

## LEMON AROMATHERAPY ON REDUCING BLOOD PRESSURE IN ELDERLY WITH HYPERTENSION

Riandi Alfin<sup>1</sup>, Destiani Rahma R<sup>2</sup>, Sitti Syabariah<sup>3</sup>  
Bandung Aisyiyah University<sup>1,2,3</sup>  
[riandialfin@unisa-bandung.ac.id](mailto:riandialfin@unisa-bandung.ac.id)<sup>1</sup>

### ABSTRACT

*This study aims to analyze the effectiveness of lemon aromatherapy in reducing blood pressure in the elderly with Hypertension. The research method was a quick experiment with a pretest-posttest design with a control group. The Independent T-test study showed that the average systolic blood pressure in the intervention group was 138, while in the control group, it was 153. In addition, the moderate diastolic blood pressure in the intervention group was 82.80, while in the control group, it was 93.67. The results of statistical tests showed differences in the mean systolic and diastolic blood pressure in the control and intervention groups ( $p=0.000$ ). In conclusion, lemon aromatherapy can reduce blood pressure in older people with Hypertension.*

*Keywords: Lemon Aromatherapy, Hypertension, Blood pressure*

### INTRODUCTION

Hypertension is a disease that does not cause symptoms so that the sufferer does not know that he is suffering from Hypertension (Andari et al., 2020; Andri et al., 2018). Heart and blood vessel disease is a significant health problem that causes death and morbidity in developing and developed countries. It is said that systolic hypertension  $> 140$  mmHg and diastolic  $> 90$  mmHg (Permata et al., 2021; Zebua et al., 2021; Sartika et al., 2020). Hypertension can be caused by increased cardiac output due to increased heart rate and parts of the heart muscle that suddenly do not get blood flow (Sartika et al., 2022; Sitepu & Hutapea, 2022).

Hypertension or high blood pressure is a common cardiovascular disease and occurs in many people in society. People are generally more familiar with high blood pressure than Hypertension. Only some people with high blood pressure are aware of this disease. This makes Hypertension known as a "silent killer" or can be called a "silent killer"; the majority of individuals with Hypertension have no indications or have vague or non-specific indications.

The World Health Organization (WHO) estimates that 41 million people worldwide died from non-communicable diseases in 2016; this incidence is equivalent to 71%. Most of the deaths resulted from four non-communicable diseases, including cardiovascular disease (17.9 million), cancer (9.0 million), chronic respiratory disease (3.8 million), and diabetes (1.6 million) (Andri et al., 2023; WHO, 2020). Quoted in WHO News, it is estimated that by 2020 1.28 billion adults aged 30 to 79 years worldwide will have high blood pressure; 46% of adults with Hypertension are not aware of it. One of the global goals is to reduce the

prevalence of Hypertension by 33% between 2010 and 2030 (Andri et al., 2021; Herawati et al., 2021; Harsismanto et al., 2020; WHO, 2021).

The results of Basic Health Research in 2018 in Indonesia showed the incidence of Hypertension through measurement reached 34.11% and diagnosed Hypertension by a doctor at 8.36%; forest Java was ranked second with a percentage of 39.60% through measurement results, and the highest was in the province of South Kalimantan of 44.13%. West Java is one of the provinces with a higher hypertension rate than Indonesia (Ministry of Health of the Republic of Indonesia, 2018). The West Java Province Report for 2018, based on measurement results, found that the prevalence of Hypertension in the city of Bandung was 36.63%, and diagnosis with Hypertension by doctors in the city of Bandung was 11.71% (Risksdas, 2018).

Incidents of increased blood pressure in the community can occur due to changes in daily lifestyle, such as smoking habits, changes in poor eating patterns, lack of physical activity, obesity, and increased stress. This maladaptive behavior can trigger fatal damage to organs, including kidney failure, coronary heart disease, and stroke to death. In addition to the physiological disturbances that occur, uncontrolled Hypertension can cause psychological disorders, including symptoms in the form of anxiety, stress, and depression, which significantly affect the increase in blood pressure, and unstable emotional states can cause high blood pressure or Hypertension (Latifah et al., 2021; Siwi et al., 2020).

