

Effects of Hydrotherapy Lemongrass (*Cymbopogon Citartus*) On Blood Pressure in Elderly People with Hypertension At the Tuntungan Community Health Center, Pancur Batu District

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Abstract.

Hypertension or high blood pressure, this disease can attack anyone, both young and old. Hypertension (high blood pressure) is a medical condition characterized by systolic pressure greater than 140 mmHg and diastolic pressure greater than 90 mmHg. Efforts to prevent blood pressure problems are not only through medication, but also through complementary medicine to treat high blood pressure. Lemongrass foot hydrotherapy is a natural treatment that improves blood circulation by widening the blood vessels and improving blood circulation, which then stimulates the nerves in the feet, stimulating the activation of the sympathetic nerves and improving blood circulation. Quasi Experimental Method with pre test and post test with control group design. In two groups intervention and control (without treatment). Done for 3 days. The sample was 20 respondents. The results of bivariate analysis with 2 tests, namely the Wilcoxon test, showed a p value = 0.005 (p value 0.05), and the Man Whitney test showed a p value = 0.001 (p value 0.05). Therefore, it can be concluded that foot hydrotherapy with lemongrass is useful in lowering blood pressure in elderly people suffering from high blood pressure at the Community Health Center in the Tuntungan District. Pancur Batu, so that health center health workers can use complementary medicine as an alternative to lowering blood pressure for people with high blood pressure because it is easy and cheap from an economic perspective.

Key words: *Hydrotherapy, Lemongrass and Hypertension.*

I. INTRODUCTION

Elderly or senior age is the final stage in the human life cycle, characterized by the aging process that occurs naturally and continuously from birth to death. Every individual will go through stages of life starting from childhood, adolescence, adulthood, and entering old age (Parmana et al., 2020). Based on Law Number 13 of 1998 concerning Health, an elderly person is someone who has reached the age of 60 years and above (Handono et al., 2021). A similar definition is also provided by the National Population and Family Planning Agency (BKKBN), which states that an elderly person is an individual aged 60 years or older (Handono et al., 2021). In this age group, various physiological changes occur, increasing the risk of non-communicable diseases (NCDs). Based on the results of the 2018 Basic Health Research (Riskesdas), the most common diseases experienced by the elderly include hypertension, arthritis, stroke, chronic obstructive pulmonary disease (COPD), and diabetes mellitus (DM).

Hypertension is one of the most common non-communicable diseases found in the elderly. Hypertension is a condition where blood pressure rises continuously above the normal limit, which is $\geq 140/90$ mmHg (AHA, 2017). In general, hypertension is divided into two types: primary (essential) hypertension and secondary hypertension. In the elderly, hypertension is generally isolated systolic hypertension, characterized by increased systolic pressure accompanied by decreased diastolic pressure due to reduced blood vessel elasticity and aortic stiffness (Fitriana et al., 2022). Data from the World Health Organization (WHO) in 2016 showed that approximately 1.13 billion people worldwide suffer from hypertension, and this number is expected to increase to 1.5 billion by 2025 (AHA, 2017). In Indonesia, the prevalence of hypertension also increased from 34.11% in 2018 to 39.9% in 2020 (WHO, 2019). The high incidence of hypertension in the elderly is closely related to physiological changes, such as decreased blood vessel elasticity, decreased heart function, and reduced effectiveness of blood circulation, thereby increasing vascular resistance (Handono et al., 2021).

Hypertension can be managed through pharmacological and non-pharmacological therapies. Pharmacological therapy involves administering antihypertensive medications, while non-pharmacological therapy involves natural approaches or complementary therapies. Complementary therapies are a form of nursing practice aimed at improving holistic health (Ministry of Health, 2019). One complementary therapy that can be used as a stand-alone intervention is warm water foot hydrotherapy. This therapy works through a vasodilation mechanism that helps improve blood circulation, reduces edema, relaxes muscles, and provides a comforting effect on the body (Perry & Potter, 2010). The effectiveness of warm water foot soaks can be enhanced by adding natural ingredients such as lemongrass. Lemongrass contains essential oils, citronellal, citral, and cadinol, which have anti-inflammatory and analgesic effects and help improve blood circulation (Ismatul & Ambarwati, 2020). The combination of warm water foot soaks with lemongrass is believed to help lower blood pressure through relaxation and dilation of blood vessels, resulting in smoother blood flow.

