The Application Of Foot Reflexology Therapy On Blood Pressure Reduction In Hypertension Patients

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Abstract. Background:Hypertension is a condition in which a person experiences an increase in blood pressure above normal levels, which can cause pain and even lead to death. This condition is defined as an increase in systolic blood pressure >140 mmHg and diastolic blood pressure >90 mmHg. Based on data from the Tanjungrejo Public Health Center, during the period of January to December 2024, there were 17,511 cases of hypertension recorded in its working area. Foot reflexology therapy (foot massage) is one of the non-pharmacological treatments currently used for hypertension. Foot massage can serve as a safe and easy non-pharmacological therapy that helps improve circulation, enhance joint mobility, reduce pain, relax muscles, and provide comfort in the joints. Objective**:**To describe the implementation of foot reflexology therapy in reducing blood pressure in hypertensive patients in Tanjungrejo Village.Method**:**The case study in this scientific paper used a pre-experimental design in the form of a one-group pre-test and post-test design. The number of samples was 15 respondents selected using purposive sampling technique**.**Research Results**:**The average pre-test blood pressure of the 15 respondents was 164 mmHg systolic and 95 mmHg diastolic. The average post-test blood pressure was 154 mmHg systolic and 87 mmHg diastolic. The difference in the average values between the pre-test and post-test was 10 mmHg for systolic and 8 mmHg for diastolic pressure. These results indicate a decrease in blood pressure among hypertensive patients in Tanjungrejo Village after undergoing foot reflexology therapy. **Conclusion:**Foot reflexology therapy can reduce blood pressure in patients with hypertension.

Key words: Hypertension, Blood Pressure, Foot Reflexology Therapy

INTRODUCTION

Hypertension is one of the non-communicable diseases (NCDs) whose prevalence continues to increase both globally and in Indonesia. According to data from the World Health Organization (WHO) in 2021, approximately 1.28 billion adults worldwide suffer from hypertension, with nearly two-thirds living in developing countries. If not properly managed, hypertension can lead to serious complications such as coronary heart disease, stroke, kidney failure, and premature death (WHO, 2021).

In Indonesia, the prevalence of hypertension is reported at 34.1% among individuals aged over 18 years (Riskesdas, 2018). One of the regions experiencing an increase in hypertension cases is Kudus Regency. Based on data from the Kudus District Health Office for the period of January–December 2024, there were 131,423 recorded cases of hypertension. Specifically, in the working area of the Tanjungrejo Health Center, a total of 17,511 hypertension cases were recorded during the same period, comprising 8,599 male patients and 8,912 female patients. In April 2023, Tanjungrejo Village recorded the highest number of hypertension cases in the area, with a total of 484 cases—203 male and 281 female (Dinkes Kudus, 2024).

Hypertension is defined as a condition of elevated blood pressure, with a resting systolic pressure of 140 mmHg or more, or a diastolic pressure of 90 mmHg or more upon repeated measurement. Several factors contribute to high blood pressure, including genetic predisposition, gender, stress, lack of physical activity, excessive salt intake, and smoking. These habits can lead to increased blood pressure and complications such as heart failure and stroke (Woro Riyadina, 2019).

Management of hypertension can be carried out through pharmacological therapies such as diuretics, antihypertensive drugs, vasodilators, and sympathomimetics, and may be supported by non-pharmacological therapies such as foot reflexology massage. This therapy is believed to stimulate specific reflex points on the feet that correspond to vital organs in the body, including the cardiovascular system. Reflexology also provides a relaxing effect and improves blood circulation, which can help reduce blood pressure (Yuningsih et al., 2023).