The incidence of Hypertension is still very high, so proper management is needed to deal with this hypertension problem (Andri et al., 2021). Actions taken to suppress the incidence of Hypertension so that it does not increase, one of the solutions can be pharmacological and non-pharmacological therapeutic techniques. Pharmacological therapy consists of antihypertensive drugs, while non-pharmacological therapy includes smoking cessation, weight loss, physical exercise, meditation/complementary therapy, relaxation therapy, reducing salt consumption, increasing consumption of fruits and vegetables, and reducing fat consumption (Silalahi et al., 2020).

The education and age of older people can affect blood pressure because the education level of older people is the background for the occurrence of smoking habits. Researchers suggest that even though the level of higher education and knowledge about Hypertension is quite good, hypertensive patients do not have a thorough understanding of their blood pressure condition, such as a lack of awareness in controlling it. In this study, older people who did not routinely take antihypertensive drugs were 70.1%. The awareness of the elderly in taking medication according to doctor's recommendations is still low (Mitra & Wulandari, 2019). This is in line with the study of Fadlilah et al. (2021) regarding complementary therapy combining warm water foot soaks and lemon aromatherapy to reduce blood pressure. It is known that the difference in systolic blood pressure after and before in the control group is 3.412 mmHg with a p-value of 0.041 mmHg ( $P < 0.05$ ), which means there is no difference between diastolic blood pressure before and after therapy. In the intervention group, the mean difference in systolic blood pressure before and after the test was  $-9,000$  mmHg with a p-value of 0,000 mmHg ( $p < 0,05$ ), which stated that there was no effect of the combination of soaking feet in warm water and lemon aromatherapy on diastolic blood pressure in prehypertension.

In practice, it is found that many hypertensive patients do not want to take medicines provided by health services; people only take drugs when their symptoms appear. The following data is confirmed by the results of the 2018 Basic Health Research report, the incidence rate in Bandung was 10.91% of people with Hypertension who did not take medication, and 21.85% did not take medication regularly. (Risksedas, 2018). Complementary therapy is part of a medical system. The development of modern medical science, especially the progress of antibiotics and synthetic drugs, draws knowledge about natural healing methods, including aromatherapy (Trisnawati & Jenie, 2019).

Several types of aromatherapy are commonly used, such as sandalwood, lemon, jasmine, roses, lavender, and ylang-ylang. Aromatherapy is always associated with interesting things p mind, body, and soul to make you feel relaxed and free. Of the various types of aromatherapy, lemon contains essential oils with a sharp fragrance (Wahyuni et al., 2020). Lemon aromatherapy has cleansing and tonic benefits, can reduce heat, increase immunity in feverish physical conditions, antioxidants, antiseptics, prevent high blood pressure, reduce anger, and control excessive emotions. The benefits of aromatherapy made from lemon can help relieve, encourage, refresh, and are believed to improve mood and relieve symptoms of stress and depression. The content of the lemon peel has two layers. The outer layer of orange peel contains essential oil (6%) with one of limonene (90%), citral (5%), citronellal, alpha terpineol, linalyl or linalool, and generally acetate. The inner layer of orange peel contains not essential oils but glycosides from bitter flavone, coumarin derivatives, and pectin (Fadlilah, 2021; Setiowati & Arianti, 2019).

Lemon aromatherapy contains D-Limonene and L-Limonene, which stimulate the central nervous system, and another ingredient is linalool, as much as 20-50%. The flavanone and vitamin C content in lemon have antioxidant and anti-cancer properties. Linalool helps stabilize the nervous system so that it can have a calming effect on anyone who inhales it. Essential oil from lemon can provide relaxing, sedative benefits, reduce anxiety, and reduce blood pressure (Nurjanah et al., 2019).

Murtianingsih & Suprayitno's research (2019) obtained the results of lemon aromatherapy and deep breathing relaxation in the intervention group, namely systolic blood pressure from 150.45 mmHg to 129.84 mmHg and diastolic blood pressure from 91.81 mmHg to 82.90 mmHg. These results indicate decreased effects of lemon aromatherapy and deep breathing relaxation on blood pressure. Researchers believe that lemon aromatherapy and deep breathing relaxation can reduce the respondent's blood pressure, and this intervention researchers believe has a relaxing and calming effect so that it can reduce heart work and blood pressure.

This study was conducted, giving the type of lemon aromatherapy often in combination with other interventions so that it was less known about the effect or effectiveness of lemon aromatherapy alone on reducing blood pressure. Therefore, this study aimed to examine the effect of lemon aromatherapy on reducing blood pressure in elderly hypertensives. Giving lemon aromatherapy can be done in the treatment room or at home for a short time. Besides lowering blood pressure, this therapy can create relaxation, calmness and reduce anxiety.

