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Effect of Lavender aromatherapy on anxiety among Javanese elderly people with hypertension living in rural community

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Abstract

Background: Hypertension or high blood pressure is one of the primary cause of death. The World Health Organization (WHO) states, almost worldwide 1 billion people have high blood pressure. Uncontrolled, long-term increased in blood pressure can damage vital organ systems. Increased blood pressure in people with hypertension can also cause anxiety. To reduce the impact of anxiety from hypertension, it is helpful to provide lavender aromatherapy for sufferers.

Purpose: To examine the impact of lavender aromatherapy on reducing anxiety levels in hypertension sufferers.

Method: Using a one-group pre-posttest design in conjunction with a pre-experimental research design. The total sample was 31 people with hypertension. The research took place in Blimbing Village, Gatak District, Sukoharjo Regency and was conducted from 18 November to 2 December 2023. The ZSAS (Zung-Self Anxiety Scale) questionnaire was used as an instrument to measure anxiety levels. The anxiety levels were analyzed using the descriptive statistics test and the effect of lavender aromatherapy was measured by the Paired Sample T-test.

Results: Before receiving lavender aromatherapy, 16 (51.6%) hypertensive patients experienced mild anxiety, and 15 (48.4%) had a moderate level of anxiety. Subsequently, after receiving the lavender aromatherapy intervention, anxiety among hypertensive patients decreased from mild anxiety to 27 (87.1%), with only 4 (12.9%) experiencing moderate anxiety. The paired sample t-test yielded a p-value of <0.05.

Conclusion: Lavender aroma therapy through candle inhalation has an influence on reducing anxiety levels in hypertension sufferers.

Suggestion: It is highly recommended for hypertension sufferers who experience anxiety to use lavender aromatherapy as a complementary therapy.

Keyword: Anxiety; Hypertension; Lavender Aromatherapy.

INTRODUCTION

An increase in blood pressure is called hypertension. Measurements of hypertension are performed with two separate readings spaced five minutes apart, with systolic blood pressure readings of more than 140 mmHg and diastolic blood pressure readings of more than 90 mmHg in a calm state or sufficient rest. Hypertension or high blood pressure is a disease that can cause death; hypertension itself is known as a silent killer disease. Hypertension does not occur suddenly but rather through a lengthy

process. High blood pressure that is not controlled for a certain period, may lead to high blood pressure becoming permanent, known as hypertension.

A condition known as hypertension occurs when an individual experiences an increase in blood pressure above normal, as indicated by an elevated systolic and diastolic number in a blood pressure examination using a sphygmomanometer or other blood pressure examination tools such as a digital blood pressure monitor. Symptoms of hypertension

can be characterized by long-term increases in blood pressure that can damage organ systems in the body, such as the kidneys, brain, retina, heart, enlargement of the left ventricle or left ventricle, chronic heart failure, and damage to the retina of the eye or blindness (Irwan, 2016).

The classification of hypertension is divided into two categories, namely primary hypertension and secondary hypertension. A disease known as primary hypertension occurs when a person's lifestyle and environmental factors combine to cause high blood pressure or an increase in blood pressure. Uncontrolled eating patterns that cause excess weight or even obesity are the initial trigger for hypertension or high blood pressure. Meanwhile, a condition known as secondary hypertension occurs when blood pressure rises as a result of someone already suffering from an additional illness, such as renal or heart failure or hormonal system damage (Irwan, 2016).

Hypertension (high blood pressure) is the primary cause of death and almost 1 billion people world suffer from high blood pressure (World Health Organization, 2023). In 2018, around 1.13 billion people in the world suffer from high blood pressure which means that one in three people in the world has been diagnosed with high blood pressure. The number of people suffering from high blood pressure continues to increase every year, it is estimated that by 2025 there will be 1.5 billion people affected by high blood pressure and its complications (Ministry of Health of the Republic of Indonesia, 2018). According to recent predictions, there may be 15% to 20% more people with hypertension by 2025, bringing the total number of sufferers close to 1.5 billion (Kearney, Whelton, Reynolds, Muntner, Whelton, & He, 2005).

