International Journal of Health, Economics, and Social Sciences (IJHESS)
Vol. 8, No. 2, April 2026, pp. 1016~1025
DOI: 10.56338/ijhess.v8i2.10508
Website: https://jurnal.unismuhpalu.ac.id/index.php/IJHESS

The Effect of Foot Massage Therapy Using Lavender Oil on Lowering Blood Pressure in Hypertensive Patients at Kabila Health Center

Cindy Claudia Ahmad[1], Nanang Roswita Paramata[2*], Andi Mursyidah[3]
[1,2,3]Jurusan Keperawatan, Fakultas Olahraga Dan Kesehatan, Universitas Negeri Gorontalo, Indonesia

***Corresponding Author:** E-mail: roswita@ung.ac.id

Article Info

Article history:

Received 21 Dec, 2025
Revised 17 Jan, 2026
Accepted 22 Feb, 2026

Keywords:

Hypertension, Foot Massage, Lavender Oil

ABSTRACT

Hypertension is a chronic condition with systolic blood pressure ≥140 mmHg and/or diastole ≥90 mmHg that is at risk of cardiovascular complications. One of the nonpharmacological therapies such as foot massage using lavender oil is an important alternative that can improve relaxation and modulate the autonomic nervous system. This study aims to analyze the effect of this therapy on reducing blood pressure of hypertensive patients at the Kabila Health Center. The research design used, which was quasi-experimental with two groups, was used on 30 respondents (15 interventions and 15 controls) who were selected through accidental sampling techniques. The research instruments included SOP foot massage and blood pressure measurement using a digital sphygmomanometer. Data analysis was carried out by Wilcoxon test and paired t-test for comparison within groups, as well as independent sample t-test for comparison between groups. The results showed a significant decrease in systolic and diastolic blood pressure in the intervention group $p = 0.001$ ($p < 0.05$) with the mean systole decreasing from 156.20 to 150.20 mmHg and the median diastole from 92 to 81 mmHg. In the control group, there was no significant change in systol $p = 0.096$ ($p > 0.05$) and diastol $p = 0.230$ ($p > 0.05$). Significant differences between groups were found for systol $p = 0.024$ ($p < 0.05$) and diastol $p = 0.000$ ($p < 0.05$). The conclusion that foot massage therapy using lavender oil had a significant effect on lowering the blood pressure of hypertensive patients at the Kabila Health Center.

INTRODUCTION

Hypertension or high blood pressure is a chronic condition characterized by a persistent increase in blood pressure, namely systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg (Ministry of Health of the Republic of Indonesia, 2024). As one of the main risk factors for cardiovascular disease, hypertension is often asymptomatic but can lead to serious complications such as stroke, heart disease, and kidney failure (Mills et al., 2020). Major risk factors include family history, obesity, excessive salt consumption, stress, lack of physical activity, smoking, and alcohol and coffee consumption (Aditya & Mustofa, 2023).

Globally, the burden of hypertensive diseases continues to increase. Based on the report *World Health Organization* (WHO) in 2023, around 1.3 billion adults aged 30-79 years were recorded to have hypertension in 2019. This figure is projected to continue to grow and reach around 1.5 billion people by 2025, making hypertension one of the world's major health problems. At the national level, the results of the 2023 Indonesian Health Survey (SKI) show that the prevalence of hypertension in Indonesia reached 30.8%, an increase compared to 2018 data of 27.5%. At the provincial level, the three regions with the highest prevalence are DKI Jakarta (37.3%), the Special Region of Yogyakarta (36.8%), and West Java (35.2%). Meanwhile, Gorontalo Province recorded a prevalence of hypertension of 26.6%, ranking 19th out of 38 provinces nationally.

Data from the Gorontalo Provincial Health Office in 2024 shows that the highest prevalence of hypertension is in Gorontalo Regency with 42,607 patients, followed by Bone Bolango Regency with 18,976 patients and Boalemo Regency with 10,899 patients. In Bone Bolango Regency, hypertension is one of the non-communicable diseases (NCDs) with a high health burden. Based on data from the Bone Bolango Health Office

from 20 health centers, the three regions with the highest prevalence of hypertension cases in 2023 are the Kabila Health Center (2,959), the Tapa Health Center (1,413) and the Botupingge Health Center (1,376). In 2024, the three regions will still occupy the highest rank, namely the Kabila Health Center (1,934), the Tapa Health Center (1,410), and the Botupingge Health Center (1,372). Meanwhile, in the first semester of 2025, the three highest areas are the Kabila Health Center (905), the Kabila Bone Health Center (670) and the Tapa Health Center (658). Although in the last three years there has been a decrease in the number of hypertension cases in the working area of the Kabila Health Center, this figure is still the highest compared to other health centers in Bone Bolango Regency.