In this case, the nurse is one of the health workers who play a significant role in managing high blood pressure or Hypertension, both pharmacologically and non-pharmacologically (Djibu et al., 2021).

## RESEARCH METHODS

The method used in this research uses quantitative research methods. This research method is used to obtain data that has a specific purpose. The type of research used is experimental. Experimental research design is a research design used to find causal relationships with research involvement in it.

The research design used in this study was a Quasy Experiment Design with a Pretest-Posttest Nonequivalent Control Group Design. This design is a research plan that uses a comparison of the intervention group and the control group. This study used two groups, the group that was given treatment was called the intervention group, and the group that was not given treatment was called the control group. Both groups were given an initial test (pre-test) measuring blood pressure before being given the lemon aromatherapy intervention. The intervention group was given the lemon aromatherapy intervention, and the control group was not given it.

The sample in this study consisted of 30 respondents. The sampling technique used was Non-Probability Sampling with a Purposive Sampling approach. The sample criteria made by the researchers included: respondents aged 45-74 years, primary Hypertension (caused by lifestyle), systolic blood pressure  $\geq 140$  mmHg and diastolic blood pressure  $\geq 90$  mmHg up to grade 2 hypertension (high blood pressure), systolic blood 160-179 mmHg and diastolic blood pressure 100-109 mmHg), Not experiencing olfactory disorders, Not taking antihypertensive drugs, Willing to be a respondent. In this study, the instrument used was an observation sheet and a measuring instrument for measuring blood pressure using a calibrated digital tensimeter. Materials for intervention using lemon aromatherapy, namely essential oil aromatherapy of lemon, cotton, and stopwatch.

At the implementation stage, the researcher introduces himself to the patient and explains the goals and actions to be carried out. Then the working stage of the researcher performs hand washing, arranges the client's position as comfortably as possible, drops five drops of lemon essential oil aromatherapy on cotton, and encourages the client to inhale lemon essential oil for 10 minutes (such as taking occasional deep breaths), in the closing stage evaluate the client's feelings after inhaling, contract the time leeway to perform the following lemon aromatherapy inhalation action. This study used two groups, the group that was given treatment was called the intervention group, and the group that was not given treatment was called the control group. Both groups were given an initial test (pre-test), namely measuring blood pressure before being given the lemon aromatherapy intervention, then the intervention group was given the lemon aromatherapy intervention, and the control group was not. After treating the intervention group for three days, both groups were given a final test (post-test) measuring blood pressure.

All interventions and results of blood pressure measurements that have been carried out are then recorded on the observation sheet and implementation sheet. The data that has been obtained is then processed into a data collection matrix that the researcher previously created. The data that has been collected is then analyzed in univariate and bivariate forms. The results of the univariate research are presented in the form of a frequency distribution table, including the respondents' characteristics, age and gender, blood pressure measurements before the lemon aromatherapy intervention, and blood pressure measurements after the lemon aromatherapy intervention. Bivariate results were obtained from the paired sample T-test and Independent T-test to determine the average effect of systolic and diastolic blood

pressure before and after in the control and intervention groups after being given lemon aromatherapy to the elderly with Hypertension.

## RESEARCH RESULT

### Univariate Analysis

Table. 1  
Frequency Distribution  
Characteristics of Respondents (n=30)

Characteristics	Category	Frequency	Percentage
1. Gender	Man	9	30 %
	Woman	21	70 %
	Total	30	100 %
2. Age	45-59	12	40 %
	60-74	18	60 %
	Total	30	100 %
3. Education	No school	1	3,3 %
	SD	6	20 %
	Junior High School	12	40 %
	senior High School	9	30 %
	College	2	6,7 %
	Total	30	100 %
4. Long suffering from hypertension	< 4 years	6	20 %
	4 years – 10 years	16	53,3 %
	10 years	8	26,7 %
	Total	30	100 %
5. Family history of hypertension	Yesa	20	66,7 %
	No	10	33,3 %
	Total	30	100 %

Based on table 1, it can be seen that based on gender characteristics, 21 respondents were female (70%); based on age, 18 respondents were in the age range of 60-74 years (40%). At the education level, 12 respondents had a junior high school education background (40%); based on the length of time they had Hypertension, 16 respondents had Hypertension with a range of 4 years - 10 years (53.3%), and in the hereditary history of Hypertension, 20 respondents had a hereditary history of Hypertension (66.7%).

