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THE INFLUENCE OF WALK ON DECREASING BLOOD PRESSURE IN HYPERTENSION PATIENTS

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ABSTRACT

The number of incidents in people with hypertension lacks physical activity resulting in complications of hypertension such as heart disease, kidney failure and stroke. Efforts that can be made to lower blood pressure with non-pharmacological therapy are walking because it can control blood pressure. This study aims to determine the effect of walking on pressure reduction in hypertensive patients. Methods: The research design uses a Quasi Experiment with a Pre-test Post-test Control Group Design approach. The number of samples was 68 consisting of 34 control groups and 34 walking intervention groups taken by consecutive sampling. The instruments used were observation sheets, calibrated sphygmomanometers, stopwatches, and standard operating procedures (SOP) for walking. Data analysis used Wilcoxon test and Mann-Whitny test. Results:Results of Mann-Whitny test analysisshows that there is an effect of walking on systolic and diastolic blood pressure with value$\rho value$< 0.05. Discussion: It is hoped that people with hypertension can practice walking because walking has a positive effect on the body to help smooth blood flow throughout the body and increase the elasticity of blood vessels so that the heart works more effectively and blood pressure decreases to near normal.

Keywords: blood pressure; hypertension; walking

INTRODUCTION

Hypertension is a problem that is being experienced by everyone in the world. The prevalence of hypertension in the world is 2/3, the majority live in low- and middle-income countries. It is estimated that 1.28 billion adults aged 30 to 79 worldwide suffer from hypertension. Less than half of adults with hypertension (42%) have been diagnosed with hypertension and (46%) adults have hypertension without realizing it. About 4 in 5 adults (79%) cannot control blood pressure(WHO, 2021).The prevalence of hypertension in Indonesia has increased every year. Data from Reskesdas in 2018 the results of measuring blood pressure at the age of more than 18 years reached 34.1%, the highest value was the population of South Kalimantan at 44.1% while Central Java reached 37.5%.(Ministry of Health, 2019). The number of hypertension sufferers in Central Java in 2021 is the first order and has increased by 71.61%. Patients with hypertension aged more than 15 years in Central Java reached 30.4%(Central Java Health Office, 2021). Based on the 2018 Basic Health Research, the results of measuring blood pressure in Kendal Regency at the age of more than 18 years were ranked 15th, namely 38.41%(Riskesdas, 2018).

The increasing number of hypertension sufferers is caused by the behavior and lifestyle patterns of hypertension sufferers themselves. Behavior and lifestyle patterns, one of which is a lack of physical activity.Basic Health Research, 2018shows that people aged more than 10 years do less physical activity, with the number increasing from 26.1% in 2013 to 33.5% in 2018. The results of this studyLiambo, Ronoatmodjo & Jannah (2021)said that a lack of physical activity such as exercise (walking, aerobics) will have a 1.15 times risk of developing hypertension because it causes excess weight. Less active physical activity tends to have a higher heart rate so that the heart

muscle has to work harder with each contraction. The harder and more frequently the heart muscle pumps, the greater the pressure imposed on the arteries(Oktaviarini et al. 2019). Treatment of hypertension is carried out with pharmacological and non-pharmacological therapy. Pharmacological therapy uses antihypertensive drugs which can have side effects on the body such as dizziness, headache and can make it worse, while nonpharmacological therapy can cause natural side effects by changing lifestyle.(Mununtung, 2018). One form of non-pharmacological therapy through changing lifestyle patterns and behaviors by limiting excess salt consumption, stopping smoking, not consuming alcohol, and doing sports/physical activity(Kurnia, 2021). The goal of hypertension nursing care is to change lifestyles, control blood pressure and prevent complications of hypertension, such as heart disease, kidney disease and stroke(Hutagalung, 2021).