Various efforts have been made, generally relying on pharmacological therapies such as the use of antihypertensive drugs (ACEs) *inhibitors, beta blockers, diuretics*). However, drug dependence often faces challenges such as side effects, cost, and low patient compliance (Putra et al., 2024). Based on cases in the field, it shows that hypertensive patients often stop treatment for the main reasons in the form of complaints of dizziness, fatigue, and limited transportation and drug costs. In an effort to overcome some of these problems, non-pharmacological therapy or complementary therapy is often an additional alternative that is often carried out by the community. These additional alternatives include lifestyle changes such as a low-salt diet, regular exercise, stress control, as well as complementary therapies such as acupressure, meditation, aromatherapy, and massage (Hadi et al., 2021).

One of the forms of therapy that is commonly known and widely practiced by people both in rural and urban areas is massage therapy. A form of massage therapy that is quite popular is therapy *Football Massage* (foot massage). This therapy is *Non-invasive*, is low-cost, and does not require special equipment so that it is suitable for the needs of hypertensive patients who experience limited access, cost, or adherence to long-term therapy. In addition to providing a sense of comfort, *Football Massage* It also has the potential to support relaxation and health recovery. This therapy works through mechanical stimulation of tactile receptors in the legs, which send signals to the central nervous system, reducing the activity of the sympathetic nervous system, increasing relaxation, and lowering peripheral vascular resistance (Lee & Kim, 2020). There are studies that have shown that *Football Massage* effective in lowering blood pressure. Research from Sari *et al*. (2021) reported a decrease in systolic blood pressure with a *p-value* by 0.001 ($p \leq 0.05$). Furthermore, Irawati's research *et al.* (2024) reported the effect of foot reflexology on patients with urgency hypertension; in the intervention group, the value of *p-value* For systolic blood pressure is 0.000 and diastolic 0.013, both are smaller than $\alpha = 0.05$.

Effectiveness of therapy *Football Massage* can be improved by the use of oil *Essential* as a supporting media. Oil *Essential* itself has various types derived from aromatic plants such as *Peppermint, Eucalyptus, Rosemary* then lavender. Each of them has a different content of active compounds and physiological effects. Among the various oils *Essential* The lavender oil (*Lavandula angustifolia*) is one that is often used in hypertensive patients due to its calming relaxation effect. The relaxation effect is because lavender oil contains bioactive compounds such as *Linalool* and *Linalyl Acetate*, which has an effect on *anxiolytic*, *sedative*, and *Vasodilation* through decreased cortisol levels and increased parasympathetic activity (Koulivand *et al*., 2019; by Oliveira *et al*., 2022). Lavender oil has been clinically proven to be able to lower blood pressure and heart rate in hypertensive patients (Hapsari *et al*., 2020). Compared to oil *Essential* others such as *Peppermint* or *Eucalyptus* which is a stimulant, lavender actually provides a soothing effect physiologically and psychologically, so it is more appropriate to use in hypertensive patients (Rahmasari *et al*., 2021).

Several studies have shown that a combination of *Football Massage* and lavender oil can help lower blood pressure in hypertensive patients. In research conducted by Saputra *et al.* (2025), found that this therapy had a clear effect on blood pressure reduction, although it was not explained in detail how many times the therapy was given. Meanwhile, research by Dwiyanti & Setyarini (2023) reported a considerable decrease in blood pressure given after therapy was carried out six times over two weeks.

Some of these things give the impression that although *Football Massage* With lavender oil already shown to help lower blood pressure, most studies were conducted by giving it multiple times in a hospital or controlled setting with limited participants. In health centers such as Kabila, with a very large number of hypertensive patients, the application of repeated therapy is certainly difficult to do. Therefore, this study wants to see if therapy is only done once, but with clear and structured techniques, it can still provide benefits. By using standard SOPs and consistent implementation, this study hopes to provide evidence that this kind of therapy has the potential to be applied in primary services, even in conditions of limited time and resources, and can be a supporting alternative in controlling hypertension at the Kabila Health Center.

Based on initial interviews with 5 hypertensive patients and 3 health workers at the Kabila Health Center, it is known that the majority only rely on medication from doctors, and have never received a foot massage with lavender oil in a structured manner. Although some have had traditional massages, no one realizes that this therapy can help lower blood pressure. By referring to the background explanation presented above, the researcher became interested in studying further about the topic that has been described "The Influence of Therapy *Foot Massage* Using Lavender Oil to Reduce Blood Pressure in Hypertensive Patients at the Kabila Health Center".

METHODS

This study is a quantitative research with *a quasi-experiment* design using *a pretest-posttest control group design* approach. This design was chosen to analyze the effect of *foot massage therapy* using lavender oil (independent variable) on the reduction of systolic and diastolic blood pressure (dependent variable) in hypertensive patients. Measurements were taken before and after the intervention in the two intervention and control groups so that it allowed comparison of changes between the groups that received and did not receive the intervention.

