The Effect of Hydrotherapy (Warm Water Feet Soaks) On Blood Pressure in Hypertension Patients

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Abstract

Hypertension, if not treated immediately, can cause various complications. One non-pharmacological therapy that can lower blood pressure is hydrotherapy (soaking the feet in warm water). Hydrotherapy (warm water foot soak) is a water therapy that can dilate blood vessels so that it can improve blood circulation and reduce blood pressure. The intervention was given 6 times in a row using warm water with a temperature of 38°C-40°C, duration 15-20 minutes, water height 25 cm from the soles of the feet to above the ankles without using footwear, to maintain the stability of the water temperature using aluminum foil which was covered over the surface of the basin. The sample in this study were 30 hypertensive patients in the intervention group and 30 in the control group. Data analysis used an independent T-test . There was an effect of hydrotherapy (warm water foot soak) on blood pressure in the intervention group, the results were obtained (p = 0.001). Hypertension if not treated immediately can cause various complications. One of the non-pharmacological therapies that can lower blood pressure is hydrotherapy (warm water foot soak). Hydrotherapy (warm water foot soak) is a water therapy that can dilate blood vessels so that it can smooth blood circulation and lower blood pressure. The intervention was given 6 times in a row using warm water with a temperature of 38 ° C-40 ° C, a duration of 15-20 minutes, a water height of 25 cm from the soles of the feet to above the ankles without using footwear. The sample in this study were 30 hypertensive patients in the intervention group and 30 in the control group. Data analysis used an independent T-test. There was an effect of hydrotherapy (warm water foot soak) on blood pressure in the intervention group, the results were obtained (p = 0.001)

Keywords : Hydrotherapy, Hypertension, Foot Soak, Blood Pressure

Introduction

Elderly is a development process of human life, so that the aging process cannot be avoided. The number of elderly people in the world based on data is 703 million people and in 2050 it is estimated to be 1.5 billion people. The number of elderly people in Indonesia in 2019 was 9.7% of a total of around 25.9 million people or 11.15% (Organization 2013) . Hypertension is systolic and diastolic blood pressure exceeding normal limits. According to data from the World Health Organization (WHO) in 2019, it is estimated that the global prevalence of hypertension is currently 22% of the world's total population. Southeast Asia ranks 3rd highest with a prevalence of 25% of the total population (Dosoo 2019) . Based on data from the Puskesmas surveillance report in the DIY Province in 2017, 29,862 cases of hypertension were found and in 2019 it increased by 78,468 cases. The data shows that hypertension ranks first out of ten diseases in Yogyakarta (Dinkes 2020) . Berbah Health Center is the Health Center with the second highest number of hypertension sufferers out of seventeen sub-districts in Sleman Regency in 2022. The number of hypertension cases in Berbah Sub-district is 2,802 people with 1,373 men and 1,429 women (Dinkes 2020) .

Current hypertension management according to The Eight Joint National Committee (JNC 8) states the importance of lifestyle modification in the form of weight loss, implementation of the DASH (Dietary Approaches to Stop Hypertension) diet, limiting salt intake ≤ 6 gr / day, physical activity for at least 30 minutes per day, limiting alcohol consumption and quitting smoking . Some of these things can control blood pressure and can even reduce the need for medication in hypertensive patients (James 2014) . In addition, hypertension treatment can be given with non-pharmacological therapy, one of which is hydrotherapy. Hydrotherapy (warm water foot soak) is a water therapy that can increase the immune system and relieve muscle tension and trauma. Warm water therapy is believed to relieve pain, treat insomnia, relieve stress and improve blood circulation (Chowdhury 2021) . Hydrotherapy is a treatment using water to treat or relieve various complaints. There are several types of water therapy, one of which is warm water foot soaking which can lower blood pressure. This warm water foot soak is very easy to do, does not require expensive costs, has no side effects and is not dangerous besides providing a relaxing effect by dilating blood vessels, reducing blood viscosity, increasing capillary permeability which causes changes in blood pressure. Based on this, the researcher is interested in conducting a study on how the effect of hydrotherapy (warm water foot soak) on blood pressure in hypertension patients in the working area of the Berbah Yogyakarta Health Center?