The results of research by Ismatul & Ambarwati (2020) showed that foot soak therapy using warm water mixed with lemongrass had a significant effect on reducing blood pressure in hypertension sufferers with a p value = $0.000 \leq 0.05$. Based on the results of initial interviews conducted by researchers on March 13, 2024, at the Tuntungan Community Health Center, Pancur Batu District, information was obtained that only around 50% of elderly people with hypertension regularly seek treatment at the community health center. In addition, the results of a January 2024 survey found that 46 elderly people suffered from hypertension and had never undergone foot hydrotherapy intervention with lemongrass as an effort to reduce blood pressure. This condition indicates the need for the implementation of simple, safe, and easy-to-do complementary therapies as an alternative companion in the management of hypertension in the elderly.

The results of the researcher's interview on Wednesday, March 13, 2024 at the Tuntungan Community Health Center, Pancur Batu District, initial interviews with health workers that of all elderly people with hypertension, approximately 50% only seek treatment regularly at the community health center. At the Tuntungan Community Health Center, Pancur Batu District, it covers 15 villages, namely: Namorih Village, Lama Village, Tengah Village, Bintang Meriah, Sugau, Tiang Layar, Namo Simpur, Pertampilen, Salam Tani, Durin Tonggal, Durin Sembelang, Namo Riam, Hulu Village, Tuntungan I, and Tuntungan II. From the survey data in January 2024, there were 46 elderly people with hypertension and health workers also said that the elderly at the Tuntungan Community Health Center, Pancur Batu District had never undergone foot hydrotherapy intervention with lemongrass to reduce high blood pressure.

II. RESEARCH METHODS

This study used a quasi-experimental method with a pre-test and post-test control group design. In this study design, respondents were randomly divided into two groups: the intervention group and the control group. Before receiving treatment, both groups underwent a baseline blood pressure measurement (pre-test) to determine the respondents' baseline condition. Next, the intervention group received foot hydrotherapy with lemongrass, while the control group received no treatment. After the intervention, both groups had their blood pressure measured again (post-test) to determine the effect of foot hydrotherapy with lemongrass on blood pressure changes in the respondents. Therapy in the intervention group was administered for three consecutive days, with each session lasting 15–20 minutes (Fitriana et al., 2021).

III. RESEARCH RESULT

This study involved 20 elderly respondents with hypertension within the Tuntungan Community Health Center (Puskesmas) in Pancur Batu District. The study lasted two months, from June to July 2024. Data collection was conducted through direct house-to-house visits and at local elderly health post (Posyandu) activities.

Before the study was conducted, each respondent was first given informed consent as a form of agreement to participate in the study. After the respondents expressed their willingness, the researcher made a contract regarding the implementation time and provided an educational booklet entitled "Let's Get to Know Hypertension in the Elderly and the Procedure for Foot Hydrotherapy with Lemongrass for Elderly with Hypertension." Next, respondents in the intervention group were given foot hydrotherapy with lemongrass for three consecutive days. On the final day of the intervention, blood pressure was checked again to determine changes in blood pressure after the therapy.

In this section, the researcher explains the complete research results based on the data that has been collected and processed. Data analysis was carried out using the SPSS Windows version 23 application to determine the effect of foot hydrotherapy with lemongrass on changes in blood pressure in elderly people with hypertension.

Univariate Analysis

1. Characteristics of Elderly Respondents with Hypertension at the Tuntungan Community Health Center, Pancur Batu District

Table 1 Frequency Distribution of Respondents' Gender Characteristics in Elderly Patients with Hypertension at the Tuntungan Community Health Center, Pancur Batu District, 2024

Gender	Frequency (f)	Percentage (%)
Woman	12	60
Man	8	40
Total	20	100

Based on the frequency distribution table of respondents' gender, it is known that the majority of respondents were female (12 people) (60%), while 8 respondents were male (40%). Thus, it can be concluded that the majority of elderly people with hypertension in this study were female.

