



THE EFFECT OF SLOW DEEP BREATHING AND WARM WATER FOOT BATHING ON BLOOD PRESSURE REDUCTION IN HYPERTENSIVE PATIENTS

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ABSTRACT

Hypertension is one of the silent killers as it often does not produce noticeable symptoms, and patients become aware of it only when the perceived illness has become severe. Hypertension could lead to complications if not promptly managed, and its management can be either pharmacological or non-pharmacological. Non-pharmacological approaches to reducing blood pressure are increasingly being studied, including the combination therapy of slow-deep breathing and warm water foot bathing. Slow-deep breathing involves slow and deep respiratory relaxation, while warm water foot bathing is a relaxation technique that utilizes warm water as a medium. The study aimed to determine the effect of slow-deep breathing and warm water foot bathing on blood pressure reduction in hypertensive patients. The research employed a quasi-experimental method with a pre-test and post-test approach without a control group. The total sampling was 24 respondents. The data were analyzed using the Wilcoxon statistical test. The study revealed pre-intervention that the average systolic blood pressure was 160.63 mmHg, and the diastolic blood pressure was 95.42 mmHg. Post-intervention presented the average systolic blood pressure reduced to 140.42 mmHg, and the diastolic blood pressure decreased to 86.04 mmHg. The Wilcoxon test results obtained that the systolic blood pressure had a p-value of 0.000 (p-value < 0.05), and the diastolic blood pressure had a p-value of 0.000 (p-value < 0.05). Based on these results, there was an effect of slow-deep breathing and warm water foot bathing on blood pressure reduction in hypertensive patients.

Keywords: hypertension; slow deep breathing; warm water foot bathing

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INTRODUCTION

Hypertension is a situation where blood pressure increases above normal values, the results of which are calculated by systolic and diastolic numbers (Sukma et al, 2019). Hypertension is a priority in the world of health in the category of non-communicable diseases and is a disease that causes high mortality rates in the world (Asri et al, 2022). Hypertension is one of the hidden killer diseases because it often does not cause complaints or symptoms and sufferers will realize when the pain they feel is getting worse (Silfiyani & Khayati, 2021). Lack of self-awareness about the dangers of hypertension results in several diseases such as stroke, heart problems, cancer, diabetes mellitus and respiratory problems (Malibel, 2020). Data from the World Health Organization (WHO) estimates that 1.28 billion of the world's population aged 30-79 suffer from hypertension and around 46% of hypertension sufferers do not know that they have it (Musa, 2022). The incidence of high blood pressure in Indonesia comes from the results of Riskesdas in 2018, namely 34.1%, which means that 1 in 3 people aged over 18 years suffer from hypertension (Hidayat and Agnesia, 2021). Based on the results of

Riskesdas in the Central Java Province Health Profile (2019), the prevalence of hypertension in Central Java Province is 37.57% (Central Java Provincial Health Service, 2019)

Meanwhile, the incidence of hypertension in Karanganyar Regency was 6,973 people recorded in health services (Karanganyar District Health Service, 2021). The high prevalence of hypertension in Indonesia requires ways to control it. Management of hypertension can be carried out using 2 techniques, including pharmacological and non-pharmacological. The pharmacological technique is the administration of anti-hypertension drugs, for example captopril and amlodipine. Pharmacological techniques are considered ineffective because they can cause long-term effects or symptoms and sufferers often do not take medication regularly. Meanwhile, non-pharmacological techniques can be used as complementary therapy to obtain better results. Along with the development of non-pharmacological techniques, many treatments have been found to reduce hypertension, such as slow deep breathing treatment and warm water foot soaks (Muchtart et al, 2020).

Slow Deep Breathing (SDB) is breathing relaxation that is done deeply and slowly (Sukri et al, 2022). Slow deep breathing can stimulate autonomic nerves which have an impact on decreasing sympathetic nerves and increasing parasympathetic nerves, therefore it can influence changes in blood pressure (Andri et al, 2019). A warm water foot soak is a foot treatment that is soaked in warm water with a temperature ranging from 37.7 – 40.5 °C and soaked 10-15 cm above the ankles. Soaking your feet in warm water regularly will create a transfer of heat energy that is calming and improves blood circulation and activates the parasympathetic nerves in the feet, thereby affecting blood pressure (Farmana et al, 2020). Researchers are interested in conducting research on the effect of slow deep breathing and warm water foot soaks on reducing blood pressure in hypertension sufferers at Posbindu Dusun Bangsri. The aim of this research was to determine the effect of slow deep breathing and warm water foot soaks on reducing blood pressure in hypertension sufferers.