Research Methods

Research Design

Experimental research with quasi-experimental design using pretest-posttest research design with control group design

Research sample

The sample in the study amounted to 60 people, 30 respondents in the intervention group and 30 respondents in the control group. The sample in the study were elderly people who did not have comorbidities such as Diabetes mellitus, heart disease and stroke.

Data collection

The sampling technique in this study used consecutive sampling , namely subject selection by determining subjects who meet the inclusion and exclusion criteria for a certain period of time.

Data analysis

Data analysis using the Paired-t test to determine the difference in blood pressure before and after the intervention with a p value <0.05.

Research ethics

This research has passed the ethical test of the ethics committee (FKKMK UGM) with registration number ref.No.KE/FK/0506/

EC/2024.

Results And Discussion

Hypertension sufferers at Berbah Health Center reached 2,802 people with 1,373 males and 1,429 females. From March to May, there were 160 hypertensive patients under treatment, 48 patients with controlled blood pressure, 39 patients with uncontrolled blood pressure and 19 patients who had not visited the Health Center in the last three months (Berbah Health Center Data, 2024). Researchers took data on hypertensive patients, consisting of 60 hypertensive patients, some of whom were controlled and some of whom were uncontrolled.

This study average age is around 60-80 years, old age greatly affects the incidence of hypertension. Several studies state that the higher the age, the greater the risk of experiencing high blood pressure due to cardiovascular functions such as increased arterial stiffness and reduced elasticity of the heart muscle and blood vessels causing increased susceptibility of the elderly to hypertension. (Kristamuliana, Simak, and Renteng 2022) .

The effect of hydrotherapy on blood pressure in hypertensive patients can be seen by analyzing the difference in the average blood pressure between the intervention group and the control group. The calculation of the average blood pressure difference is the measurement before (pre-test) minus after (post-test 1) in each group.

Table 1. Respondent Characteristics in Hypertension Patients In the Berbah Health Center Working Area 2024 (n=60)

Characteristics	Group				p value
	Intervention (n=30)		Control (n=30)		
	Mean ± SD	f (%)	Mean ± SD	f (%)	
Age (years)	**67.53 ± 5.69**		**66.50 ± 5.14**	±	**0, 464 a**
Gender					
Man		**15 (50.0)**		**8 (26.7)**	**0.063 b**
Woman		**15 (50.0)**		**22 (73.3)**	
Education					
Junior high school or lower		**21 (70.0)**		**20 (66.7)**	**0.781 b**
High school or higher		**9 (30.0)**		**10 (33.3)**	
Work					
Yes		**8 (26.7)**		**3 (10.0)**	**0.095 b**
No		**22 (73.3)**		**27 (90.0)**	
Smoke					
Yes		**4 (13.3)**		**2 (6,7)**	**0.671 c**
No		**26 (86.7)**		**28 (93.3)**	
Medication Compliance					
Low		**15 (50.0)**		**19 (63.3)**	**0.297 b**
Medium – High		**15 (50.0)**		**11 (13.0)**	
Diet Pattern					
Bad		**3 (10.0)**		**4 (13.3)**	**1,000 c**
Good		**27 (90.0)**		**26 (86.7)**	
Physical Activity					
Light		**10 (33.3)**		**13 (43.3)**	**0.426 b**
Medium – Heavy		**20 (66.7)**		**17 (56.7)**	

Based on data from the Sleman Health Office (2020), the prevalence of hypertension in the Sleman area in women tends to be higher than in men (Dinkes 2020) . This is in line with Widiastuti's research (2020) which shows that women with advanced age experience premenstruation and postmenopause causing a decrease in the hormone estrogen which causes vasoconstriction of blood vessels, an increase in LDL (Low Density Lipoprotein) levels forming atherosclerosis in the arteries and blood vessels, this can increase blood pressure (Widiastuti 2020) . In line with Riamah's research (2019), the risk of hypertension increases with age. Although hypertension can occur at any age, it is most often found in people aged 60-74 years. This is caused by natural changes in the heart, blood vessels, hormones, changes in blood pressure.