Nursing care for hypertension with non-pharmacological therapy, namely changing lifestyles with sports or physical activity. Sports or physical activities that can be done by people with hypertension include walking, swimming, and cycling. Walking is a series of steps in one direction forward repeatedly by moving step by step. Walking is the easiest type of exercise to do because everyone, both young and old alike, can do it, economical because you don't need a lot of equipment, fun because you can do it together(Rohimah & Dewi, 2022). Walking has an effect on reducing systolic and diastolic blood pressure. According to research conducted byRohimah & Dewi (2022), said that after walking there was an average decrease in systolic blood pressure of 6 mmHg and diastolic blood pressure of 5 mmHg. Another research conducted byConference (2020), also showed a decrease in blood pressure after walking, a decrease in systolic 9.11 mmHg and a decrease in diastolic 5.93 mmHg.

When doing activity training, systolic blood pressure will increase, while diastolic does not depend on exercise intensity. If the exercise is continued, the systolic blood pressure will gradually decrease as a reaction to the increased dilatation of the artiolae in the muscles that are active during exercise. Regular exercise will cause the heart to work more efficiently, reducing heart rate and decreasing blood pressure(Initial, 2018). After walking, blood pressure will decrease. This is due to the occurrence of mechanisms in the body, namely decreased activity of the sympathetic nervous system, decreased total peripheral vascular resistance, decreased cardiac output, increased baroreflex sensitivity and decreased plasma volume. Walking exercise can reduce daily blood pressure at rest and during activity(Rohimah & Dewi, 2022).

The results of a preliminary study conducted in the working area of the Kangkung II Health Center found data on visits for hypertension sufferers in August - October 2022 as many as 774 people. Researchers conducted observations and interviews with 10 respondents who suffer from hypertension. The results obtained are that the activities carried out in the morning and evening are mostly carried out daily activities such as doing household chores after everyone is done sitting chatting with neighbors, watching television, working and never doing sports activities.The description of the background above shows that people with hypertension do less physical activity or exercise. One way to reduce hypertension is to change your lifestyle by doing physical activity or sports. Researchers are interested in providing an intervention of walking 30 minutes 5 days a week for people with hypertension. Researchers examined the effect of walking on reducing blood pressure in people with hypertension.

METHOD

The conceptual framework in this study is the independent variable, namely walking, and the dependent variable systolic and diastolic blood pressure. The research design uses a quasi-experimental approach with the Pre-test Post-test Control Group Design approach. A total of 68 samples consisted of 34 people in the control group and 34 people in the walking intervention group which were taken by Consecutive Sampling. The location of the research was carried out in the Working Area of the Kangkung II Health Center. The research instrument was in the form of an observation width and a digital sphygmomanometer. . Data collection begins with obtaining permits according to the procedure.

The researcher determines the prospective respondents according to the inclusion criteria. Furthermore, prospective respondents were given information related to the research to be carried out and respondents who were willing to do the research signed an informed consent form. Before conducting the research, the researchers divided the respondents into 2 groups, namely the control group and the walking intervention group. the control group was pre-tested on the first day and post-test on the fifth day without being given any intervention, the intervention group was walking pre-test on the first day and post-test on the fifth day by being given a walking intervention 5 times a week for 30 minutes. After the data was collected, data was analyzed using the Wilcoxon test and the Mann-Whitny test. Before conducting the research, the researchers divided the respondents into 2 groups, namely the control group and the walking intervention group. the control group was pre-tested on the first day and post-test on the fifth day without being given any intervention, the intervention group walked pre-test on the first day and post-test on the fifth day by being given a walking intervention 5 times a week for 30 minutes. After the data was collected, data was analyzed using the Wilcoxon test and the Mann-Whitny test. Before conducting the research, the researchers divided the respondents into 2 groups, namely the control group and the walking intervention group. the control group was pre-tested on the first day and post-test on the fifth day without being given any intervention, the intervention group walked pre-test on the first day and post-test on the fifth day by being given a walking intervention 5 times a week for 30 minutes. After the data was collected, data was analyzed using the Wilcoxon test and the Mann-Whitny test.