METHOD

This research uses a quasi-experimental method with a pretest and posttest approach without control. The sampling technique used total sampling with a sample size of 24 respondents. The research was carried out in July 2023 at Posbindu Dusun Bangsri, Bangsri Village, Karangpandan District, Karanganyar Regency. The instruments used included informed consent sheets and respondent identity, standard operational procedures for slow deep breathing and foot soaks using warm water, sphygmomanometer and water thermometer. This study used a manual sphygmomanometer that had been calibrated at the Government Health Facilities Institute (LPFK). A sphygmomanometer is used to measure blood pressure before and after intervention . The data obtained was then analyzed using the Wilcoxon statistical test.

RESULTS

Based on the data obtained, information was obtained regarding data from each respondent variable, namely age, gender, caffeine consumption, salt consumption, occupation, and education as well as blood pressure pre and post slow deep breathing and soaking feet in warm water. The results of data collection obtained the following statistical results:

Table 1.

Distribution Frequency of Respondents Based on Age, Gender, Caffeine Consumption, Salt Consumption, Occupation and Education (n=24)

Karakteristik Responden	f	%
Age		
Late Adulthood (36-45 years)	3	12.5
Early Elderly (46-55 years)	5	20.8
Late Elderly (56-65 years)	7	29.2
	9	37.5
Gender		
Woman	18	75.0
Man	6	25.0
Konsumsi Kafein		
Sering	13	54.2
Jarang	11	45.8
Caffeine Consumption		
Often	16	66.7
Seldom	8	33.3
Work		
Doesn't work	13	54.2
Trader	1	4.2
Farmer	4	16.7
Laborer	4	16.7
Other	2	8.3
Education		
No school	7	29.2
Elementary school	11	45.8
Junior high school	1	4.2
Senior high school	5	20.8

Table 2.

Blood Pressure Before Slow Deep Breathing and Soaking Feet in Warm Water (n=24)

Pre Test	Mean	Sd	Min	Max
Sistolik	160.63	15.059	140	190
Diastolik	95.42	7.929	90	120

Table 2, it can be seen that the average systolic value of the 24 respondents before the action was carried out was 160.63 mmHg and diastolic 95.42 mmHg. The lowest systolic blood pressure is 140 mmHg and the highest is 190 mmHg, while the lowest diastolic blood pressure is 90 mmHg and the highest is 120 mmHg.

Table 3.

Blood Pressure After Taking Slow Deep Breathing and Soaking Your Feet in Warm Water (n=24)

Post Test	Mean	Sd	Min	Max
Sistolik	140.42	13.345	120	160
Diastolik	86.04	7.369	80	110

Table 3, the average systolic blood pressure of the 24 respondents after the treatment was given was 140.42 mmHg and diastolic 86.04 mmHg. The lowest systolic blood pressure is 120 mmHg and the highest is 160 mmHg, while the lowest diastolic blood pressure value is 80 mmHg and the highest is 110 mmHg.

Table 4.

Analysis of the Effect of Slow Deep Breathing and Warm Water Foot Soaking on Blood Pressure in Hypertension Sufferers at Posbindu Dusun Bangsri (n=24)

Variabel	Z	P-Value
Pre-Post Sistolik	-4.296	0.000
Pre-Post Diastolik	-4.352	0.000

Table 4, the Wilcoxon test results show that systolic blood pressure p-value = 0.000 (p-value <0.05) and diastolic blood pressure p-value = 0.000 (p-value <0.05). H_a was accepted and H_o was rejected, so it can be concluded that the action of slow deep breathing and soaking the feet in warm water can affect the blood pressure of hypertensive sufferers.

DISCUSSION

Characteristics of Respondents: Slow Deep Breathing and Soaking Your Feet in Warm Water on Reducing Blood Pressure in Hypertension Sufferers

According to the results of research conducted on 24 respondents who were the research sample based on age, the majority were elderly (<65 years) with 9 respondents (37.5%). This research is in line with research by Putro et al (2023) which states that high blood pressure can be caused by age because individuals aged 30-50 years will usually develop primary hypertension. Hypertension will increase with age. Individuals aged over 60 years, 50 have a 60% risk of having pressure greater than or equal to 140/90 mmHg. Based on the research results, respondents were dominated by women, namely 18 respondents (75%). The results of this study are in line with research from Yuliandra et al (2023) which stated that female respondents had a 75% greater potential for hypertension. Based on the research results, the majority of respondents often consume caffeine, 13 respondents (54.2%), and the majority of respondents often consume salt, 16 respondents (66.7%). According to the research results, respondents were predominantly unemployed, 13 respondents (54.2%), and the majority of respondents were elementary school graduates, 11 respondents (45.8%).