Table. 2 Images of Average Blood Pressure Before and After Treatment of Hypertension Patients in the Berbah Health Center Work Area 2024 (n=60)

	Measurement			p value
	Pre-test	Post-test 1	Post-test 2	
	Mean ± SD	Mean ± SD	Mean ± SD	
Intervention Group				
Systolic Blood Pressure	**161.87 ± 15.66**	**140.83 ± 12.59**	**142.40 ± 2.31**	**0.001***
Diastolic Blood Pressure	**88.27 ± 12.04**	**81.40 ± 10.76**	**80.37 ± 1.49**	**0.001***
Control Group				
Systolic Blood Pressure	**155.67 ± 11.31**	**157.37 ± 14.34**	**-**	**0.420**
Diastolic Blood Pressure	**85.17 ± 9.12**	**85.07 ± 7.78**	**-**	**0.939**

This study shows that there is a difference in systolic and diastolic blood pressure before and after hydrotherapy in the intervention group of hypertensive patients in the Berbah Health Center Work Area. In line with the results of a study conducted by Susanti (2022) after being given warm water foot soaks 6 times in a row with a duration of 15 minutes, a significant difference was found in systolic and diastolic blood pressure (Susanti 2022) . In line with the study conducted by Mirani (2022) the study showed that the average blood pressure of respondents before being given the intervention was 149.50 mmHg systolic blood pressure and 99.81 mmHg diastolic, while the average blood pressure of respondents after being given the hydrotherapy intervention was 141.38 mmHg systolic and 95.19 mmHg diastolic. This shows that there is a difference in systolic and diastolic blood pressure after being given the intervention (Mirani 2022) .

Table 3. Effect of Hydrotherapy on Blood Pressure In Hypertension Patients in the Berbah Health Center Work Area 2024 (n=60)

	Pre-test – Post-test 1 Mean ± SD	p value	CI 95%	Cohen's d
Systolic Blood Pressure				
Intervention Group	**21.03 ± 14.56**	**0.001**	**15.98-29.49**	**1.74**
Control Group	**-1.70 ± 11.39**			
Diastolic Blood Pressure				
Intervention Group	**6.87 ± 9.72**	**0.003**	**2.36-11.16**	**0.80**
Control Group	**0.10 ± 7.07**			

This is in line with research conducted by Mirani (2022) which shows the effect of hydrotherapy on reducing blood pressure, which can be seen from the results of the mean value in the diastolic blood pressure intervention group, the average value was 11.6 and after the diastolic blood pressure intervention was given, the mean value was 9.27, while in the intervention group the mean value of diastolic blood pressure was 19.4 and the diastolic blood pressure was 21.7 (Mirani 2022)

Aging is a process of physiological and biological decline in function. The elderly will experience physical changes, one of which is heart and blood vessel disorders such as hypertension (Riskesdas 2018) .Hypertension is an increase in blood pressure that can occur at any age, but is most often found in those aged 60 years and over. Elderly is a developmental process of human life, so that an aging process occurs that cannot be avoided. According to WHO, an elderly person is 60 years of age and over (Organization 2013) . Based on data from the Sleman Health Office (2020), the prevalence of hypertension in the Sleman area for women tends to be higher than for men (Dinkes, 2020). This is in line with Widiastuti's research (2020) which shows that women with advanced age experience premenstruation and postmenopause causing a decrease in the hormone estrogen so that vasoconstriction of blood vessels occurs, there is an increase in LDL (Low Density Lipoprotein) levels, atherosclerosis forms in the arteries and blood vessels which can increase blood pressure (Widiastuti, 2020).

In line with Riamah's research (2019) along with increasing age is caused by natural changes in the heart, blood vessels, hormones, changes in the structure of large blood vessels so that blood vessels become narrower and blood vessel walls become stiff (Riamah 2019) . Characteristics of patient distribution Hypertension in Berbah Health Center mostly has a low level of education, this is in line with other studies which state that the intensity of education low which will affect a person's thinking patterns related to lifestyle (Kishore et al. 2016) . Hypertension can be treated with two methods, namely pharmacological and non-pharmacological. Non-pharmacological therapy that can be given to hypertension patients is hydrotherapy (soaking feet in warm water).