Table 2 Frequency Distribution of Respondents' Age Characteristics in Elderly Patients with Hypertension at Tuntungan Community Health Center Pancur Batu District in 2024

Age (Years)	Frequency (f)	Percentage (%)
60-74	12	60
75-90	8	40
Total	20	100

The study results showed that the majority of respondents were between the ages of 60 and 74. This suggests that hypertension is more common in the early elderly population. As age increases, various physiological changes occur in the body, such as decreased blood vessel elasticity, thickening of artery walls, and decreased organ function, which leads to a tendency for blood pressure to rise.

The 60–74 age group is still considered active in daily activities, but the aging process can still increase the risk of hypertension. Meanwhile, in those aged 75–90, although the number of respondents is smaller, the risk of complications from hypertension tends to be higher due to declining physical condition and body function. Therefore, age is a significant factor associated with the incidence of hypertension in the elderly.

Table 3 Frequency Distribution of Respondents' Educational Characteristics in Elderly Patients with Hypertension at the Tuntungan Community Health Center, Pancur Batu District, 2024

Education	Frequency (f)	Percentage (%)
No school	4	20
Elementary School	5	25
Junior High School	4	20
Senior High School	4	20
Bachelor	3	15
Total	20	100

Based on the frequency distribution table of respondents' education levels, it is known that the majority of respondents had an elementary school education (5 people (25%). Respondents who had never attended school were 4 people (20%), junior high school education was 4 people (20%), and

high school education was 4 people (20%). Meanwhile, respondents with a bachelor's degree were the smallest number, namely 3 people (15%).

These results indicate that the majority of elderly people with hypertension in this study had primary to secondary education. Education level can influence a person's ability to receive health information, understand hypertension, and implement healthy lifestyles in their daily lives.

Table 4 Frequency Distribution of Respondents' Occupational Characteristics in Elderly Patients with Hypertension at the Tuntungan Community Health Center, Pancur Batu District, 2024

Work	Frequency (f)	Percentage (%)
housewife	4	20
Farmer	6	30
Trader	7	35
Retired	2	10
Doesn't work	1	5
Total	20	100

Based on the frequency distribution table of respondents' occupations, it is known that the majority of respondents work as traders (7 people) (35%), followed by farmers (6 people) (30%). Respondents who work as housewives (IRT) are 4 people (20%), retirees are 2 people (10%), and unemployed are 1 person (5%).

These results indicate that the majority of elderly people with hypertension in this study still have jobs, particularly in the trade and agriculture sectors. The type of work can influence the health of older adults, including physical activity levels, rest patterns, and stress levels, which can contribute to hypertension.

Table 5 Frequency Distribution of Characteristics of How Long Elderly Patients Suffer from Hypertension at the Tuntungan Community Health Center, Pancur Batu District, in 2024

Duration of Hypertension (Years)	Frequency(f)	Percentage(%)
10-15	12	60
16-20	8	40
TOTAL	20	100

Based on the frequency distribution table of the length of time suffering from hypertension, it is known that the majority of respondents have suffered from hypertension for 10-15 years, as many as 12 people (60%), while respondents who have suffered from hypertension for 16-20 years are 8 people (40%).

These results indicate that the majority of elderly people in this study had long-standing hypertension. The duration of hypertension can impact the respondents' health, as chronic hypertension carries the risk of various complications, such as heart disease, stroke, and kidney dysfunction, if not properly controlled. Therefore, regular blood pressure management is crucial to prevent complications in elderly people with hypertension.

Table 6 Frequency Distribution of Blood Pressure Categories in Intervention Groups for Elderly Patients with Hypertension at the Tuntungan Community Health Center, Pancur Batu District, in 2024

Blood Pressure Category (mmHg)	Pre-test		Post-test	
	(f)	(%)	(f)	(%)
Pre-Hypertension (130-139)	0		7	70%
Hypertension Grade I (140-159)	7	70%	3	30%
Grade II Hypertension (>160)	3	30%	0	
Total	10	100%	10	100%

Based on the blood pressure category table in the intervention group, it was found that before therapy (pre-test), the majority of respondents were in the stage I hypertension category, as many as 7 people (70%), while 3 respondents were in the stage II hypertension category (30%). There were no respondents in the pre-hypertension category.