Blood Pressure Before Slow Deep Breathing and Soaking Feet in Warm Water

The results of the study stated that blood pressure before giving slow deep breathing and soaking the feet in warm water showed an average systolic result of 160.63 mmHg and diastolic 95.42 mmHg from 24 respondents. This research is the same as research conducted by Andini et al (2019) which stated that 88 respondents (76.5%) of 115 respondents had hypertension. Research conducted by Megasari et al (2023) also provided almost the same results, namely that from 37 elderly respondents, the average systolic blood pressure before the intervention was 166.31 mmHg, while the average diastolic blood pressure before the intervention was 94.05 mmHg. Hypertension is one of the hidden killer diseases because it often does not cause complaints or symptoms and sufferers will become aware when the pain they feel is severe (Silfiyani & Khayati, 2021). An increase in blood pressure can cause ongoing symptoms in the target organs in the body, which can trigger the emergence of other diseases (Palimbong et al, 2019). Frequent neglect and unawareness of hypertension results in several diseases such as stroke, heart problems, cancer, diabetes mellitus and respiratory problems (Malibel, 2020). Hypertension sufferers will experience signs and symptoms of pain, headaches, stiffness, fatigue, and functional damage which are clinical manifestations. Hypertension sufferers also complain of shortness of breath (Fitriana et al, 2023).

Blood Pressure After Slow Deep Breathing and Soaking Feet in Warm Water

The results of the study showed that blood pressure after giving slow deep breathing and soaking the feet in warm water showed an average systolic result of 140.42 mmHg and diastolic 86.04 mmHg. This research is the same as research conducted by Azhari (2019), there was a decrease in blood pressure in respondents who were given slow deep breathing,

where the systolic was 140 mmHg and the diastolic was 88.24 mmHg. Likewise, research on warm water foot soaks conducted by Farmana et al (2020) showed a reduction in blood pressure with a systolic p value of 0.006 and diastolic 0.001 < 0.05. Slow Deep Breathing (SDB) is a relaxing breathing action that is carried out deeply and slowly (Sukri et al, 2022). Slow Deep Breathing is carried out consciously and requires calm in order to have a relaxing effect. Slow deep breathing carried out regularly can help regulate blood pressure (Mughtar et al, 2020). Slow deep breathing stimulates the autonomic nerves which have an impact on reducing sympathetic nerves and increasing parasympathetic nerves, therefore it can influence changes in blood pressure if carried out regularly (Andri et al, 2019).

Slow deep breathing is done with a long inspiration which will stimulate the HPA (Hypothalamus-Pituitary-Adrenal) axis which is the regulator of the neuroendocrine system, metabolism and behavioral disorders. In people who experience tension, it is the sympathetic nervous system that works, while when relaxed, it is the parasympathetic nervous system that works, so relaxation suppresses feelings of tension and creates a feeling of relaxation. The feeling of relaxation is transmitted to the hypothalamus to produce corticotropin releasing hormone (CRH) and continues to activate the anterior pituitary to secrete encephalin and endorphin whose role as neurotransmitters influences a relaxed mood (Rantesigi, 2024). According to the theory put forward by Wahyudi & Rahmadani (2024), the deep breathing relaxation mechanism is a conscious action to regulate deep breathing carried out by the cerebral cortex, while spontaneous breathing is carried out by the medulla oblongata. This deep breathing relaxation is done by reducing the breathing frequency from 16-19 times per minute to 6-10 times per minute. Deep breathing relaxation can stimulate the emergence of nitric oxide which will enter the lungs and even the center of the brain which functions to make the individual calmer so that blood pressure which is high will decrease Soaking your feet in warm water is the act of soaking your feet using warm water as the medium. This activity is simple, easy to do, does not involve toxic substances, does not require medication, and is cheap (Malibel, 2020). Warm water has an effect on the body so that soaking feet in warm water can improve blood circulation if done regularly (Dewi & Rahmawati, 2019).