Foot reflexology therapy involves compression or pressure on muscles to stimulate venous blood flow in the subcutaneous tissue and reduce blood retention in peripheral blood vessels. This

pressure causes the arteries to dilate, increasing blood supply to the massaged area, enhancing muscle contraction efficiency, and eliminating metabolic waste. This results in reduced muscle tension, promoting relaxation and comfort. Reflexology also has a direct effect on the flexibility of blood vessel walls by applying soft tissue manipulation techniques that reduce psychological stress and increase endogenous morphine-like hormones such as endorphins, enkephalins, and dynorphins. These hormones trigger feelings of happiness, calmness, and relaxation, while the stress hormone cortisol decreases, helping stabilize blood pressure. Additionally, levels of norepinephrine and dopamine in the body are reduced, further contributing to a relaxed and peaceful state that supports blood pressure reduction (Sulaiman & Margiyati, 2019).

METHODS

This study employed a pre-experimental design using a one-group pre-test and post-test approach, where blood pressure was measured before and after the intervention of foot reflexology therapy on the same group without a control group. There were two variables in this study: the independent variable was foot reflexology therapy, and the dependent variable was blood pressure values.The population in this study consisted of all individuals with hypertension in Tanjungrejo Village. The sample was selected using purposive sampling based on specific inclusion criteria (Sugiyono, 2020). The final sample included 15 respondents who met the following inclusion criteria: hypertensive patients who were willing to participate, cooperative, not experiencing severe complications, and not suffering from mental disorders.The **i**nstruments used in this study included a digital sphygmomanometer to measure blood pressure and a standard operating procedure (SOP**)** for the implementation of foot reflexology therapy.This research applied univariate analysis using descriptive statistics, which is a statistical method used to analyze variables individually. This analysis focuses on one variable at a time, without considering the influence or relationship with other variables, and aims to describe the quality or characteristics of a single variable (Ramdhan Muhammad, 2021).

RESULTS AND DISCUSSION

Results

1. Respondent Characteristics by Age

Table 1. Frequency Distribution of Respondents by Age

Age Category	Frequency (f)	Percentage (%)
Usia		
26 -35 years (early adulthood)	0	0
36 - 45 years (late adulthood)	1	6,67 %
46 - 55 years (early elderly)	5	33,33 %
56 - 65 years (late elderly)	9	60 %
Total	**15**	**100%**

Based on the table above, most respondents were aged 56–65 years (late elderly), totaling 9 respondents (60%), while the lowest number was in the 36–45 age group with only 1 respondent (6.67%).

2. Respondent Characteristics by Gender

Table 2. Frequency Distribution of Respondents by Gender

Gender	f	%
Male	4	26,67%
Famale	11	73,3%
Total	**15**	**100%**

Based on the table above, it can be seen that the gender of the respondents was mostly female with a frequency of 11 respondents (73.3%) and male with a frequency of 4 respondents (26.67%).

3. Respondent Characteristics by Occupation

Table 3. Frequency Distribution of Respondents by Occupation

Occupation	f	%
Farm laborer	7	46,6%
Trader	2	13,33%
Housewife	3	20%
Unemployed	3	20%
Total	**15**	**100%**

Based on the table above, it can be seen that the most common occupations of respondents were as farm laborers with a frequency of 7 respondents (46.6%), housewives with a frequency of 3 respondents (20%), unemployed with a frequency of 3 respondents (20%), and traders with a frequency of 2 respondents (13.33%).

4. Average Blood Pressure Before Foot Reflexology Therapy

Table 4. Pre-Test Blood Pressure Averages

Variable	n	Mean	Median	Mode	Max	Min
Systolic Pressure	15	164 mmHg	169 mmHg	-	187 mmHg	137 mmHg
Diastolic Pressure	15	95 mmHg	96 mmHg	96 mmHg	103 mmHg	79 mmHg

The table above shows that the mean pre-test systolic blood pressure for respondents was 164 mmHg and the diastolic was 95 mmHg. The highest systolic blood pressure was 187 mmHg and the highest diastolic blood pressure was 103 mmHg.