RESULTS

Univariate Analysis

Frequency Distribution of Respondent Characteristics by Group

Table 1. Frequency Distribution of Respondent Characteristics by Group

Yes	Groups	Frequency (n)	Present (%)
1	Intervention	15	50
2	Controls	15	50
Total		30	100

Source : *Primary Data (2025)*

Based on table 1, it can be seen that the distribution of the respondent group that was given the intervention was 15 people (50%) and the control group was 15 people (50%).

Frequency Distribution of Respondent Characteristics by Age

Table 2. Frequency Distribution of Respondent Characteristics by Age

Yes	Age	Groups			
		Intervention		Controls	
		Frequency (n)	Present (%)	Frequency (n)	Present (%)
1	Adults (19-44 yrs)	5	33,3	5	33,3
2	Pre-elderly (45-59 yrs)	10	66,7	10	66,7
Total		15	100	15	100

Source : *Primary Data (2025)*

Based on table 2, it can be seen that the age distribution of respondents in the intervention group consists of 5 people (33.3%) adults (19-44 years) and 10 people (66.7%) who are pre-elderly (45-59 years). In the control group, the age distribution showed the same pattern, namely 5 people (33.3%) aged adults (19–44 years) and 10 people (66.7%) aged pre-elderly (45-59 years).

Frequency Distribution of Respondent Characteristics by Gender

Table 3. Frequency Distribution of Respondent Characteristics by Gender

Yes	Gender	Groups			
		Intervention		Controls	
		Frequency (n)	Present (%)	Frequency (n)	Present (%)
1	Male	6	40	5	33,3
2	Women	9	60	10	66,7
Total		15	100	15	100

Source : *Primary data (2025)*

Based on table 3, it can be seen that in the intervention group, male respondents amounted to 6 people (40.0%) and women amounted to 9 people (60.0%). In the control group, male respondents amounted to 5 people (33.3%) and women amounted to 10 people (66.7%).

Frequency Distribution of Respondent Characteristics by Education Level

Table 4. Frequency Distribution of Respondent Characteristics by Education Level

Yes	Education Level	Groups			
		Intervention		Controls	
		Frequency (n)	Present (%)	Frequency (n)	Present (%)
1	Not finished elementary school	1	6,7	1	6,7
2	SD	6	40	3	20
3	Junior High School	2	13,3	4	26,7
4	High School	5	33,3	5	33,3
5	Bachelor	1	6,7	2	13,3
Total		15	100	15	100

Source : Primary Data (2025)

Based on table 4, it can be seen that in the intervention group, the highest level of education was elementary school with 6 people (40.0%), while the least level of education was Elementary and Bachelor's graduates, as many as 1 person each (6.7%). In the control group, the highest level of education was 5 people (33.3%), and the least level of education was 1 person (6.7%) who did not finish elementary school.

Frequency distribution of respondent characteristics by Comorbid

Table 5 Frequency Distribution of Respondent Characteristics by Comorbid

Yes	Comorbidities	Groups			
		Intervention		Controls	
		Frequency (n)	Present (%)	Frequency (n)	Present (%)
1	None	9	60	11	73,3
2	DM	2	13,3	3	20
3	High cholesterol	1	6,7	1	6,7
4	Gout	3	20	0	0
Total		15	100	15	100

Source : Primary Data (2025)

Based on table 5, it can be seen that in the intervention group, the most comorbidities were no comorbidities with a total of 9 people (60.0%), while the least comorbidity was high cholesterol as many as 1 person (6.7%). In the control group, the most comorbidities were also no comorbidities, which was 11 people (73.3%), and the least comorbidity was high cholesterol as many as 1 person (6.7%).

Distribution of Blood Pressure of Hypertension Patients in the Intervention Group at the Kabila Health Center before (*pre test*) and after (*post test*) Foot *Massage* Therapy Using Lavender Oil

Table 6. Distribution of Blood Pressure of Hypertension Patients in the Intervention Group at the Kabila Health Center before (pre test) and after (post test) Foot *Massage* Therapy Using Lavender Oil

No. Respondents	Before (Pre Test)		After (Post Test)	
	Sistol (mmHg)	Diastol (mmHg)	Sistol (mmHg)	Diastol (mmHg)
1	178	95	170	91
2	137	87	128	80
3	164	92	156	87
4	142	84	135	80
5	152	90	146	86
6	138	85	131	81
7	160	93	152	88
8	176	104	173	93
9	168	94	159	89
10	145	87	138	82
11	170	95	162	89

12	152	91	151	84
13	140	86	133	81
14	175	92	150	87
15	163	97	169	92
Average	156,20	91,47	91,47	86,00

Source : Primary Data (2025)

Based on Table 6, it can be seen that the average systolic blood pressure in the intervention group before the administration of *foot massage* therapy using lavender oil (*pre-test*) was 156.20 mmHg, and decreased to 150.20 mmHg after the administration of therapy (*post-test*). Meanwhile, the mean diastolic blood pressure in the pre-intervention group was 91.47 mmHg, and decreased to 86.00 mmHg after therapy.