After receiving foot hydrotherapy with lemongrass (post-test), there was a change in blood pressure levels among respondents. Most respondents experienced a decrease in blood pressure to the pre-hypertension category (70%), while 3 respondents (30%) remained in the stage I hypertension category. The post-test results showed no further stage II hypertension.

These results indicate that foot hydrotherapy with lemongrass can help lower blood pressure in elderly people with hypertension. This is evident in the decrease in the number of respondents with stage I and II hypertension and an increase in the number of respondents with pre-hypertension after the intervention.

Table 7 Frequency Distribution of Blood Pressure Categories in the Control Group of Elderly Patients with Hypertension at the Tuntungan Community Health Center, Pancur Batu District, in 2024

Blood Pressure Category (mmHg)	Pre-test		Post-test	
	(f)	(%)	(f)	(%)
Pre-Hypertension (130-139)	0		0	
Hypertension Grade I (140-159)	7	70%	8	80%
Grade II Hypertension (>160)	3	30%	2	20%
Total	10	100%	10	100%

Based on the blood pressure category table in the control group, it was found that before the final measurement (pre-test), the majority of respondents were in the grade I hypertension category, as many as 7 people (70%), while respondents in the grade II hypertension category were 3 people (30%). There were no respondents in the pre-hypertension category.

After the final measurement (post-test), the majority of respondents remained in the stage I hypertension category, with 8 people (80%), while 2 respondents (20%) were in the stage II hypertension category. In the control group, there were also no respondents in the pre-hypertension category.

These results indicate that there was no significant change in blood pressure in the control group. Most respondents remained in the stage I hypertension category, with some still experiencing stage II hypertension. This indicates that without the intervention of lemongrass foot hydrotherapy, blood pressure reduction in elderly people with hypertension tends to be minimal.

BIVARIATE ANALYSIS

Table 8. Differences in Post-Test Blood Pressure in the Intervention Group and the Control Group in Elderly Patients with Hypertension at the Tuntungan Community Health Center, Pancur Batu District, 2024.

Group	N	Mean	Min=Max	Standard Deviation	P value
Intervention	10				0/005*
Systolic BP		135.5	130-140	3.68	
Diastolic BP		85	85-90	4.83	
Control	10				
Systolic BP		148	135-155	6.74	
Diastolic BP		93	90-100	3.94	
Total	20				

Based on the table of blood pressure analysis results after the intervention, it is known that in the intervention group with 10 respondents, the average (mean) systolic blood pressure was 135.5 mmHg with a range of 130–140 mmHg and a standard deviation of 3.68. The average diastolic blood pressure in the intervention group was 85 mmHg with a range of 85–90 mmHg and a standard deviation of 4.83.

Meanwhile, in the control group of 10 respondents, the average systolic blood pressure was 148 mmHg, with a range of 135–155 mmHg and a standard deviation of 6.74. The average diastolic

blood pressure in the control group was 93 mmHg, with a range of 90–100 mmHg and a standard deviation of 3.94.

The statistical test results showed a p-value of 0.005 (<0.05), indicating a significant effect between foot hydrotherapy with lemongrass and blood pressure reduction in elderly hypertensive patients. This indicates that the intervention group experienced a better reduction in blood pressure than the control group after receiving foot hydrotherapy with lemongrass.

IV. DISCUSSION

1. Respondent Characteristics In Elderly People with Hypertension

Based on the research results, it was found that of the 20 respondents, the majority were in the 60–74 years age range (12 people (60%)), while 8 respondents were in the 75–90 years age range (40%). These results indicate that the majority of hypertension sufferers in this study were in the early elderly group. Increasing age is a risk factor for hypertension because in the elderly, degenerative processes occur in the cardiovascular system, such as decreased blood vessel elasticity and thickening of the artery walls due to atherosclerosis. This condition causes blood flow to become less smooth, resulting in increased blood pressure. In addition, the elderly also tend to experience decreased physical activity due to decreased body function, which can worsen hypertension (Fauzan & Indah, 2018).