Table. 2  
Distribution of Blood Pressure Before Performed  
Lemon Aromatherapy Therapy in the Elderly  
with Hypertension

Variable	n	Min	Max	Mean	SD
Systolic blood pressure results					
intervention group	15	138	174	154,87	12,029
control group	15	140	171	153,60	9,635
Diastolic blood pressure results					
intervention group	15	80	110	95,07	6,871
control group	15	88	106	95,13	5,817

Table two shows that the average measurement results before the aromatherapy intervention were carried out on systolic blood pressure results of 154.87 mmHg in the intervention group and 153.60 mmHg in the control group. Based on the results of diastolic blood pressure, the mean was 95.07 mmHg in the intervention group and 95.13 mmHg in the control group.

Table. 3  
Distribution of Blood Pressure After Performing  
Lemon Aromatherapy Therapy in the Elderly  
with Hypertension

Variabel	n	Min	Max	Mean	SD
Systolic blood pressure results					
intervention group	15	122	157	138,00	9,658
control group	15	141	169	154,27	8,972
Diastolic blood pressure results					
intervention group	15	75	96	82,20	5,557
control group	15	84	106	93,67	6,067

Based on table 3, it can be seen that the mean of the measurement results after the aromatherapy intervention was carried out on the systolic blood pressure of 138.00 mmHg in the intervention group and 154.27 mmHg in the control group. Based on the results of diastolic blood pressure, the mean was 82.20 mmHg in the intervention group and 93.67 mmHg in the control group.

### Bivariat Analysis

Table. 4  
Analysis of Pired T-Test Results on After Blood Pressure  
Giving Lemon Aromatherapy  
Intervention Group and Control Group

Variable	N	Descriptive statistics (Std. D)	T	Df	Sig. (2-tailed)
Blood pressure results					
After intervention	15	154,87			
Pre systole	15	138,00	12,164	14	0,000
Post Systole	15	95,7			
Pre Diastole	15	82,20	11,069	14	0,000
Blood Pressure Results					
After Control	15	153,60			
Pre systole	15	153,27	1,299	14	0,215
Post Systole	15	95,13			
Pre Diastole	15	93,67	1,396	14	0,184

Based on Table 4, it is explained that the results of the paired t-test mean blood pressure before intervention was 154.87 (systolic) and 95.7 (diastolic), while the average blood pressure after intervention was 138.00 (systolic ) and 82.20 (diastolic). The result of calculating the t value for systolic blood pressure is 12.164 with a P-value of 0.000, while for diastolic blood pressure, the t value is 11.069 with a P-value of 0.000. So it can be concluded that the hypothesis test results rejected Ho so

that there was a significant difference between the mean systolic and diastolic blood pressure before and after the intervention by giving lemon aromatherapy ( $p < 0.005$ ).

While in the control group, the average pre-blood pressure was 153.60 (systolic) and 95.13 (diastolic), while the average post-blood pressure was 153.27 (systolic) and 93.67 (diastolic). The result of calculating the t-value for systolic blood pressure is 1.299 with a P-value of 0.215, while for diastolic blood pressure, the t-value is 11.396 with a P-value of 0.184. So it can be concluded that the results of the hypothesis test accept  $H_0$ , so there is no significant difference between the mean pre and post-systolic and diastolic blood pressure in the control group, which was not intervened by giving lemon aromatherapy ( $p > 0.005$ ).

Table. 5  
Analysis of Independent T-Test Results on Blood Pressure After Administration  
Lemon Aromatherapy Intervention Group  
and Control Group

Variable	Mean	SD	T (T-Test)	P-Value
Blood pressure results				
After intervention				
Intervention		9,658		
Systole	138		-4,779	0,000
Control systole	153,27	8,972		
Interventional		5,557		
Diastole	82,80		-5,398	0,000
Control Diastole	93,67	6,067		

Based on table 5 shows that the average systolic blood pressure in the intervention group was 138, while in the control group, it was 153. From the statistical test results, it can be concluded that there was a difference in the average systolic blood pressure in the control and intervention groups ( $p = 0.000$ ). In addition, the average diastolic blood pressure in the intervention group was 82.80, while in the control group, it was 93.67. From the results of statistical tests, it can be concluded that there is a difference in the average diastolic blood pressure in the control and intervention groups ( $p=0.000$ ).