Distribution of blood pressure of hypertension patients in the control group at the Kabila Health Center in the initial measurement (*pre test)* and re-measurement (*post test*)

Table 7 Distribution of blood pressure of hypertensive patients in the control group at the Kabila Health Center at the initial measurement (*pre test*) and re-measurement (*post test*)

No. Respondents	Before (Pre Test)		After (Post Test)	
	Sistol (mmHg)	Diastol (mmHg)	Sistol (mmHg)	Diastol (mmHg)
1	152	88	151	88
2	142	86	142	86
3	134	82	136	83
4	149	92	150	92
5	146	85	146	85
6	164	97	164	96
7	159	94	159	96
8	145	90	146	90
9	166	95	166	94
10	171	107	171	105
11	160	83	160	83
12	167	90	167	88
13	158	88	159	88
14	151	89	152	86
15	175	94	175	94
Average	1	9	9	8

Source : Primary Data (2025)

Based on Table 7, it can be seen that the average systolic blood pressure in the control group at the initial measurement (*pre-test*) was 155.93 mmHg, and decreased to 155.20 mmHg at the re-measurement (*post-test*) after the observation period without intervention. Meanwhile, the average diastolic blood pressure in the control group at the *pre-test* was 90.67 mmHg, and decreased to 89.87 mmHg at the re-test

Bivariate Analysis

Systolic and Diastolic Blood Pressure in the Intervention Group Before and After Foot *Massage* Therapy Using Lavender Oil at Kabila Health Center

Table 8. Analysis of systolic and diastolic blood pressure in the Intervention Group Before and After Foot *Massage* Therapy Using Lavender Oil at the Kabila Health Center

Groups	Red (SD)		I 95%	Median (min-max)		P-value
	Pre-Test	Post Test		Pre-Test	Post Test	

Sistol	156,20 (13,74)	150,20 (14,81)	3,80 - 8,19	-	-	0,001
Diastol	-	-	-	92 (84-104)	81 (75-89)	0,001

Source : Primary Data (2025)

Based on table 8, the average value of systolic blood pressure in the intervention group before the intervention was 156.20 mmHg and decreased to 150.20 mmHg after giving *foot massage* using lavender oil. Meanwhile, the median diastole blood pressure before the intervention was 92 mmHg (min 84, max 104) and decreased to 81 mmHg (min 75, max 89) after the intervention. The results of the *paired t-test* and *Wilcoxon* statistical tests showed *a value of* $p = 0.001$ ($p < 0.05$) for both parameters, which means that there was an effect of intervention on reducing systolic and diastolic blood pressure in hypertensive patients at the Kabila Health Center.

Systolic and Diastolic Blood Pressure in the Control Group Before and After at the Kabila Health Center

Table 9. Analysis of systolic and diastolic blood pressure in the Control Group Before and After at the Kabila Health Center

Groups	Test time	n	Average (n.d.)	Min	Max	P-value
Sistol	Pre-test	15	155,93 (11,62)	134	175	0,096
	Post-test	15	156,26 (11,26)	136	175	
Diastol	Pre-test	15	90,66 (6,29)	82	107	0,230
	Post-test	15	90,26 (5,96)	83	105	

Source : Primary Data (2025)

Based on table 9, it was shown that *the Wilcoxon* test in the control group showed $p = 0.096$ ($p > 0.05$) for systolic blood pressure and $p = 0.230$ ($p > 0.05$) for diastole, which means that there was no significant effect on blood pressure changes in hypertensive patients at the Kabila Health Center. This is reflected in the average systolic blood pressure that has almost remained unchanged, from 155.93 mmHg (min 134; max 175) to 156.26 mmHg (min 136; max 175), as well as diastole which drops very minimally from 90.66 mmHg (min 82; max 107) to 90.26 mmHg (min 83; max 105).

Comparative Analysis of *Foot Massage* Therapy Intervention Group Using Lavender Oil with Control Group in Hypertension Patients at Kabila Health Center

Table 10. Comparative Analysis of Foot Massage Therapy Intervention Group Using Lavender Oil with Control Group.