Analysis of the Effect of Slow Deep Breathing and Warm Water Foot Soaking on Reducing Blood Pressure in Hypertension Sufferers

The results of the analysis showed that the results of statistical tests showed that the average systolic pressure before the procedure was carried out was 160.63 mmHg and diastolic pressure was 95.42 mmHg. Then the average systolic pressure after the procedure was 140.42 mmHg and diastolic 86.04 mmHg. The results of the Wilcoxon statistical test show that the systolic pressure has a p-value of 0.000 < 0.05 and the diastolic pressure has a p-value of 0.000 < 0.05, so H_a is accepted and H_o is rejected. According to the research results, it can be concluded that giving slow deep breathing and soaking the feet in warm water can reduce the blood pressure of hypertension sufferers. Doing slow deep breathing and soaking your feet in warm water regularly can make you feel more relaxed and comfortable so that the respondent's blood pressure decreases. This research is the same as research by Azhari (2019) which is based on the Wilcoxon statistical test which shows changes in blood pressure after slow deep breathing with p-value = 0.000. Research carried out by Malibel (2020) based on the Wilcoxon statistical test showed a change in blood pressure after the feet were soaked in warm water with a p-value = 0.000.

Hypertension is one of the main problems in the world of health. As the population increases and aging increases, the number of people suffering from hypertension is increasing. The increase in the prevalence of hypertension can also be influenced by other factors, such as

increasing obesity rates and high salt intake (Sukri et al., 2022). Hypertension sufferers not only have a risk of heart disease, but can also suffer from nerve and kidney disease. The higher the blood pressure, the greater the risk (Purnika et al, 2019). Therefore, treatment is needed to reduce blood pressure numbers apart from taking medication. Slow deep breathing carried out regularly can influence changes in blood pressure and can provide good results for hypertension sufferers (Andri et al, 2021). Slow Deep Breathing is carried out consciously and requires calm in order to have a relaxing effect. Slow deep breathing carried out regularly can help regulate blood pressure (Mughtar et al, 2020). Slow deep breathing can stimulate autonomic nerves which have an impact on decreasing sympathetic nerves and increasing parasympathetic nerves, therefore it can influence changes in blood pressure (Andri et al, 2019). Slow Deep Breathing is conscious relaxation to regulate breathing deeply and slowly. Slow deep breathing exercises have the effect of increasing tidal volume thereby activating the Hering-Breuer reflex which has the effect of reducing chemoreflex activity and increasing baroreflex sensitivity, through this mechanism it can reduce sympathetic activity and blood pressure (Akhiransyah et al., 2023). Doing slow deep breathing can have a positive impact on health because doing deep breathing relaxation causes relaxation and will stretch the muscles and blood vessels which will smoothen the blood vessels (Doren et al, 2024)

Soaking your feet in warm water is a way of soaking your feet using warm water as the medium. This activity is simple, easy to do, does not involve toxic substances, does not require medication, and is cheap (Malibel, 2020). Soaking your feet in warm water regularly will create calming heat energy and improve blood circulation and activate the parasympathetic nerves in the feet, thereby affecting blood pressure (Farmana et al, 2020). The decrease in blood pressure is caused by relaxation with the principle of positioning the body in a calm and comfortable condition, so that relaxation therapy such as slow deep breathing and warm water foot soaks can reduce blood pressure. Deep breathing relaxation can reduce oxygen consumption, metabolism, respiratory rate, heart rate, muscle tension and blood pressure (Susmadi et al, 2023). According to researchers, slow deep breathing and soaking your feet in warm water can lower the blood pressure of hypertension sufferers. Slow deep breathing and soaking your feet in warm water can make someone who does it feel relaxed and comfortable, this can improve blood circulation so that blood pressure can decrease.

CONCLUSION

Age characteristics of respondents in the study were predominantly elderly (> 65 years), 9 people (37.5%), dominated by women, 18 respondents (75%), the majority often consumed caffeine, 13 respondents (66.7%), the majority frequently consuming salt was 16 respondents (66.7%), the majority of respondents did not work, 13 respondents (54.2%), and the majority had elementary school education, 11 people (45.8%). Blood pressure before administering slow deep breathing and soaking the feet in warm water resulted in a minimum systolic value of 140 mmHg and diastolic 90 mmHg, a maximum systolic value of 190 mmHg and diastolic 120 mmHg and a mean systolic value of 160.63 mmHg and diastolic 95.42 mmHg. Blood pressure after giving slow deep breathing and soaking the feet in warm water resulted in a minimum systolic value of 120 mmHg and diastolic 80 mmHg, a maximum systolic value of 160 mmHg and diastolic 110 mmHg and a mean systolic value of 140.42 mmHg and diastolic 86.04 mmHg. The results of the study showed that there was an effect of slow deep breathing and warm water foot soaks on reducing blood pressure in hypertension sufferers at Posbindu Dusun Bangsri with a p-value of 0.000.

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