## DISCUSSION

### Characteristics of Respondents

Clients with Hypertension in this study were respondents included in the pre-elderly to elderly category aged 45-74 years. In this study, most respondents were aged 60-74 years. This aligns with Junaedi's research, which explains that increasing age can increase the risk of developing high blood pressure. Although high blood pressure can occur at any age, it is most common in adults aged 35 and over. High blood pressure is a natural thing that happens with age. This is due to natural changes in the heart, blood vessels, and hormone levels. However, other risk factors accompanying these changes can trigger high blood pressure (Adam., 2019).

When a person is over 60 years old, physiological changes will begin to occur in the body, including thickening of the arterial walls due to a buildup of collagen in the muscle layer, and blood vessels will gradually narrow and become stiff, increasing systolic blood pressure volume. Changes in the structure of the large blood vessels can cause a person's blood pressure to increase (Adam, 2019).

Researchers think that entering an early age (pre-elderly) and the elderly until they get older both have the potential for an increase in blood pressure, especially when other factors support an increase in blood pressure, such as lifestyle.

Gender characteristics are one possibility that can cause blood pressure to increase. Based on the results of the study, the majority of sex characteristics were found to be female. This aligns with Falah's research (2019), which showed that most were female. Namely, 19 respondents (63.3%), and a small portion of the respondents were male. The researcher argues that women tend to get stressed more quickly, so they care more about their health status and seek treatment independently. Female sex, the risk of Hypertension in men will be higher at productive age, and in women, the risk of developing Hypertension when entering menopause.

This study's results align with the research of Septiawan et al. (2018). It was found that the majority of respondents with Hypertension were elementary and secondary school (SMP) graduates, which could affect the ability of respondents to receive information related to health information, thereby influencing their healthy living behavior. Even though they are often exposed to health information, environmental influences can trigger high blood pressure. Examples include foods with high cholesterol or excess salt intake, as well as due to physical activity or lifestyle that is not good.

In this study, it was found that the majority of hypertension sufferers had a family history of Hypertension. The results showed that people with a history of hereditary Hypertension were 3.7 times more likely to experience hypertension than those who did not have hereditary Hypertension. In Nuraeni's research (2019), Nuraeni et al. (2018) also explained that people with a family history of high blood pressure being carriers of Hypertension have twice the risk of developing it. The symmetric gene encodes the aldosterone synthase gene, resulting in ectopic aldosterone production. Mutations in the endothelial sodium channel gene result in increased aldosterone activity, suppression of plasma renin activity, and hypokalemia, the deleterious cause of mineralocorticoid excess syndrome. Water retention increases with increased aldosterone, thereby increasing blood pressure.

This opinion is supported by Adam (2019) that someone with genetic factors or hereditary Hypertension in the family will cause the family to have a risk of Hypertension. Someone whose parents have high blood pressure has twice the risk of developing high blood pressure than those who do not have a family history of high blood pressure. The theory that explains Hypertension in people with a family history of Hypertension is around 15-35% occurring 3.8 times more often in people with a family history who have Hypertension.

### **Blood Pressure in Hypertension Clients Before and Se Lemon Aromatherapy Intervention Has Been Performed in the Intervention Group**

Several types of aromatherapy are commonly used, such as sandalwood, lemon, jasmine, roses, lavender, ylang-ylang. Aromatherapy has always been associated with things that appeal to the mind, body, and spirit to make you feel relaxed and free. Of the various types of aromatherapy, lemon contains essential oils with a sharp fragrance (Wahyuni et al., 2020). Lemon aromatherapy has cleansing and tonic benefits, can reduce heat, increase immunity in feverish physical conditions, antioxidants, antiseptics, prevent high blood pressure, reduce anger, and control excessive emotions. The benefits of aromatherapy made from the lemon can help



relieve, encourage, and refresh, and it is believed to improve mood and relieve symptoms of stress and depression (Fadlilah, 2021; Setiowati & Arianti, 2019).

Based on the research, it was found that there was an effect of giving lemon aroma therapy on systolic and diastolic blood pressure in hypertensive patients. , smoking, salt consumption, obesity, and stress, as well as uncontrollable risk factors such as age, sex, and heredity (genetics). According to Junaedi, a lack of physical activity can increase the risk of developing high blood pressure. This has to do with the problem of obesity. Consuming too much salt or sodium has been linked to increased blood pressure because too much sodium or salt can increase the amount of sodium in cells, which upsets the balance of fluids in the body. If blood volume automatically increases, then blood flow also increases, while the size of the blood vessels remains the same, which causes an increase in blood pressure on the blood vessel walls, which will cause an increase in blood pressure (Silalahi et al., 2020).