Blood Pressure	Groups	Average (s.b)	Average difference (IK 95%)	P-value
Sistol	Intervention	144,73 (13,58)	11,53 (20,86 - 2.19)	0,024
	Controls	156,26 (11,26)		
Diastol	Intervention	82,20 (3,96)	8,06 (11,85 – 4,27)	0,000
	Controls	90,26 (5,96)		

Source : Primary Data (2025)

Based on table 10, it shows that out of 30 respondents (15 in the intervention group and 15 in the control group), the following results were obtained. In systolic blood pressure, the intervention group had an average of 144.73 (SD = 13.58), while the control group had an average of 156.26 (SD = 11.26); *The independent sample T-test* yielded $p = 0.024$ (<0.05), indicating a significant difference between the two groups after the intervention. Meanwhile, in diastole blood pressure, the intervention group had an average of 82.20 (SD = 3.96), and the control group had an average of 90.26 (SD = 5.96) The *independent sample t-test* yielded $p = 0.000$ (<0.05), which showed a very significant difference between the two groups after the administration of the action.

DISCUSSION

Systolic and Diastolic Blood Pressure in the Intervention Group Before and After Foot *Massage* Therapy Using Lavender Oil at Kabila Health Center

Based on the results of a study conducted on 15 respondents with a diagnosis of hypertension at the Kabila Health Center, it showed that all respondents in the intervention group had high systolic and diastolic blood pressure before being given *foot massage therapy* using lavender oil, namely the average systolic blood pressure was 156.20 mmHg and diastole was 91.46 mmHg. After being given the intervention for 20 minutes, blood pressure decreased to an average systole of 144.73 mmHg and diastole of 82.20 mmHg. The results of *the paired t test* and the Wilcoxon *statistical test* showed a *p-value* = 0.001 for both parameters, indicating a statistically significant decrease.

These findings are in line with the research of Irawati *et al.* (2024) reported a decrease in blood pressure with a difference of 20.00 mmHg systolic and 12.06 mmHg in diastole after giving *foot massage* with aromatherapy oil for 20 minutes in hypertensive patients. Similarly, Putu & Ketut (2022) found a significant effect of lavender aromatherapy in decreasing the activity of the sympathetic nervous system, which has a direct impact on peripheral vasodilation and decreased vascular resistance.

The effect of lowering blood pressure due to *foot massage* with lavender oil can be explained through the neurophysiological *mechanism* of relaxation. Tactile stimulation on the soles of the feet activates *afferent fibers* that inhibit the vasomotor center in *the medulla oblongata*, while the *compounds linalool* and *linalyl acetate* in lavender oil act as *GABA receptor agonists*, which decrease the excitability of the central nervous system and reduce tone. It is this combination of mechanical stimulation and pharmacological effects of aromatherapy that amplifies the acute blood pressure lowering response. sympathetic (Putu & Ketut, 2022).

This decrease in blood pressure can be attributed to the dominant characteristics of the respondents in this study. A total of 10 respondents (66.7%) were in the pre-elderly age category (45-59 years), an age group known to have an increased risk of hypertension due to decreased elasticity of blood vessels and decreased responsiveness of the autonomic nervous system to stress (Riyada *et al*., 2024). Older age is indeed a major non-modified risk factor for hypertension, and responses to non-pharmacological interventions such as touch therapy tend to be more visible in this population due to the body's limited physiological adaptive capacity (Lukitaningtyas & Cahyono, 2023). At this age, diastolic blood pressure is also affected by increased peripheral vascular resistance due to the accumulation of atherosclerotic plaques along with the aging process (Riyada *et al*., 2024).

In addition to age, comorbid factors also need to be considered. In the intervention group, 60% of respondents had no comorbidities, while 40% had comorbidities such as diabetes mellitus, high cholesterol, or gout. Despite this, a significant decrease in blood pressure still occurred in both parameters, which suggests that *foot massage therapy* with lavender oil has a fairly strong effect even in individuals with comorbidities. This is in line with research conducted by Dwiyanti and Setyarini (2023), which found that reflexological stimulation of the legs can decrease the activity of the sympathetic nervous system and increase parasympathetic activity, regardless of the presence of mild comorbidities, thereby contributing to a decrease in blood pressure. These findings are also supported by Takeda *et al*. (2022), which states that reflexological stimulation of the legs is able to increase peripheral blood flow through decreased sympathetic system activity, even in individuals with mild metabolic disorders.

These findings are also supported by the mechanism of action of lavender oil. The *linalool* and *linalyl acetate compounds* in lavender oil are known to have mild sedative effects through the pathway of the limbic system, which can lower levels of cortisol and norepinephrine two of the main hormones that contribute to increased blood pressure (Koulivand et al., 2019). The active compound can be absorbed through the skin and enter the systemic circulation, where it acts as a modulator of calcium channels and inhibitors of the release of *sympathetic neurotransmitters*. As a result, there is a relaxation of vascular smooth muscles and a decrease *in peripheral resistance* are the main factors that determine diastolic blood pressure (Setyawan & Kintoko, 2024).