RESULTS AND DISCUSSION

Univariate analysis

Characteristics of patients with hypertension

Table 1
Description of Age of Hypertension Sufferers in Control Group and Walking Intervention Group, February 2023 (n=68)

Group	Age Characteristics				
	f	Median	IQR	Min	Max
Control	34	52	10	40	60
InterventionWalk	34	51	9	40	60

Table 1 the age characteristics of the respondents in the control group can be seen that the median age of the control group is 52 years and the walking intervention group is 51 years.

Table 2
Description of the Gender of Hypertension Patients in the Control Group and the Walking Intervention Group, February 2023 (n=68)

Group	Gender Characteristics

	Man		Woman		Total	
	f	%	f	%	f	%
Control	5	14,7	29	85,3	34	100
Walking Intervention	4	11,8	30	88.2	34	100

Table 2 the majority are female control group 29 (85.3%) respondents and the walking intervention group 30 (88.2%) respondents.

Systolic and diastolic blood pressure pre-test and post-test in control group and groupinterventionwalk.

Table 3
Description of Pre-test and Post-test Systolic and Diastolic Blood Pressure in Control Group and Walking Intervention Group, February 2023 (n=68)

Group	Blood pressure	f	Median	IQR	Min	Max
Control	*Pre-test* systolic	34	154	9	140	160
	Diastolic		92	3	90	96
	Post-test systolic		155	8	145	160
	Diastolic		92.5	5	87	97
InterventionWalk	*Pre-test* systolic	34	154	10	140	160
	Diastolic		92	3	90	95
	Post-test systolic		145	10	135	160
	Diastolic		90	7	80	95

Table 3 systolic and diastolic blood pressure in the control group showed a mean pre-test of 154/92 mmHg and a post-test of 155/92.5 mmHg, while in the walking intervention group showed a median pre-test of 154/92 mmHg, and post-test 145/90 mm Hg.

Bivariate Analysis

Table 4
Changes in Pre-test and Post-test Systolic and Diastolic Blood Pressure in the Control Group and Changes in Pre-test and Post-test Systolic and Diastolic Blood Pressure in the Walking Intervention Group, February 2023 (n=68)

Group	Blood pressure	f	Median	*ρvalue*
Control	Systolic (Pre-test)	34	154	0.084
	Systolic (Post-test)		155	
	Diastolic (Pre-test)	34	92	0.925
	Diastolic (Post-test)		92.5	
Walking Intervention	Systolic (Pre-test)	34	154	0.001
	Systolic (Post-test)		145	
	Diastolic (Pre-test)	34	92	0.002
	Diastolic (Post-test)		90	

Table 4 the results of the study in the control group showed that the pre-test systolic blood pressure obtained a ρvalue of 0.084 and the post-test diastolic with a ρvalue of 0.925, this means that the ρvalue is greater than 0.05 (ρvalue > 0.05), so it can be concluded that there was no significant change between systolic and diastolic blood pressure pre-test and post-test in the control group. The results of the study in the walking intervention group showed that pre-test systolic blood pressure obtained a ρvalue of 0.001 and post-test diastolic blood pressure with a ρvalue of 0.002. This means that the ρvalue is less than 0.05 (ρvalue <0.05), so it can be concluded that there is a change in intervention between systolic and diastolic blood pressure pre-test and post-test in the walking group.

Table 5
Effect of Walking on Post-test Systolic and Diastolic Blood Pressure Between Control and Intervention Walking Groups (n=68)

Blood pressure	Group	n	Median	ρvalue
Systolic (Post-test)	Control	34	155	0.0001
	Walk		145	
Diastolic (Post-test)	Control	34	92.5	0.010
	Walk		90	

Table 5 the results showed that the post-test systolic blood pressure between the control and walking groups showed a ρvalue of 0.0001 and the post-test diastolic between the control and walking groups showed a ρvalue of 0.010. This matter means that the ρvalue is less than 0.05 (ρvalue <0.05), so it can be concluded that there is a significant effect of walking on post-test systolic and diastolic blood pressure between the control group and the walking intervention group.