Giving lemon aromatherapy affects changes in blood pressure in people with Hypertension. This happens because lemon aromatherapy is an antioxidant and antiseptic; in aromatherapy treatment, it can relax and soothe the body. In line with the research by Murtianingsih & Suprayitno (2019), the results of the respondents' blood pressure showed that lemon aromatherapy and deep breathing relaxation effectively reduced systolic and diastolic blood pressure. Lemon aromatherapy and deep breathing relaxation can provide a relaxing and calming effect, reducing heart work and lowering blood pressure.

Linalool is one of the substances found in lemons that helps stabilize the nervous system and can have a calming effect on anyone when inhaled (Tuju et al., 2022). 91 Other studies suggest that lemon aromatherapy can reduce blood pressure in combination with exercise for older people, such as research by Sani et al. (2020), which shows a decrease in blood pressure after exercise. More extended exercise can relax blood vessels because exercise can reduce peripheral resistance. After exercise, the body is relaxed by inhaling lemon aromatherapy, whose essential oil, when inhaled, makes it uplifting and refreshing and awakens the body and soul so that it can lower blood pressure.

Several types of aromatherapy are commonly used, such as sandalwood, lemon, jasmine, roses, lavender, and ylang-ylang. Aromatherapy is always associated with interesting things p mind, body, and soul to make you feel relaxed and free. Of the various types of aromatherapy, lemon contains essential oils with a sharp fragrance (Wahyuni et al., 2020). Lemon aromatherapy has cleansing and tonic benefits, can reduce heat, increase immunity in feverish physical conditions, antioxidants, antiseptics, prevent high blood pressure, reduce anger, and control excessive emotions. The benefits of aromatherapy made from lemon can help relieve, encourage, refresh, and are believed to improve mood and relieve symptoms of stress and depression. The content of the lemon peel has two layers. The outer layer of orange peel contains essential oil (6%) with one of limonene (90%), citral (5%), citronellal, alpha terpineol, linalyl or linalool, and generally acetate. The inner layer of orange peel contains not essential oils but glycosides from bitter flavone, coumarin derivatives, and pectin (Fadlilah, 2021; Setiowati & Arianti, 2019).

Lemon aromatherapy contains D-Limonene and L-Limonene, which stimulate the central nervous system, and another ingredient is linalool, as much as 20-50%. The flavanone and vitamin C content in lemon have antioxidant and anti-cancer properties. Linalool helps stabilize the nervous system so that it can have a calming

effect on anyone who inhales it. Essential oil from lemon can provide relaxing, sedative benefits, reduce anxiety, and reduce blood pressure (Nurjanah et al., 2019).

### **Blood Pressure in Hypertensive Clients Before and After Lemon Aromatherapy Intervention in the Control Group**

Based on the results of the study in the control group, it was found that there was no decrease in blood pressure in hypertensive patients when measurements were taken. Researchers measured blood pressure in the control group on the first and third days, did nothing, and were not given lemon aromatherapy intervention. From the blood pressure measurements, several respondents had increased blood pressure, and some experienced decreased blood pressure. Changes in blood pressure can be caused by one of the risk factors that cannot be controlled, such as age, gender, and heredity (genetics). As well as lifestyle factors, such as respondents who still regularly consume coffee every morning, cannot sleep, or constantly wake up in the middle of the night and have trouble returning to sleep. However, some respondents have regulated their eating patterns and physical activities, such as jogging, even though they are not routine.

In line with the study of Mulyasari et al. (2020), the results were obtained in the control group before being given a combination of lavender aromatherapy and healing touch; the results of systolic blood pressure were mean of 146.95 mmHg and a diastolic of 91.47 mmHg. Compared to after a combination of lavender aromatherapy and healing touch, the control group was not given, just sat still for 20 minutes; blood pressure results systolic with a mean of 146.84 mmHg and a diastolic of 91.16 mmHg. The measurement results are not much different, but there is no significant decrease because while waiting for 20 minutes, it is just silent.