The prevalence of hypertension, in Indonesia is quite high; moreover, the consequences are a health problem in society. Hypertension is one of the risk factors that most influence the occurrence of cardiovascular diseases. High blood pressure often shows no symptoms, so it is only recognized when it has led to organ problems such as heart dysfunction or stroke (Ministry of Health of the Republic of Indonesia, 2018).

it is correct that various factors can contribute to hypertension. Age, family history, obesity, high salt intake, smoking and excessive alcohol consumption are indeed among the risk factors. Additionally, being

overweight, lack of exercise and a diet high in fat and salt can also contribute to the emergence of high blood pressure. It is essential to be aware of these factors and adopt a healthy lifestyle to help manage and prevent hypertension.

Several risk factors lead to an increase in blood pressure, including age, a family or genetic history of hypertension, obesity, high salt levels, and lifestyle habits such as smoking and consuming alcoholic beverages. Additionally, being overweight, lack of exercise, and consuming excessive amounts of fat and salt can also be risk factors (Akbar, Sulur, Ambohamsah, Darmiati, Nur, & Humaerah, 2021).

Risk factors age, gender, and genetics factors are unchangeable. The age factor affects the occurrence of hypertension due to alterations to blood vessel structure. Then the risk factors that cannot be changed are gender and genetics. Gender influences the occurrence of hypertension because men tend to have around 2.3 times more risk of experiencing increased blood pressure than women. This is thought to be because men have a lifestyle that is more likely to raise blood pressure. But even after menopause, women are more likely to have hypertension, and this tendency persists until they are 65 years old. This is due to changes in hormonal factors. For genetic risk factors, a close family history of suffering from hypertension (hereditary factor) also increases the risk of hypertension, especially primary hypertension. Genetic factors also relate to the regulation of cell membrane salt and renin metabolism.

Risk factors that can be changed include an unhealthy lifestyle, which can include being overweight or obese, smoking, a lack of physical activity, excessive salt consumption, excessive alcohol consumption, and psychosocial stress. Overweight and body mass index (BMI) are directly correlated with blood pressure, especially systolic blood pressure. Obesity is not a cause of hypertension, but the prevalence of someone with excess body weight has a risk 5 times higher than someone with normal or ideal body weight, this is because hypertension sufferers, around 20 - 33% are found to be overweight. Inhaled toxic substances from cigarettes, like nicotine and carbon monoxide, can enter the bloodstream and harm the endothelium lining of arteries these substances can cause atherosclerosis and high blood pressure. With this, smoking in people with high blood pressure will further

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increase the risk of damage to arteries. Apart from that, inactivity can also lead to affect high blood pressure, this is because regular exercise or physical activity will make blood pressure go down even though body weight has not gone down. Consuming excessive salt will cause blood pressure to increase because salt causes fluid to build up in the body. After all it attracts fluid outside the cells so that it is not excreted, thereby increasing blood volume and pressure (Ministry of Health of the Republic of Indonesia, 2013).

A person suffering from hypertension may experience anxiety due to the fact that treating hypertension usually takes a long time and there's a chance that complications could make life shorter (Yuniartika, & Murti, 2020). Anxiety is a stress-related emotion that manifests as tenseness, concerned thoughts, and a bodily reaction (rapid heartbeat, elevated blood pressure (Muyasaroh, 2020). Anxiety is a condition where individuals or groups experience difficult feelings or fear and autonomic nervous system activity in response to unclear, non-specific threats (Carpenito-Moyet, 2006). Anxiety is indeed a natural response to stressful or threatening situations. It becomes problematic when the intensity of the fear is overwhelming or if the feeling persists, leading to what can be diagnosed as an anxiety disorder (Dean, 2016). In general, anxiety disorders are characterized by inordinate panic and fear, as well as affiliated behavioral disorders. While fear is the feeling brought on by impending trouble, anxiety is best defined as the state in which the autonomic nervous system is acutely activated by "expectation of unborn trouble". Anxiety conditions are often assessed through the use of questionnaires administered to cases; however, the dimension of psychophysiological parameters (such as respiratory rate, heart rate, and its variability, as well as systolic and diastolic blood pressure) is also significant. (Donelli, Antonelli, Bellinazzi, Gensini, & Firenzuoli, 2019).