Characteristics of Hypertension Sufferers

The age of hypertension sufferers in the control group showed that the mean age of hypertension sufferers was 52 years and the walking intervention group was 51 years. Where this age is included in the middle adult age category. In accordance with the age classification according to the Ministry of Health written byAl Amin (2017)that the middle adult age is 46-55 years. In accordance with the theory which states that as you get older the risk of hypertension also increases. The condition related to hypertension and age is that with increasing age the structural changes in blood vessels narrow and blood vessel walls thicken due to the buildup of collagen in the muscle layer so that blood pressure increases.(Tambunan, 2021). The results of this study are similar to research conducted byJehani, Hepilita & Krowa (2022)regarding factors related to hypertension in middle adulthood in the working area of the Wangko Health Center, North Rahong sub-district in 2022 which states that hypertension sufferers are more common in middle adulthood 40-65 years. Other researchHendrawati, Ni, Aris, I, Moh & Dian, (2021)Respondents who experienced hypertension were mostly aged over 40 years.

Researchers synthesize at age that the aging process is a process that must be experienced by all living things and can cause a decrease in bodily functions. As you get older, your blood pressure also increases. This is caused by structural changes in blood vessels that are stiff and less elastic so that they can increase blood pressure. Gender of hypertensive patients in the control and walking groups was female. In accordance with the theory of conditions related to hypertension and gender is hormonal changes after menopause. Before menopause, women do not experience cardiovascular disease because the role of the hormone estrogen can increase levels of High

Density Lipoprotein (DHL). High levels of LDL cholesterol will prevent atherosclerosis or the accumulation of fat, cholesterol and other substances in the walls of blood vessels, but as this process continues, the quality of the hormone estrogen naturally changes according to a woman's age, generally starting to occur in women who are entering menopause(Marliani, 2013).
Previous research resultsEkarini, Wahyuni & Sulistyowati (2020)states that hypertension sufferers are dominated by women. The results of research conducted byWidjaya, Nita, Faishal, Ratih Ranty & Erlina (2019)shows that the majority of hypertension sufferers are experienced by women because women who are entering menopause have increased blood pressure caused by the hormone estrogen which begins to decrease. StudyYanti, Asyrofi & Arisdiani (2020)This shows that women after menopause are more likely to experience hypertension than men. Research results Other researchWulandari, Ekawati, Harokan & Murni (2023)shows that the number of hypertensive patients who experience hypertension is more experienced by women. Researcher's synthesis on the sex of women who have experienced menopause will be more susceptible to hypertension because as women age, the levels of estrogen produced by the body will decrease, so that women who have entered menopause will be more at risk of experiencing hypertension.

Pre-test and post-test systolic and diastolic blood pressure in the control group and the walking intervention group.

The pre-test and post-test blood pressure in the control group significantly showed a pre-test value of 154/92 mmHg and a post-test of 155/92.5 mmHg. The pre-test and post-test blood pressure in the walking intervention group significantly showed a pre-test value of 154/92 mmHg and a post-test of 145/90 mmHg. Hypertension is a condition where systolic blood pressure is ≥140 mmHg and diastolic is ≥90 mmHg.(Annisa et al. 2021). Classification of hypertension was categorized into mild hypertension with systolic blood pressure 140-159 mmHg and diastolic 90-99 mmHg, moderate hypertension with systolic blood pressure 160-179 mmHg and diastolic 100-109 mmHg, severe hypertension with systolic blood pressure> 180 mmHg and diastolic > 110 mm Hg(Mediarti et al. 2022). The theory shows that based on systolic and diastolic blood pressure measurements, both groups have mild hypertension.

