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## The Effectiveness of Lemon Aromatherapy on Blood Pressure in Elderly Hypertension Patients in Integrated Healthcare Center of Lawe Rutung Village

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### Abstrak

Hipertensi pada lansia merupakan penyakit yang menyebabkan gagal jantung, stroke, infark miokard, bahkan kematian. Hipertensi merupakan beban global karena prevalensinya yang meningkat pada pasien lanjut usia. Penelitian ini bertujuan untuk mengetahui efektivitas aromaterapi lemon terhadap tekanan darah pada pasien hipertensi lanjut usia. Desain penelitian menggunakan pendekatan pra-eksperimental dengan desain *one-group pre-post-test*. Sampel yang digunakan berjumlah 42 responden dengan menggunakan teknik *total sampling* yaitu pasien hipertensi pada lansia di Posyandu Lawe Rutung Desa Lawe Bulan Kabupaten Aceh Tenggara. Intervensi yang diberikan adalah aromaterapi lemon, pasien diberikan aromaterapi sebanyak 2 kali per hari dengan durasi 15 menit selama 3 hari. Pasien diukur tekanan darah sistolik sebanyak dua kali yaitu sebelum dilakukan intervensi dan setelah dilakukan intervensi (setelah 3 hari pemberian aromaterapi lemon). Tidak ada yang *drop out* dalam penelitian ini. Data dianalisis menggunakan *Paired t-test*. Hasil penelitian menunjukkan bahwa terdapat perbedaan tekanan darah sistolik yang signifikan pada pasien hipertensi sebelum dan sesudah diberikan intervensi ( $p\text{-value} = 0,000; \alpha < 0,05$ ). Aromaterapi lemon merupakan salah satu terapi relaksasi dari kesehatan komplementer dan integratif. Aromaterapi lemon mengandung minyak atsiri yang dapat memberikan efek relaksasi dan menenangkan pada pasien hipertensi lanjut usia serta meningkatkan aliran darah. Kondisi rileks inilah yang menyebabkan tekanan darah menurun.

Kata Kunci: *Aromaterapi Lemon, Tekanan Darah, Hipertensi*

## Abstract

Hypertension in the elderly is a disease that causes heart failure, stroke, myocardial infarction, and even death. Hypertension is a global burden due to its increasing prevalence in elderly patients. The study aims to analyze lemon aromatherapy's effectiveness on blood pressure in elderly hypertension patients. The research design used a pre-experimental approach with a one-group pre-post-test design. The sample was 42 respondents using a total sampling of hypertensive patients in the elderly of Integrated Healthcare Center Lawe Rutung Village Lawe Bulan District Southeast Aceh Regency. The intervention given was lemon aromatherapy, patients were given aromatherapy 2 times per day with a duration of 15 minutes for 3 days. The patient had systolic blood pressure measured twice, namely before the intervention was carried out and after the intervention was carried out (after 3 days of giving lemon aromatherapy). There were no dropouts in this study. Data were analyzed using a Paired t-test. The research results showed that there was a significant difference in systolic blood pressure in hypertensive patients before and after being given the intervention ( $p$ -value = 0.000;  $\alpha < 0.05$ ). Lemon aromatherapy is one of relaxation therapy from complementary and integrative health. Lemon aromatherapy contains essential oils that can have a relaxing and calming effect on elderly hypertension patients and increase blood flow. This relaxed condition causes blood pressure to decrease.

Keywords: *Lemon Aromatherapy, Blood Pressure, Hypertension*

## INTRODUCTION

Hypertension in the elderly is a disease that causes heart failure, stroke, myocardial infarction, and even death. Hypertension is a global burden due to its increasing prevalence in elderly patients. Elderly hypertensive patients are estimated to affect one-third of the world's population by 2025. The impact that can occur in elderly patients suffering from hypertension is exacerbated by changes in hemodynamics, arterial stiffness, decreased kidney function, and neurohormonal and autonomic dysregulation (Hisamatsu et al. 2020; Oliveros et al. 2020). Preventive intervention and optimal medical treatment for hypertension are needed to reduce cardiovascular mortality and reduce disease symptoms and the socio-economic burden of patients. The prevalence of elderly people in research by Lee, Kim, and Cho (2019) conducted in Korea, shows that the prevalence of elderly hypertension has been consistent over the last 20 years. The prevalence of elderly hypertension patients was 7.6 million patients (29.8%) in 1998 to 11.7 million (29.1%) in 2016. This occurs due to the rapid aging of the population.