### **Comparison of Average Blood Pressure Before and After Given Aromatherapy in the Intervention Group and the Control Group**

Based on the results of the study, it was found that there was a significant difference between the average blood pressure results in the intervention group and the control group in both systolic and diastolic blood pressure. The researcher assumes that in the control group, there is a decrease in diastolic blood pressure but not significantly because some respondents can control their diet, and physical activity, such as jogging, so the decrease in blood pressure shows a moderate decrease. Several other factors cause a decrease in blood pressure. Research

Mitra & Wulandari (2019) describe the factors affecting uncontrolled blood pressure in older people. In the research results, smoking is the dominant factor affecting uncontrolled blood pressure in older people. The results of the analysis of other factors that were significantly related to uncontrolled blood pressure in older adults with Hypertension were age, routine taking of antihypertensive medication, smoking status, and sodium intake with  $p < 0.05$ .

The education and age of older people can affect blood pressure because the education level of older people is the background for the occurrence of smoking habits. Researchers suggest that even though the level of higher education and knowledge about Hypertension is quite good, hypertensive patients do not have a thorough understanding of their blood pressure condition, such as a lack of awareness in controlling it. In this study, older people who did not routinely take antihypertensive drugs were 70.1%. The awareness of the elderly in taking

medication according to doctor's recommendations is still low (Mitra & Wulandari, 2019). This is in line with the study of Fadlilah et al., (2021) regarding complementary therapy combining warm water foot soaks and lemon aromatherapy to reduce blood pressure. It is known that the difference in systolic blood pressure after and before in the control group is 3.412 mmHg with a p-value of 0.041 mmHg (P0.05), which means there is no difference between diastolic blood pressure before and after therapy. In the intervention group, the mean difference in systolic blood pressure before and after the test was -9,000 mmHg with a p-value of 0,000 mmHg (p0,05), which stated that there was no effect of the combination of soaking feet in warm water and lemon aromatherapy on diastolic blood pressure in prehypertension.

Lemon aromatherapy is an essential oil from the lemon peel that contains chemical compounds from limestone because its working system can slow down the action of prostaglandins after being given lemon aromatherapy which produces a feeling of calm (Cholifah et al., 2016). When lemon essential oil aromatherapy is inhaled, molecules such as geraniol and linalool are aromatic volatiles carried to the top of the nose, where cilia emerge from the receptor cells. Suppose the 96 molecule attaches to the cilia. In that case, the electrochemical information will be transmitted to the limbic system through the sense of smell, thereby stimulating memory and emotional responses in a person. Electrochemical compounds cause feelings of calm and relaxation, improve blood flow, and reduce heart work (Saputra, 2021; Sani et al., 2020). In this study, the scent of citrus combined with other scents (lavender and peppermint) significantly lowered blood pressure and heart rate and reduced factors of anger, confusion, annoyance, and depression. When respondents inhaled the aroma of lemons, it increased their positive mood and reduced negative emotions while inhaling the scent of lemons.

Essential oil molecules directly stimulate the limbic lobes and hypothalamus, and the limbic system is directly involved in other parts of the brain that control heart rate, blood pressure, respiration, memory, stress levels, and hormonal balance, where scents stimulate emotions, causing psychophysiological influences.

Based on previous researchers, reducing blood pressure after being given lemon aromatherapy is relaxing. Other research on psychology, such as anxiety and stress, is in the research of Judha & Syafitri (2018), which shows a significant difference in stress before and after giving lemon aromatherapy to older people. Anxiety results show significant differences in anxiety in older people before and after giving lemon aromatherapy to older people. Research has shown that the difference or success of giving aromatherapy is not only influenced by the lemon content, namely linalool but also supported by the accuracy of the method of administration, such as the correct dose of 2-3 drops and the effect of inhaling aromatherapy. Active for 10 minutes. Using the inhalation method or by inhalation is a fast, simple, and effective way to obtain therapeutic benefits.

## CONCLUSION

Based on the results of the study, it can be concluded that there are differences in the average diastolic blood pressure in the control and intervention groups.

## SUGGESTION

Based on the results of this study, it is recommended to parties related to the implementation of this research. It is hoped that this research can be used as information for health workers or those on duty in public health service settings and hospitals to be a choice of non-pharmacological nursing interventions that can be carried out at the age of young, elderly to elderly both in nursing homes or hospitals. Research can be used as reading material that can add insight, and the results of this research can be used as input for ideas for the development of nursing education, especially for lecturers, medical-surgical nursing courses, and community nursing courses. Finally, this research can be used as evidence-based in developing further research on lemon aromatherapy for blood pressure in Hypertension. In future studies, it is hoped that researchers can improve research designs.

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