Physiologically, the body's mechanism is unbalanced, blood pressure becomes unstable, if the body's mechanism is disrupted, blood pressure will increase. Increased blood pressure in the arteries is due to 1) the work system of the heart is working stronger than usual, because there are obstacles to blood flow in the blood vessels. 2) the aorta is stiff and less elastic, so that the aorta does not expand when the heart pumps blood. Blood flowing through narrow blood vessels will be forced to through them and cause an increase in pressure. 3) when vasoconstriction occurs, blood pressure increases, that is, if the arteries are temporarily narrowed by nerve stimulation or the body's hormones. 4) increased fluid in the bloodstream can cause an increase in blood pressure. this occurs when there is an abnormality in kidney function where the kidney cannot excrete a certain amount of salt and water in the body. The volume of blood in the body increases so that the blood pressure also increases, and vice versa(Guntur, Syamsunie & Haqi, 2019).

The results of this study are the same as the researchAyu & Mayang (2021)which resulted in the majority having mild hypertension. The results of the study stated that people with hypertension were not controlled by their treatment and had an unhealthy lifestyle. The same is true of research conducted byAstuti, Tasman, & Amri (2021)also results in hypertensive patients experiencing mild hypertension which is influenced by age, BMI and physical activity. Other researchArifin, Zaenal,

& Irmayani (2020)showed that physical activity and irregular eating patterns tend to have mild hypertension. The researcher's synthesis of pre-test and post-test systolic and diastolic blood pressure in the control group and the road intervention group experienced a significant decrease. but clinically the pre-test and post-test systolic and diastolic blood pressure in both groups still experienced mild hypertension with systolic blood pressure of 140-159 mmHg and diastolic 90-99 mmHg because an unbalanced body mechanism can increase blood pressure in the blood vessels arteries increase.

Changes in Pre-test and Post-test Systolic and Diastolic Blood Pressure in the Control Group

The control group in this study only measured the first day's pre-test blood pressure without being given any intervention until the fifth day and then on the fifth day another blood measurement was taken as a post test. The results of the study in the control group showed no significant change between pre-test and post-test systolic and diastolic pressure. This was corroborated by the results of the blood pressure of hypertension sufferers in the control group, both systolic and diastolic blood pressure, higher than the pre-test. The age factor can affect blood pressure because with increasing age the risk of hypertension becomes higher. As people get older the risk of hypertension increases because hypertension is a degenerative disease, that is, with age, organ function decreases. Naturally as an aging process where the heart and blood vessels decrease(Malisa et al. 2021).

Blood pressure did not change significantly because the control group was not given intervention. All control group respondents did not exercise. According to research conducted byJingga, Dhea & Indarjo (2022)found a significant relationship between sports activity and the incidence of hypertension, where most of the respondents did not exercise. The study also showed that respondents who did not exercise had a risk of developing hypertension 2.956 times compared to respondents who exercised. This research is aligned with researchBeginning (2018)regarding the effect of physical exercise walking 30 minutes on reducing blood pressure in hypertensive patients at the Kedawung Health Center, it was found that there was no difference between systolic and diastolic blood pressure before and after treatment in the group that did not walk. The same is true of research conducted bySari & Wulandari (2022)which showed that there was no change in pre-test and post-test systolic and diastolic blood pressure in the control group.

The researcher's synthesis in the control group stated that there were no significant changes in pre-test and post-test systolic and diastolic blood pressure because the control group was not given intervention. An increase in blood pressure is caused by the age factor because with age the blood vessels narrow so that the work system of the heart increases and blood pressure also increases. Lack of physical activity in people with hypertension also has a risk of developing hypertension. This control group was used as a comparison to determine the difference between the control group and the group that was given the intervention.

Changes in Systolic and Diastolic Blood Pressure Pre-test and Post-test Walking Intervention Group

The results showed that in the walking intervention group there was a significant change between systolic and diastolic blood pressure before and after being given the 30-minute walking intervention five times a week. This was corroborated by the results of the blood pressure of

hypertension sufferers in the walking group, both systolic and diastolic blood pressure, lower than before the walking intervention was given.This significant decrease in blood pressure occurs through several mechanisms. When walking, blood pressure increases, but after rest, blood pressure decreases to normal limits. Walking is done regularly, the decrease in blood pressure lasts longer. This is because regular walking can lower blood pressure(Aliftitah & Oktavianisya, 2020). Walking reduces the activity of the sympathetic system which causes vasodilation of blood vessels and total peripheral resistance followed by a decrease in diastolic blood pressure. Decreased blood pressure can also occur due to decreased vasopressin and increased cardiac output. This causes cardiac output to decrease followed by a decrease in systolic pressure(Carlson, 2016). The walking movement activates all the skeletal muscles which causes a more even blood pressure response to flow between muscle tissues. Blood carries oxygen and glucose needed for muscle contraction(Ayuningtias & Suryani 2019).