In simple terms, foot massage helps the body relax and reduce stress, which directly affects the nervous system. When stress decreases, the sympathetic nerves (which make the heart beat faster and blood vessels constrict) become calmer, while the parasympathetic nerves (which calm the body) become more active. Lavender oil amplifies this effect because its soothing scent can lower stress hormones such as cortisol. Together, massage and lavender oil make the heart work less hard and blood vessels more relaxed, so that blood pressure drops (Ilmiyah *et al.,* 2024).

In this study, the administration of *foot massage* therapy with lavender oil topically for 20 minutes was able to stimulate reflex points in the legs related to the cardiovascular system, while allowing transdermal absorption of *linalool* compounds that have sedative and vasodilator effects. This condition promotes an increase in parasympathetic tone, which further leads *to peripheral vasodilation* and a decrease *in systemic vascular resistance* (Ervianda *et al*., 2023). The response of a decrease in diastole by more than 5 mmHg also suggests that this therapy is able to affect the small arteries and arterioles, the main components of diastolic pressure determination (Saputra *et al*., 2025).

Systolic and Diastolic Blood Pressure in the Control Group Before and After at the Kabila Health Center

Based on the results of the study on 15 respondents of hypertension patients at the Kabila Health Center in the control group, systolic and diastolic blood pressure measurements were carried out twice: first (*pre-test*) after a 5-minute break, and second (*post-test*) after waiting for 20 minutes in a quiet sitting condition without additional activity or stimulus. The results showed that the average systolic blood pressure at the initial measurement was 155.93 mmHg and at the final measurement was 156.26 mmHg, while the average diastolic blood pressure at the initial measurement was 90.66 mmHg and at the final measurement was 90.26 mmHg. The changes that occur are very small and clinically meaningless. *Wilcoxon*'s statistical test showed *a p-value* = 0.096 for systole and *a p-value* = 0.230 for diastole, which means that there was no statistically significant difference between the two measurements. This confirms that blood pressure fluctuations under observational conditions without intervention are stable and influenced by normal physiological variations.

This finding is in line with research by Novtariansyah (2025), who explains that patients' blood pressure in the clinical environment is indeed susceptible to fluctuations due to psychological responses to the presence of health workers or medical settings. This phenomenon is commonly known as *white coat hypertension* (WCH), where blood pressure increases temporarily when they first arrive at a healthcare facility, and then tends to decrease as anxiety decreases after the patient adapts. However, in this study, the initial measurement (*pre-test*) was carried out after the respondents were given a five-minute rest period in a quiet sitting condition, so it is likely that the effects of acute stress due to the clinical environment have subsided before data recording begins. As a result, during the 20-minute observation period without intervention, there were no statistically or clinically significant changes in blood pressure in the control group. This stability reflects that the recorded blood pressure values already represent an individual's physiological baseline, not a transient response to situational stress. Physiologically, this can be understood through short-term autonomic regulatory mechanisms, in which the sympathetic and parasympathetic nervous systems work dynamically to maintain *cardiovascular homeostasis* in the absence of significant external stimuli (Andrianto, 2022).

The characteristics of the respondents also explained the stability of blood pressure in the control group. A total of 10 respondents (66.7%) were female. In this phase, most women are still in premenopause or early perimenopause, so the *relative estrogen* levels are still sufficient to provide a protective effect on the vascular system. Blood pressure can increase in women with age, especially systolic blood pressure, but at the age before 55 years, women are generally protected from hypertension by the hormone estrogen which is able to increase HDL (*high-density lipoprotein*) levels, an important factor in preventing the *atherosclerosis* process. This hormonal protection explains why, even without intervention, blood pressure in the control group in this study showed very minimal fluctuations. This stability reflects a calmer physiological response to neutral observation conditions such as sitting still for 20 minutes. These findings are in line with the study of Susanti *et. al* (2024), which reported a significant association between sex and the incidence of hypertension ($p < 0.05$), noting that the risk in women increased sharply after losing the effects of *post-menopausal estrogen,* a condition that the majority of respondents in the control group of this study had not experienced.

The Effect of *Foot Massage* Therapy Using Lavender Oil on Lowering Blood Pressure in Hypertensive Patients at Kabila Health Center

Based on the results of the study, there was a significant difference in blood pressure between the group that received *foot massage therapy* using lavender oil and the group that did not receive the intervention. In systolic blood pressure measurement, the average value in the intervention group was recorded at 144.73 mmHg, while in the control group it reached 156.26 mmHg. This difference is supported by the results of a statistical test that yields a value *of p* = 0.024, which means it is smaller than the significance limit of $\alpha = 0.05$. This indicates that the decrease in systolic blood pressure in the intervention group did not occur by chance, but was related to the administration of *foot massage* therapy using lavender oil.