5. Average Blood Pressure After Foot Reflexology Therapy

Table 5. Post-Test Blood Pressure Averages

Variable	n	Mean	Median	Mode	Max	Min
Systolic Pressure	15	154 mmHg	154 mmHg	154 mmHg	175 mmHg	131 mmHg
Diastolic Pressure	15	87 mmHg	87 mmHg	87 mmHg	95 mmHg	76 mmHg

The table above shows that the mean post-test systolic blood pressure for respondents was 154 mmHg and the diastolic was 87 mmHg. The highest systolic blood pressure was 175 mmHg and the highest diastolic blood pressure was 95 mmHg.

6. Difference in Blood Pressure Before and After Reflexology

Table 6. Mean Differences in Blood Pressure Pre-Test and Post-Test

Variable	n	Pre test mean	Post test mean	Difference
Systolic Pressure	15	164 mmHg	154 mmHg	10 mmHg
Diastolic Pressure	15	95 mmHg	87 mmHg	8 mmHg

Based on table 6, it shows that the difference in blood pressure values in hypertension sufferers in Tajungrejo village before (pre-test) and after (post-test) foot reflexology massage therapy is systolic blood pressure of 10 mmHg and diastolic blood pressure of 8 mmHg.

Discussion

Based on the results of a 3-day study in Tanjungrejo Village with 15 respondents who had characteristics of age, gender, and occupation. From the age characteristics data, it was found that the majority of hypertension sufferers were in late old age (56-65 years) with a total of 9 respondents (60%). The results of this study are in line with previous research conducted in Yogyakarta, where most respondents came from the early elderly age group (45-55 years) and late elderly (56-65 years). The study stated that the increasing number of people suffering from hypertension is related to increasing life expectancy and lifestyle aspects. Therefore, it is very important for families with elderly members with hypertension to adopt a healthy lifestyle to improve the quality of life of the elderly (Azizatul Latifah et al., 2024). Age is one of the risk factors for developing hypertension. This is caused by endothelial dysfunction and increased arterial stiffness in individuals with hypertension, especially systolic hypertension that appears as a person reaches old age. In addition, this can also be caused by natural changes that occur in the body that affect blood vessel pressure, as well as hormonal changes that affect the vascular system, thereby causing increased blood pressure and the occurrence of hypertension (Nurhayati Ummy A'isyah et al., 2023).

Based on the results of the study, it shows that the majority of hypertension sufferers are female with a total of 11 respondents (73.3%) suffering from hypertension in Tanjungrejo village. This is in line with research conducted by Cipto Utomo and Kharin Herbawati which states that hypertension in the elderly is more common in women. It was found that elderly women tend to experience hormonal changes during their fertile period. After experiencing menopause, hormonal factors in women cause hypertension to occur more frequently than in men. This is also related to age characteristics that influence the emergence of hypertension (Cipto Utomo & Kharin Herbawani, 2022). This is in line with research conducted by Umamah, F., & Lestari, A in 2020 which stated that of 52 respondents, there were 12 female respondents who had not yet experienced pre-menopause with almost all (83.3%) not experiencing hypertension. Meanwhile, of the 40 female respondents who had experienced pre-menopause, the majority (70.0%) experienced hypertension (Umamah, F., & Lestari, A. (2016).

Based on research results, the majority of hypertension sufferers in Tanjungrejo Village work as farm laborers, with a total of 7 respondents (46.67%). Job stress arises when workers experience constant pressure to complete work or high mental demands but have little ability to change their work methods to be more effective. Certain job characteristics, especially high work stress, can cause hypertension (Nursolihah et al., 2023). This is in line with research conducted by Sulistyono & Modjo in 2010, which stated that environmental factors that play a role in increasing the risk of hypertension among field workers include work-related stress, exposure to loud noise, exposure to high temperatures, exposure to small particles, and blood lead levels. Furthermore, behavioral factors that contribute to the risk of hypertension in field workers include lack of physical activity, smoking and coffee consumption habits, excess weight, and personality traits (Sulistyono et al., 2022).