The strategy for managing hypertension in the elderly must take into account the patient's condition because the elderly also sometimes have comorbidities. Other considerations can also focus on increasingly complex medical complications, the level of

frailty of the elderly, and psychosocial factors. Non-pharmacological treatment can also be given to elderly hypertension patients to reduce the risk of complications and other side effects (Oliveros et al. 2020; Slivnick and Lampert 2019). Non-pharmacological interventions can also be provided with complementary and integrative health. Interventions with a complementary and integrative health approach include relaxation therapy, reflexology, yoga, massage, support groups, and hope. Aromatherapy is a non-pharmacological intervention method or complementary and integrative health approach using relaxation therapy. Various types of aromatherapy can be given by inhalation, cosmetics, and massage. Olfactory aromatherapy is a method that can reduce stress. There are also various types of aromatherapy including orange, lavender, rose, bergamot, and lemon aromatherapy (Kholibrina and Aswandi 2021; Rambod et al. 2020).

Lemon aromatherapy has benefits as a cleansing tonic, increasing immunity in fever conditions, reducing fever, antiseptic, antioxidant, controlling excessive emotions, and preventing hypertension. The benefits of lemon-based aromatherapy helps relieve, refresh, improve mood, and relieve symptoms of stress. The content of lemon aromatherapy is essential oil. The outer layer of lemon peel contains 6% essential oil with one of 90% limonene, citronellal, linalyl or linalool, citral (5%), alpha terpineol, and generally acetate. Meanwhile, the inner layer of lemon contains glycosides from bitter flavone, pectin, and coumarin derivatives (Alfin, Rahma R, and Syabariyah 2023). Based on this analysis, the study aims to analyze lemon aromatherapy's effectiveness on blood pressure in elderly hypertension patients..

## RESEARCH METHOD

The research design used a pre-experimental approach with a one-group pre-post-test design. The sample was 42 respondents using a total sampling of hypertensive patients in the elderly of Integrated Healthcare Center Lawe Rutung Village Lawe Bulan District Southeast Aceh Regency. The intervention given was lemon aromatherapy, patients were given aromatherapy 2 times per day with a duration of 15 minutes for 3 days. The patient had systolic blood pressure measured twice, namely before the intervention was carried out and after the intervention was carried out (after 3 days of giving lemon aromatherapy). There were no dropouts in this study. Data were analyzed using a Paired t-test.

## RESULTS AND DISCUSSION

### Univariate Analysis

Table 1 Respondents's Characteristics

Variable	Mean		Median	SD	Min-Max	95% CI Lower-Upper
Age*	59.02		58.50	6.73	45-72	56.93-61.12
Hypertension Suffering	4.64		4.50	2.30	1-10	3.92-5.36

Variable		n	%
Gender	Man	7	16.7
	Women	35	83.3
Educational Level	Illiterate	7	16.7
	Elementary School	12	28.6
	Junior High School	6	14.3
	Senior High School	17	40.5
Employment	Unemployed	15	35.7
	Farmer	8	19.0
	Private Employed	11	26.2
	Self-Employed	6	14.3
	Civil Engineer	2	4.8

\* Normally Distributed Data

The research results in Table 1 showed that the average age of elderly people was 59.02 years with a standard deviation of 6.73 years. The median duration of suffering from hypertension was 4.60 years with a minimum duration of suffering from hypertension of 1 year and a maximum duration of suffering from hypertension of 10 years. The gender prevalence of the elderly was mostly female, 35 respondents (83.3%). The prevalence of education level of most senior high school students was 17 respondents (40.5%). The majority of elderly people's work prevalence was not working, with as many as 15 respondents (35.7%).