Meanwhile, in diastole blood pressure, the difference between the two groups was even more. The average diastolic blood pressure in the intervention group was recorded at 82.20 mmHg, while the control group showed an average of 90.26 mmHg. The p-value obtained from the statistical test was $p = 0.000$ well below the threshold of $\alpha = 0.05$ which confirms that the difference is very statistically significant. These findings explain that non-pharmacological interventions in the form of *foot massage* with lavender oil have a real effect on lowering blood pressure, both in systole and diastole in respondents at the Kabila Health Center.

Response patterns at the individual level reinforce the findings. Individually, all respondents in the intervention group experienced a decrease in blood pressure, both systolic and diastolic after giving *foot massage* with lavender oil. In contrast, in the control group that was not given any intervention, most respondents also showed a decrease in blood pressure, but the changes were very small and clinically irrelevant. This minimal decrease is not the result of treatment, but reflects a natural physiological phenomenon, namely the process of *habituation* to the clinical environment and the regression of blood pressure towards baseline after the disappearance of acute stressful effects such as *white coat hypertension*.

These physiological conditions can be explained through the theory of *short-term homeostasis regulation*, which explains that the body maintains blood pressure through the baroreceptor reflex and the balance of sympathetic-parasympathetic neural activity in response to environmental changes (Sherwood, 2021). Without external stimuli, blood pressure fluctuations in the range of ±2 mmHg for 15–30 minutes are normal physiological variations, especially in new hypertensive patients whose autonomic nervous systems are still responsive (Wijayanti et al., 2021). A study by Prasetyo & Lestari (2023) also reported a similar pattern: a control group in a study of nonpharmacological therapies showed an average decrease in systolic blood pressure of 0.8 mmHg only due to the effects of time and adaptation to the clinical environment.

The difference in the magnitude of the decrease in systolic blood pressure and in diastol indicates that the changes in the intervention group are not caused by time factors or environmental adaptation, but are directly influenced by the therapeutic mechanism of the intervention. This strengthens the internal validity of the study while confirming that *foot massage* with lavender oil is a form of complementary nonpharmacological therapy that has a strong physiological basis in lowering blood pressure (Dwiyanti & Setyarini, 2023). In the context of basic health services, these findings show that these interventions can be integrated as therapeutic care companions for new hypertension patients at health centers, both those who will require pharmacological therapy and those that are adequately treated with lifestyle modifications, thereby enriching a holistic approach in the management of hypertension (Putra *et al*., 2024).

CONCLUSION

Based on the results of research at the Kabila Health Center, it is known that therapy *Football Massage* Using lavender oil significantly lowers blood pressure in hypertensive patients. In the intervention group, systolic blood pressure decreased from an average of 156.20 mmHg to 150.20 mmHg and diastole decreased from a median of 92.00 mmHg to 81.00 mmHg, with test results *Paired T-Test* ($p = 0.001$) and *Wilcoxon* ($p = 0.001$), showing a significant influence. On the other hand, in the control group there was no significant change either in the systol ($p = 0.096$) or diastole ($p = 0.230$). Test results *Independent Sample T-Test* on the data *Stuart T*-intervention showed significant differences between the two groups, with $p = 0.024$ for systol and $p = 0.000$ for diastole ($p < 0.05$), so it can be concluded that there is an effect of therapy *Football Massage* using lavender oil to reduce blood pressure in hypertensive patients at the Kabila Health Center.

ADVICE

This research is expected to be useful as a basis for the application of nonpharmacological therapies in the management of blood pressure in hypertensive patients, becoming a reference for health workers, especially at the Kabila Health Center in designing evidence-based interventions, increasing patient and public awareness about safe and affordable independent efforts through *Football Massage* with lavender oil, as well as the basis for the development of further research on the effectiveness and application of complementary therapies in the management of hypertension.

REFERENCES

Aditya, N. R., & Mustofa, S. (2023). Hypertension: An overview. Majority, 11(2), 128–138.

Andrianto. (2022). Managing hypertension. Airlangga University Press.

Dwiyanti, N. F., & Setyarini, A. (2023). The effectiveness of foot reflexology with lavender oil in lowering blood pressure in stage 1 hypertension patients. Indonesian Journal of Health Information, 9(3), 273–278.

Ervianda, E., Hermawati, H., & Yuningsih, D. (2023). The application of foot massage to reduce blood pressure in hypertensive patients at the Karanganyar Regency Hospital. Journal of Ventilators: Journal of Health and Nursing Research, 1(3), 196–207.

Hapsari, D. R., Prasetyo, A., & Widyastuti, E. (2020). The effectiveness of the combination of foot massage and lavender oil on the blood pressure of hypertensive patients. Indonesian Journal of Nursing, 23(2), 112–120.