Factors that can cause anxiety in hypertension sufferers include biological, social, and psychological factors (Darkay, 2022). Apart from that, complications that occur from high blood pressure can also be a factor that triggers anxiety in sufferers, sufferers is fear that the condition will get worse. Apart from these factors, economic limitations and various types of work can also cause an anxious response (Rizal, Rizani, & Marwansyah, 2019). Because of this, it is

critical to focus on and address these factors in the management of hypertension sufferers to reduce anxiety levels.

Excessive stress and anxiety can affect blood pressure and worsen hypertension. Hypertension sufferers are also four times more likely to experience an increase in blood pressure (Sholikhah, Laksmi, & Supratman, 2021). One of the factors that contribute to elevated blood pressure is anxiety because when you are anxious, the blood vessels will narrow, causing the blood pressure to increase. Several studies have shown the relationship between anxiety and hypertension, for example, research conducted at the Kramat Jati Community Health Center, East Jakarta, showed a relationship between anxiety and hypertension with a p-value of 0.041 (Marliana, Kaban, & Chasanah, 2020).

There are two ways that can be used to overcome anxiety, namely pharmacological and non-pharmacological. Pharmacologically, drugs can treat mental problems such as stress, anxiety, and withdrawal, but there are side effects that result from using these drugs (Satria, 2020). There are several ways to deal with anxiety non-pharmacologically, namely yoga, deep breathing relaxation, laughter therapy, and the use of aromatherapy (Sabrina, Sanjaya, & Sagita, 2020). One non-pharmacological treatment that is easy to use to reduce anxiety levels is the use of lavender aromatherapy.

Aromatherapy is an alternative treatment that is widely known in other forms such as essential oils and many other forms, that have benefits as regulators of cognitive function, mood, and health. Aromatherapy can be made from various plant extracts, such as flowers, leaves, plant roots, bark, and various parts of plants, with different preparation methods depending on their respective functions. There are many types of plants used as extracts such as rosemary, lavender, sandalwood, jasmine, orange, ginger, lemon, basil, ylang-ylang, tea tree, and many more. There are many types of aromatherapy in various forms, such as essential oil, incense, candles, massage oil and also soap (Romadhon, & Rahmawaty, 2022).

One of the complementary treatments using non-pharmacological techniques used to reduce anxiety is the use of aromatherapy. Using the smells of essential aromatherapy oils can reduce anxiety. The type of aromatherapy that can be used to reduce anxiety is lavender aromatherapy. The calming properties are

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the reason why lavender oil aromatherapy has been used since ancient times (Atsumi, & Tonosaki, 2007).

“Lavera” a refreshing word from latin, is where the term lavender originates. The tiny bluish-purple blossoms of the lavender plant reach a height of 72 cm, originating from the southern region of the Mediterranean Sea to tropical Africa and east to India (Ramadhian, & Zettira, 2017).

One way of aromatherapy with lavender flowers (*Lavandula angustifolia*) is to inhale them so that they enter the body directly. Aromatherapy with lavender flowers contains linool, which has a calming effect and stimulates the cilia receptors of the olfactory nerve in the olfactory epithelium to transmit the aroma to the olfactory bulb via the olfactory nerve. The olfactory bulb is connected to the limbic nerves and receives all information from auditory, visual, and olfactory systems. The limbic system is a ring-shaped structure in the brain that lies below the cerebral cortex. The hippocampus and the amygdala, which both belong to important limbic system areas linked to aroma and memory (including the process of smelling lavender flowers), are the two most significant limbic system regions associated with aroma. The hypothalamus functions as a regulator and sends scent signals to the raphe nucleus, a small but crucial brain region. The effect of a stimulated raphe nucleus is the release of serotonin, a neurotransmitter that regulates the onset of sleep (Buckle, 2015).

Lavender is indeed a member of the Lamiaceae family, and its essential oil is commonly used for various purposes. It is known for its calming properties and is often used to reduce stress, alleviate pain, treat burns or abrasions, act as a muscle relaxant, and improve sleep quality. The soothing aroma of lavender is widely used in aromatherapy for its potential benefits on mental and physical well-being (Greenberg, & Slyer, 2018). The Lavender essential oil, also known as *Lavender angustifolia* essential oil, is said to have positive immunomodulatory effects on wound healing in addition to being antimicrobial, antifungal, anxiolytic, antidepressant, and analgesic (Cavanagh, & Wilkinson, 2002).