Based on gender, the results showed that the majority of respondents were female (12 people (60%)), while 8 were male (40%). These results align with Syahrini's (2018) study on systolic blood pressure in elderly people with hypertension, which stated that hypertension is more common in women than in men. This is caused by hormonal changes in women, particularly the decrease in estrogen after menopause. Estrogen plays a role in maintaining blood vessel elasticity, so when this hormone decreases, women become more susceptible to high blood pressure or hypertension.

Based on the analysis using the Mann-Whitney test, a p-value of 0.002 (<0.05) was obtained, indicating that foot hydrotherapy with lemongrass significantly reduced blood pressure in elderly people with hypertension. These results indicate that foot hydrotherapy with lemongrass is effective in helping lower blood pressure in the elderly. The relaxing effect of warm water and the natural properties of lemongrass, which help improve blood circulation, are thought to play a role in this blood pressure reduction process.

2. The Effect of Hydrotherapy with Lemongrass on Blood Pressure in Elderly People with Hypertension

Based on the results of the research that has been conducted, the average blood pressure before the intervention (pre-test) in the intervention group was obtained, namely systolic blood pressure of 151.00 mmHg and diastolic of 97.00 mmHg. After being given foot hydrotherapy therapy with lemongrass (post-test), the average blood pressure decreased to systolic 135.50 mmHg and diastolic 83.00 mmHg. The results of the analysis using the Mann-Whitney test showed a p value = 0.001 (<0.05), which means that there is an effect of providing foot hydrotherapy with lemongrass on reducing blood pressure in elderly people with hypertension in the work area of the Tuntungan Health Center, Pancur Batu District.

The results of this study align with research conducted by Ismatul and Ambarwati (2020) on the effect of warm water and lemongrass foot soak therapy on lowering blood pressure in hypertensive patients. The study used a quasi-experimental design with a two-group pre-test and post-test approach. The analysis showed a ρ value of 0.000 with $\alpha = 0.05$, thus concluding that warm water and lemongrass foot soak therapy significantly reduced blood pressure in hypertensive patients in Kudus Regency.

This research is also supported by Harnani's (2017) study on the effectiveness of warm water and lemongrass foot soaks on lowering blood pressure in the elderly. The results of this study showed the effectiveness of warm water and lemongrass foot soak therapy in lowering blood pressure in the elderly, with a p-value of 0.000.

Furthermore, research by Uliya and Ambarwati (2020) states that untreated hypertension can lead to various serious complications, such as stroke, heart failure, and kidney failure. Therefore, non-pharmacological hypertension management that is easy, affordable, and self-administered is necessary, one of which is hydrotherapy. Hydrotherapy is an alternative therapy method that utilizes water as a therapeutic medium to help treat various health conditions, including hypertension (Susanti, 2022).

Physiologically, warm water hydrotherapy can improve blood circulation, stimulate the autonomic nervous system, provide a relaxing effect, and help reduce stress and muscle tension. This effect causes vasodilation, or widening of blood vessels, which can lower blood pressure (Sumarmi & Mavalida, 2022). In addition to using warm water, adding lemongrass also provides additional benefits in helping lower blood pressure. Lemongrass is an herbal plant that contains essential oils, flavonoids, alkaloids, and hypolipidemic substances that function to help improve blood circulation, dilate blood vessels, and lower blood lipid levels. These compounds play a role in helping lower blood pressure in people with hypertension (Augin & Soesanto, 2022).

Researchers believe that uncontrolled hypertension can lead to various complications in vital organs, such as the heart, brain, and kidneys. Therefore, people with hypertension need to regularly control their blood pressure through diet, physical activity, regular blood pressure checks, and adherence to medication. In addition to pharmacological therapy, the use of non-pharmacological therapies such as foot hydrotherapy with lemongrass can be a safe, easy, and natural alternative to help lower blood pressure. With appropriate and continuous application of therapy, it is hoped that blood pressure in hypertensive patients can be controlled, thereby minimizing the risk of complications.