Ilmiyah, T., Gustomi, M. P., & Alfianti, K. Z. (2024). Effectiveness of foot mass with lavender oil (Lavandula angustifolia) and foot soak with warm lemongrass water (Cymbopogon citratus) against hypertension. Complementary Health Care Journals, 1(1), 1–11.

Irawati, P., Fitri, O. E., & Umara, A. F. (2024). The effect of foot massage therapy on lowering blood pressure in patients with hypertension urgency. Indonesian Nursing Scientific Journal, 7(2), 151–160.

Ministry of Health of the Republic of Indonesia. (2024). Guidelines for hypertension control in first-level health facilities. Jakarta: Ministry of Health of the Republic of Indonesia.

Koulivand, P. H., Khaleghi Ghadiri, M., & Gorji, A. (2019). Lavender and the nervous system: Pharmacology and therapeutic effects. Evidence-Based Complementary and Alternative Medicine, 2019, 1–11.

Lee, J. Y., & Kim, M. S. (2020). The effects of foot reflexology on blood pressure and heart rate variability in patients with essential hypertension: A randomized controlled trial. Journal of Clinical Nursing, 29(15–16), 2874–2882.

Lukitaningtyas, D., & Cahyono, E. A. (2023). Hypertension: Review article. Health Science and Practice Development, 2(2), 100–117.

Mills, K. T., Bundy, J. D., Kelly, T. N., Reed, J. E., Kearney, P. M., Reynolds, K., ... & He, J. (2020). Global disparities of hypertension prevalence and control: A systematic analysis of population-based studies from 90 countries. Circulation, 140(13), 1054–1067.

Novtariansyah, M. W. (2025). Association of whitecoat hypertension with the risk of cardiovascular disorders: A literature review. Medika Alkhairaat: Journal of Medical and Health Research, 7(2), 1168–1171.

Prasetyo, B., & Lestari, S. (2023). The effect of observation time on changes in blood pressure in the control group in a study of nonpharmacological therapy of hypertension. Journal of Indonesian Community Nurses (JNKI), 8(1), 45–52.

Putra, I. G. A. D., Susilawati, N. M. D., & Sudarma, I. K. (2024). Adherence to taking antihypertensive drugs and factors that affect them in urban areas of Indonesia. Journal of Nursing and Health Sciences, 10(1), 33–41.

Putu Ita Purnama Dewi, & Ketut Widyani Astuti. (2022). Effectiveness of the use of lavender aromatherapy oil (Lavandula angustifolia) in lowering blood pressure in hypertension. Scientific Journal of Mandalika (JSM), 3(11), 5.

Rahmasari, R. I., Fitri, N. L., & Nurhayati, S. (2021). Application of massage on the feet with lavender essential oil on blood pressure in hypertensive patients in the heart room of the Jend. Ahmad Yani Hospital, Metro City. Journal of Young Scholars, 1(4), 564–571.

Riyada, F., Fauziah, S. A., Liana, N., & Hasni, D. (2024). Factors that affect the risk of hypertension in the elderly. Scientific Journal (SCIENCE), 3(1), 27–47.

Saputra, W., Husni, H., Septiyanti, S., & Buston, E. (2025). The effectiveness of foot massage therapy and lavender aromatherapy on blood pressure in people with hypertension. Journal of Health Research, 17(1), 305–315.

Sari, D. P., Widyastuti, E., & Prasetyo, A. (2021). Effect of foot massage on blood pressure in hypertensive patients: A quasi-experimental study in the Yogyakarta region. Indonesian Journal of Nursing, 24(1), 45–52.

Setyawan, A., & Kintoko. (2024). Potential applications and active substances of lavender essential oil as an anti-hypertension: Narrative literature review. International Journal of Global Health and Research, 7(1), 29–36.

Sherwood, L. (2021). Human physiology from cell to system (translation of the 9th edition). Publisher of EGC Medical Books.

Susanti, S., Aghniya, S. N., Almira, S. S., & Anisa, N. (2024). Relationship of age, gender with hypertension at Soerosono Pulmonary Main Clinic. PREPOTIF: Journal of Public Health, 8(2), 3597–3604.

Indonesian Health Survey. (2023). National report of the 2023 Indonesian health survey. Ministry of Health of the Republic of Indonesia.

Takeda, A., Okumura, N., et al. (2022). Effects of foot massage combined with lavender oil inhalation on blood pressure, heart rate, and anxiety in essential hypertension patients. Journal of Alternative and Complementary Medicine, 28(6), 789–797.

WHO. (2023). Hypertension. World Health Organization.

Wijayanti, A., Suryandari, W. A., & Prasetyo, D. R. (2021). Patterns of blood pressure fluctuations in hypertensive patients without intervention during clinical observation. Journal of Nursing and Public Health Sciences (JIKeM), 10(2), 112–120.