighted the potential cumulative effect of lavender aromatherapy. The findings of this study suggest that while lavender aromatherapy may not produce immediate results, its continued use can lead to beneficial outcomes in reducing hypertension. The positive effects observed after several days of consistent application support the potential of lavender essential oil as a complementary treatment for managing hypertension, especially in patients whose condition is exacerbated by stress and anxiety. Stress is a well-documented risk factor for cardiovascular diseases, and effective management is crucial in preventing these conditions from worsening. Although scientific evidence specifically supporting aromatherapy for cardiovascular health is still limited, this study adds valuable preliminary data. The observed reduction in hypertension among participants indicates that lavender aromatherapy could be a viable complementary therapy, particularly for stress-induced hypertension. Despite the small sample size, the study provides valuable insights into the potential benefits of lavender essential oil aromatherapy for patients with hypertension exacerbated by stress and anxiety. The results showed a trend towards reduced blood pressure levels following the aromatherapy sessions, suggesting that lavender essential oil may help manage hypertension in such patients. These preliminary findings highlight the need for larger-scale studies to further investigate the efficacy and safety of aromatherapy as a complementary treatment for hypertension.

CONCLUSION



The lavender essential oil extraction process via hydro distillation was successfully carried out, with all evaluation parameters meticulously performed. The primary aim of this study was twofold: to extract lavender essential oil and to investigate its effects on cardiovascular disease, specifically hypertension exacerbated by stress and anxiety. This prospective and controlled pilot study, conducted at Dhadiwal Hospital in Nashik, Maharashtra, offers promising preliminary evidence on the potential benefits of lavender essential oil aromatherapy in managing hypertension. The study enrolled a small, diverse group of participants who received consistent application of lavender essential oil over a short period. The results indicated a trend towards reduced blood pressure levels, suggesting that lavender essential oil could be an effective complementary treatment for hypertension.

Stress management plays a critical role in preventing the worsening of cardiovascular conditions. Although scientific evidence specifically supporting the use of aromatherapy for cardiovascular health remains limited, this study contributes valuable preliminary data. The observed reduction in hypertension among the participants underscores the potential of lavender aromatherapy as a viable complementary therapy, particularly for hypertension induced or exacerbated by stress and anxiety. The findings of this study, despite being derived from a small sample size, provide valuable insights into the potential benefits of lavender essential oil aromatherapy for patients with hypertension. The trend towards reduced blood pressure levels following aromatherapy sessions suggests that lavender essential oil may help manage hypertension in patients whose condition is influenced by stress. These preliminary findings highlight the need for larger-scale studies to further investigate the efficacy and safety of lavender essential oil in managing hypertension.

Future research should aim to include a larger and more diverse participant pool, extending the study's duration to observe long-term effects and incorporating additional measures to control for various influencing factors. This approach would help to establish a more comprehensive

understanding of the therapeutic potential of lavender aromatherapy in cardiovascular health management. Such studies could explore different methods of essential oil application, variations in dosage, and potential interactions with other treatments. Additionally, the inclusion of more detailed physiological and psychological assessments could provide deeper insights into the mechanisms through which lavender essential oil exerts its effects on blood pressure and stress levels. Furthermore, investigating the molecular composition of the extracted lavender essential oil and its specific active components could offer a better understanding of the therapeutic properties of lavender. This could pave the way for the development of more targeted and effective aromatherapy treatments for hypertension and other stress-related conditions. This pilot study at Dhadiwal Hospital highlights the potential of lavender essential oil aromatherapy as a beneficial intervention for managing hypertension exacerbated by stress and anxiety. The rigorous design, careful selection of participants, standardized intervention procedures, and meticulous data collection all contribute to the reliability of the findings. While the preliminary results are promising, larger-scale studies are warranted to build on these findings and further explore the therapeutic potential of lavender essential oil in the management of hypertension and cardiovascular health.

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