V. CONCLUSION

Based on the results of the research and discussion that has been carried out, it can be concluded that:

1. Before being given foot hydrotherapy intervention with lemongrass, most respondents were in the grade I hypertension category with a blood pressure range of 140–159 mmHg.
2. After receiving foot hydrotherapy with lemongrass, most respondents experienced a decrease in blood pressure to pre-hypertension (130–139 mmHg), representing 7 out of 10 respondents. This decrease was also influenced by the respondents' adherence to a healthy diet and regular blood pressure checks.
3. There was an effect of providing foot hydrotherapy with lemongrass on reducing blood pressure in elderly people with hypertension at the Tuntungan Community Health Center, Pancur Batu District, with statistical test results showing a significant p value = 0.001 (<0.05). This indicates that foot hydrotherapy with lemongrass is effective in helping to lower blood pressure in elderly people with hypertension.

SUGGESTION

For Respondents

It is hoped that foot hydrotherapy with lemongrass can be used as a non-pharmacological therapy or alternative herbal therapy to help lower blood pressure in elderly people with hypertension. Furthermore, respondents are also encouraged to maintain a healthy lifestyle, regulate their diet, and have their blood pressure checked regularly.

For Community Health Centers

It is hoped that healthcare workers, particularly those at senior health posts (Posyandu) can provide education and guidance on the benefits and procedures of lemongrass foot hydrotherapy as a complementary therapy for elderly people with hypertension. This can be a promotional and preventive measure in managing hypertension in the elderly.

For Further Researchers

It is hoped that this research can be used as a reference for further research by developing other

variables or interventions related to complementary therapy, such as the use of lemongrass aromatherapy or a combination of other herbal therapies in hypertension sufferers.

REFERENCE

- [1]. Arafah, S. (2019). The effect of warm water foot soak therapy on reducing blood pressure in hypertension patients in the Pattallassang Community Health Center, Takalar Regency. *Nursing Media: Makassar Health Polytechnic*, 10(2), 78. <https://doi.org/10.32382/jmk.v10i2.1336>
- [2]. Biahimo, INU, & Mulyono, S. (2020). Changes in blood pressure in hypertensive elderly people through warm water foot soak therapy. *Aisyiah General and Health Scientific Journal*, 5(1), 9–16. <https://journal.polita.ac.id/index.php/jakiyah/article/view/3>
- [3]. Ernawati, DAS, & Maulana, MA (2015). The effect of warm water foot soak therapy on reducing blood pressure in hypertension patients in the working area of the UPK Khatulistiwa Community Health Center, Pontianak City. *Tanjungpura University Health Journal*, 3(2), 2–4.
- [4]. Handono, NP, Saputri, SY, & Husada, KG (2021). The effectiveness of warm water foot soaks on reducing blood pressure in elderly hypertensive patients. *GSH Nursing Journal*, 10(1), 56–61.
- [5]. Hariana, A. (2016). *Medicinal plants and their properties*. Jakarta: Penebar Swadaya.
- [6]. Hydrotherapy, P., & Against, S. (2024). The effect of lemongrass hydrotherapy on blood pressure in hypertension sufferers. *Journal of Health*, 4(1), 125–132.
- [7]. Ismatul, & Ambarwati. (2020). Foot soak therapy using warm water mixed with salt and lemongrass to lower blood pressure in hypertension sufferers. *Journal of Nursing*.
- [8]. Ministry of Health of the Republic of Indonesia. (2019). Hypertension, the silent killer. Ministry of Health of the Republic of Indonesia, 1–5. <https://pusdatin.kemkes.go.id/resources/download/pusdatin/infodatin/infodatin-hipertensi-si-pembunuh-senyap.pdf>
- [9]. Notoatmodjo, S. (2018). *Health research methods*. Jakarta: Rineka Cipta.
- [10]. Potter, P., & Perry, AG (2010). *Fundamentals of nursing* (4th Edition, Vol. 1). Jakarta: EGC Medical Book Publisher.