The causes of hypertension in Tanjungrejo village include non-adherence to medication, diet adherence, and obesity. This finding aligns with research conducted by Delfriana Ayu A and colleagues, which found that the high incidence of hypertension is influenced by various risk factors. Some causes of hypertension include smoking, fruit and vegetable consumption, high-risk foods, processed flour-based foods, and a history of other medical conditions (Delfriana Ayu A et al., 2022).

The results of blood pressure measurements in 15 respondents with hypertension in Tanjungrejo Village before (pre-test) the foot reflexology massage therapy intervention was carried out, the average systolic blood pressure was 164 mmHg and the diastolic was 95 mmHg. Then after (post-test) the foot reflexology massage therapy intervention was carried out, the average systolic blood pressure was 154 mmHg and the diastolic blood pressure was 87 mmHg. The difference between the pre-test and post-test systolic blood pressure was 10 mmHg and the diastolic was 8 mmHg. It can be concluded that foot reflexology massage therapy can lower blood pressure in 15 respondents from Tanjungrejo Village who suffer from hypertension. Foot reflexology massage therapy can improve blood circulation and facilitate blood flow throughout the body. With good blood circulation, oxygen can be distributed maximally and efficiently to all parts of the body. The more oxygen that reaches important organs, the better the performance of these organs and the body's metabolic system (Ratnawati & Aswad Ahmad, 2019). Foot reflexology massage therapy has a direct impact on the flexibility of blood vessel walls by regulating soft tissue structures, which can refresh and reduce mental stress. Foot reflexology massage also

stimulates the sympathetic nervous system, which is experiencing decreased function, resulting in lower blood pressure (Chanif & Khoiriyah, 2017). This is in line with research conducted by Lukman and colleagues in 2018, which stated that reflexology massage provides stimulation through pressure on nerves in the human body. This therapy is not a substitute for conventional medical treatment, but rather serves as an adjunct to help control blood pressure. Results tested using a paired sample T-test showed that reflexology massage has an effect on systolic (p=0.026) and diastolic (p=0.001) blood pressure. Therefore, it can be concluded that foot reflexology massage can lower blood pressure in patients with hypertension (Lukman et al., 2020). Strengthened in research conducted by Muhammad Fandizal, Yuli, and Dhien in 2020, it was stated that the soles of the feet are a part of the body that has many nerves and can be stimulated through gentle massage with the hands. Reflexology massage can improve blood circulation, reduce norepinephrine levels, lower cortisol hormone levels, and reduce muscle tension, which in turn can reduce stress and contribute to lowering blood pressure, as evidenced by the results of the difference in blood pressure before and after foot reflexology massage therapy, namely a positive mean value (8.66667) there was a tendency for a decrease in blood pressure after foot reflexology massage with an average decrease of 8.7. Therefore, it can be concluded that foot reflexology massage therapy can lower blood pressure in people with hypertension (Fandizal et al., 2020).

CONCLUSION

Conclusion

The application of foot reflexology massage therapy to reduce blood pressure in hypertension sufferers in Tanjungrejo Village, for 3 consecutive days, it can be concluded that there is a difference in blood pressure before and after being given foot reflexology massage intervention in hypertension sufferers in Tanjungrejo Village. The results of the average blood pressure assessment of 15 respondents before (pre-test) foot reflexology massage therapy was 164 mmHg for systolic blood pressure and 95 mmHg for diastolic blood pressure. Then the average results of blood pressure measurements after (post-test) foot reflexology massage therapy intervention were 154 mmHg for systolic blood pressure and 87 mmHg for diastolic blood pressure. The results of blood pressure measurements before (pre-test) and after (post-test) foot reflexology massage therapy intervention showed a decrease in systolic blood pressure values with an average decrease of 10 mmHg and diastolic blood pressure with an average decrease of 8 mmHg.

Recommendations

The results of this study are expected to be used as a basis for consideration in establishing foot reflexology as a non-pharmacological therapy to support the management of hypertension. Foot reflexology can also be incorporated into educational programs and health services, particularly in preventive and promotive hypertension management.

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