The results of this study are in line with researchAliftitah & Oktavianisya (2020)where the 30-minute walking intervention resulted in a significant change between systolic and diastolic blood pressure. Research resultIndran & Sylvie (2019)entitled "The Effect of Walking Exercise on Reducing Blood Pressure in Hypertension Sufferers", resulted in the effect of walking on reducing systolic and diastolic blood pressure before and after being given walking interventions in hypertension sufferers. Other research resultsPuspodiningsih & Sugiarto (2018)states that there is an effect of walking on systolic and diastolic blood pressure in patients with hypertension.The researcher's synthesis stated that there was a significant change between systolic and diastolic blood pressure pre-test and post-test in the walking intervention group with hypertension. This decrease in blood pressure occurs because the heart's work system is stable, blood vessels dilate, and blood pressure flows smoothly so that a decrease in blood pressure occurs as does the widening of a water pipe which will reduce pressure on the flow of water. Blood pressure will decrease slowly. This reduction in blood pressure will last longer and can reach normal limits if done regularly.

Effect of walking on post-test systolic and diastolic blood pressure between the control group and the walking intervention group

The results showed that there was a significant effect of walking on post-test systolic and diastolic blood pressure between the control group and the walking intervention group. This was corroborated by the post-test systolic and diastolic blood pressure results between the two groups which showed that the post-test systolic and diastolic blood pressure values between the control group and the significant walking group showed a ρvalue less than 0.05 (ρvalue < 0.05). The difference in post-test systolic and diastolic blood pressure was significant between the control and walking intervention groups because the control group was not given any intervention while the walking group was given regular walking interventions which were carried out five times a week. The acute effect of physical activity increases heart rate and lowers blood pressure because blood vessels dilate and blood vessels relax, resulting in a decrease. This means that regular walking can reduce peripheral vascular resistance. The mechanism for reducing blood pressure occurs due to the lack of the heart pumping blood maximally. Individuals who exercise regularly have bigger and stronger heart muscles compared to individuals who do not exercise(Huldani et al. 2022).

Walking is a non-pharmacological treatment which is an easy type of exercise, because everyone, both young and old, can do it. Cheap, because it doesn't use much of the equipment needed except for footwear. festive, because walking can be done together in small or large groups(Rohimah &

Dewi, 2022). This dynamic walking physical activity exercise is highly recommended to be done every day for 30 minutes a week(Umara et al. 2023). The benefits can strengthen the heart muscles so that they can normalize blood circulation and help lower blood pressure(Mustafa, 2022).The same thing in this research also happened in research conducted byRohimah & Dewi (2022)showed that there was an effect of walking on blood pressure in hypertensive patients. This research is in line with research conducted byRahmawati, Dewi & Sari (2018)showed that the effect of walking can reduce systolic and diastolic blood pressure in people with hypertension. StudyAnnazmi, Wibowo & Zen (2022)stated that there was a significant effect on systolic and diastolic blood pressure after walking.

The research synthesis stated that there was a significant effect of walking on right systolic and systolic blood pressure post-test between the control and walking intervention groups. Where the walking intervention group walked five times a week effectively lowering blood pressure in hypertension sufferers compared to the control group which was not given intervention. Walking has a positive effect on the body to help smooth blood flow throughout the body and increase the elasticity of blood vessels so that the heart works more effectively and blood pressure decreases to near normal.

CONCLUSION

There is an effect of walking on reducing blood pressure in people with hypertension.

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