So far, there has been no hydrotherapy research that measures the resistance or effects of interventions in maintaining stable blood pressure. In line with the results of research conducted by Susanti (2022) after being given warm water foot soaks 6 times in a row with a duration of 15 minutes, a significant difference was found in systolic and diastolic blood pressure, the average systolic blood pressure before treatment was 148mmHg, dropping to 139.33mmHg after treatment. While the average diastolic blood pressure before treatment was 91.33mmHg, dropping to 83.33mmHg after treatment (Susanti, 2022).

The limitations of this study were that it did not measure patient diet, medication compliance and physical activity.

Conclusion

This study proves that there is an effect of hydrotherapy (warm water foot soak) on changes in blood pressure in hypertensive patients. These results also prove that there is a significant difference between the decrease in blood pressure in the intervention group and the control group. Suggestions in this study, researchers conduct data collection with the same method but add samples from previous studies and measure external variables after related to diet, medication compliance, and client physical activity. The results of the study can be implied for non-pharmacological therapy in hypertensive patients and can be applied to patients who experience discomfort and insomnia.

Conflict Of Interest

During the data collection process no conflicts occurred.

Thank-You Note

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References

Chowdhury, et.al. 2021. "Therapeutic Aspects of Hydrotherapy: A Review." Bangladesh *Journal of Medicine* 32(2nd edition): 138–41. Health Office. 2020. "Yogyakarta Health Profile." https://kesehatan.jogjakota.go.id/uploads/ dokumen/profil_dinkes_2020_data_2019.pdf.

Dosoo, et al. 2019. "Prevalence of Hypertension in the Middle Belt of Ghana: A Community-Based Screening Study. In International *Journal of Hypertension*." Pubmed 07: 1–7. https://doi.org/10.3329/jom.v17i1.30056.

James, et.al. 2014. "Evidence-Based Guideline for the Management of High Blood Pressure in Adults Report From the Panel Members Appointed to the Eighth Joint National Committee (JNC 8) Clinical Review & Education Special Communication 507." *PubMed* 311: 507–20. https://jamanetwork.com/ (October 6, 2023).

Kishore, Jugal, Neeru Gupta, Charu Kohli, and Neeta Kumar. 2016. "Prevalence of Hypertension and Determination of Its Risk Factors in Rural Delhi." *International Journal of Hypertension* 10: 1–6.

Kristamuliana, Valen Fridolin Simak, and Septriani Renteng. 2022. "Elderly Knowledge About Hypertension in the Wenang Health Center Work Area, Manado City." *IMELDA Nursing Scientific Journal* 8(2): 102–6.

Mirani, Nanda. 2022. "The Effect of Combination of Hydrotherapy and Neroli Aromatherapy Inhalation Method on Reducing Hypertension in Pregnancy." *Imelda Scientific Journal of Midwifery* 8(1): 1–6.

Organization, World Health. 2013. 24 World Health Organization *A Global Brief on Hypertension; Silent Killer, Global Public Health Crisis.* Geneva: World Health Organization .

Riamah. 2019. "Factors Causing Hypertension in the Elderly at UPT PTSW Khusnul Khotimah." *Menara Ilmu Journal* 13(5): 106–13.

Riskesdas. 2018. *Health Research and Development Agency of the Ministry of the Republic of Indonesia*.https://kesmas.kemkes.go.id/assets/upload/dir_519d41d8cd98f00/files/Hasil-riskesdas-2018_1274.pdf.

Susanti, Eva. 2022. "The Effect of Warm Water Foot Soak Hydrotherapy on Blood Pressure in Elderly Patients with Hypertension in Palembang." *Nursing Media: Makassar Health Polytechnic* 13(2): 185.

Widiastuti, Linda. 2020. "Acupressure and Foot Exercises on Peripheral Arterial Disease Levels in Type 2 DM Clients." *Silampari Nursing Journal* 3(2): 694–706.