## Bivariate Analysis

Table 2 Systolic Blood Pressure Before and After Giving Lemon Aromatherapy

Variable	Mean	Median	Standard Deviation	Min- Max	95% CI		P-value
					Lower	Upper	
Systolic Blood Pressure (Pre-Test)	157.26	155.00	10.27	143.00- 181.00	154.06	160.46	0.000*
Systolic Blood Pressure (Post-Test)	146.67	142.00	15.90	110.00- 177.00	137.71	147.62	

\* Data is normally distributed

The research results based on Table 2 showed that the average systolic blood pressure before intervention was given to hypertensive patients at the Integrated Healthcare Center of Lawe Rutung Village Lawe Bulan District Southeast Aceh Regency was 157.26 mmHg with a standard deviation of 10.27 mmHg. The mean systolic blood pressure after intervention given to hypertensive patients at the Integrated Healthcare Center of Lawe Rutung Village Lawe Bulan District Southeast Aceh Regency was 146.67 mmHg with a standard deviation of 15.90 mmHg. The results of further analysis showed that there was a significant difference in systolic blood pressure in hypertensive patients at the Integrated Healthcare Center of Lawe Rutung Village Lawe Bulan District Southeast Aceh Regency before and after being given the intervention (p-value = 0.000;  $\alpha < 0.05$ ).

## DISCUSSION

The research results showed that there was a significant difference in systolic blood pressure in hypertensive patients at the Integrated Healthcare Center of Lawe Rutung Village Lawe Bulan District Southeast Aceh Regency before and after being given the intervention. This research is in line with research conducted by Alfin et al (2023), there was a significant difference in systolic blood pressure before and after being given lemon aromatherapy (p-value = 0.000;  $\alpha < 0.05$ ). Research conducted by Brigita Aulia Juliana Soeryanto et al (2024) also showed that there was a significant difference in systolic blood pressure values before and after administering lemon aroma therapy to hypertensive patients (p-value = 0.000;  $\alpha < 0.05$ ).

Lemon aromatherapy can influence changes in blood pressure because lemon aromatherapy has antioxidant and antiseptic properties. Providing lemon aromatherapy can also relax patients and soothe the body (Oliveros et al. 2020). Research conducted by Murtianingsih and Suprayitno (2019) also provided lemon aromatherapy combined with

breath relaxation to elderly hypertension patients, showing a difference in systolic blood pressure values before and after the intervention was given ( $p$ -value = 0.000;  $\alpha < 0.05$ ). Lemon aromatherapy has a relaxing effect which can reduce heart function and lower blood pressure. When lemon aromatherapy is inhaled, the molecules from the lemon aromatherapy easily evaporate which will carry the aromatic elements contained in the lemon aromatherapy. The content of lemon aromatherapy is essential oil. The outer layer of lemon peel contains 6% essential oil with one of 90% limonene, citronellal, linalyl or linalool, citral (5%), alpha terpineol, and generally acetate. Meanwhile, the inner layer of lemon contains glycosides from bitter flavone, pectin, and coumarin derivatives (Alfin et al. 2023; Murtianingsih and Suprayitno 2019).

When the patient inhales lemon aromatherapy, the cilia of the nasal receptor cells will respond, and electrochemical messages will be transmitted through the olfactory tract to the limbic system. The limbic system will stimulate the patient's memory and emotional response. Next, the hypothalamus acts as a regulator to generate signals that must be conveyed to the brain. Signals received by the brain will be converted into electrochemical compounds in the form of neurotransmitters (serotonin and endorphins). These two compounds provide a calming and relaxing effect on hypertension sufferers and increase blood flow. This relaxed condition causes blood pressure to decrease (Sari Ika 2022; Saputra and Halisy Pebriani 2024).

## CONCLUSION

Lemon aromatherapy is one of relaxation therapy from complementary and integrative health. Lemon aromatherapy contains essential oils that can have a relaxing and calming effect on elderly hypertension patients and increase blood flow. This relaxed condition causes blood pressure to decrease.

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