The chemical compounds contained in lavender aromatherapy essential oil can influence brain function activities through the nervous system related to smell. This response will stimulate increased neurotransmitter activity, and focus on resolving psychological issues (emotions, sensations, ideas,

and wants) (Jaelani, 2009). Giving lavender aromatherapy has benefits for a person, including joint pain, stress, anxiety hypertension, irregular heartbeat, metabolic rate, sleep disturbances (insomnia) and elevated melatonin and serotonin production (Mangoenprasodjo, 2005). Using aromatherapy can foster feelings of calm (relaxation) in the body, mind and spirit (soothing the physical mental, mind and spiritual), create a peaceful atmosphere, and can keep away feelings of anxiety and restlessness (Jaelani, 2009).

This study's uniqueness in comparison to earlier studies compared to that the application of lavender aromatherapy is usually carried out at any time, but in this study it was carried out before going to sleep and after waking up. In this phase, humans reach a relaxed state so it is hoped that lavender aromatherapy will be more effective in reducing anxiety.

This study aimed to determine the effect of providing lavender aromatherapy on reducing anxiety levels in hypertension sufferers.

RESEARCH METHOD

This research employed a quantitative research using experimental design. The population of this study consisted of all 31 participants suffering from hypertension who experienced anxiety, and the research sample was selected using total sampling techniques. This research took experimental data before and after the intervention. The intervention treatment was by providing lavender aromatherapy through inhalation of aromatherapy candles. The lavender aromatherapy process was given for 2 consecutive weeks before going to bed and after waking up for 10-15 minutes. The anxiety level of hypertensive sufferers was measured using the ZSAS (Zung-Self Anxiety Scale) questionnaire. This questionnaire was created to measure anxiety levels. In this questionnaire there are 20 question items, with 15 questions aimed at increasing anxiety and 5 questions aimed at reducing anxiety. Each question has a score of 1 to 4, where score=1 is never, score=2 is sometimes, score=3 is some of the time, and score=4 is almost all the time. Furthermore, the accumulated anxiety level scores are categorized into five, namely the score group 1-20 is not anxious, the score group 21-44 is mild anxiety, the score group 45-59 is moderate anxiety, the score group 60-74 is

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severe anxiety, and the score group 75-80 is panic (anxiety). The research took place in Blimbing Village, Gatak District, Sukoharjo Regency, and was conducted from 18 November to 2 December 2023. This research has received permission and

recommendation from the Health Research Ethics Commission of Faculty of Health Sciences, Muhammadiyah University, Surakarta, Indonesia with ethical certificate no: 114/KEPK-FIK/XII/2023, 05 November 2023.

RESEARCH RESULTS

Table 1. Characteristics of The Participants (N=31)

Variables	Results	p-value	Analysis
Age (Mean±SD)(Range)(Years)	(63.71±9.012)(50-80)		
Gender (n/%)			
Male	5/16.1		
Female	26/83.9		
Occupation (n/%)			
Housewife	13/41.9		
Entrepreneur	11/35.5		
Retired	5/16.1		
Others	2/6.5		
Anxiety Level Pre-Intervention (n/%)			
No anxiety	0/0.0		
Mild anxiety	16/51.6	0.005	Normal
Moderate anxiety	15/48.4		
Severe anxiety	0/0.0		
Panic	0/0.0		
Anxiety Level Post-intervention (n/%)			
No anxiety	0/0.0		
Mild anxiety	27/87.1	0.018	Normal
Moderate anxiety	4/12.9		
Severe anxiety	0/0.0		
Panic	0/0.0		

Table 1 shows that the age of the participant is in the range 50 – 80 years with a mean of 63.71 and a standard deviation of 9.012. Meanwhile, for the gender category, 16.1% are male and 83.9% are female. Then for occupation, as a housewife it was 41.9%, as an entrepreneur it was 35.5%, as a retiree it was 16.1%, and others were 6.5%. Meanwhile, the pre-intervention anxiety level got a p-Value of 0.005, where the not anxious category was 0.0%, the mild anxiety was 51.6%, the moderate anxiety was 48.4%, the serious anxiety was 0.0%, and the panic was 0.0%. Furthermore, the post-intervention anxiety level got a p-Value of 0.018, where the not anxious category was 0.0%, the mild anxiety was 87.1%, the moderate anxiety was 12.9%, the severe anxiety was 0.0%, and the panic was 0.0%.

Table 2. Paired Sample Test of Lavender Aromatherapy and Anxiety

Variable	Asymp.Sig (2-tailed)
Anxiety level (pre and post)	0.019

Based on Table 2, the anxiety analysis data before and after being given lavender aromatherapy is Sig. Value (2-tailed): 0.019.

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DISCUSSION

The prevalence of hypertension in older people will be higher (Sholikhah, Laksmi, & Supratman, 2021). This is because in old age, individuals experience changes in the structure and function of the vascular system. Changes in blood pressure in old age are caused by peripheral blood. The elderly are more at risk of developing hypertension (high blood pressure) because their blood pressure tends to be higher (Azizah, Rosyidah, & Machfudloh, 2020). Blood pressure increases with age because the thickening of artery walls leads to the accumulation of collagen substances in the muscle layer, causing blood vessels to gradually narrow and stiffen (Aminiyah, Ariviana, Dewi, Fauziah, Kurniawan, Susumaningrum, & Kurdi, 2022).

Several studies state that the majority of hypertension sufferers are women. Women suffer from hypertension the most, namely 36.85%, compared to men, namely 31.34% (Ministry of Health of the Republic of Indonesia (2018). Women experience more anxiety, namely 59.8%, compared to men, namely 40.2% (Istiana, Purqoti, & Mustikawati, 2021) This shows significant differences exist in problems and emotions between men and women where women display more fear and sadness than men. It is easier for women to recognize their emotions from the expressions they make and also from their facial expressions. Women tend to show genuine expressions when they are in a situation that does not match their expectations. There is a relationship between gender and the prevalence of hypertension (Maulidina, Harmani, Suraya, & Masyarakat, 2019).

Apart from that, the participant's employment status also has an influence on the prevalence of hypertension. The lower a person's income, the more anxiety they will experience in their life, where economic factors play a very important role in maintaining a person's health status (Darkay, 2022). The factors that cause housewives to experience anxiety are housework responsibilities that are centered only on the mother and feelings of loneliness and unappreciated because the job is only to take care of the house without income. Participants who have a job with a fairly good income will have a peaceful life because their financial problems are met. In addition, it can also reduce the burden of thinking about the costs of treatment borne by sufferers.

Someone with a low economic status in one's job will experience anxiety easily (Stuart, 2006).

This research shows that the frequency distribution of anxiety decreased after being given lavender aromatherapy. Lavender aromatherapy can reduce a person's anxiety level (Darkay, 2022). Anxiety is one of the factors that causes an increase in blood pressure, when a person feels anxious, the blood vessels will narrow, causing blood pressure to increase. There is a relationship between anxiety and hypertension with a p-value of 0.041 (Marliana, Kaban, & Chasanah, 2020; Laka, Widodo, & Rahayu, 2018). This is because after giving lavender aromatherapy, the lavender molecules and particles will enter through the nose, then received by the nerve receptors as a good signal, then presented as a pleasant smell, and finally the sensory smell enters and affects the limbic system as the center of a person's emotions so that the feeling becomes more relaxed, making thinking calmer and thereby creating adaptive coping (Azizah, Rosyidah, & Machfudloh, 2020).

The results of the Shapiro-Wilk normality test show that the pre-intervention data is 0.005, while for post-intervention is 0.018, so it can be concluded that the significance value is $p > 0.05$, which means that both distributions are said to be normal. Providing lavender aromatherapy reduces anxiety in hypertension sufferers, with the results of the Paired Sample Test analysis showing a Sig. (2-tailed) value 0.019 (p value < 0.05), this shows that lavender aromatherapy has a fairly good effect in reducing anxiety in hypertension sufferers.

CONCLUSION

Hypertension sufferers usually experience anxiety. Lavender aroma therapy through candle inhalation can reduce anxiety levels in hypertension sufferers.

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