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ORIGINAL ARTICLE

The Effect of 6 Minutes of Walking Exercise on Reducing Blood Pressure in The Elderly

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ABSTRACT

Introduction: Hypertension is a condition in which blood pressure increases, causing symptoms that affect specific target organs in the body and can lead to damage, such as stroke, left ventricular hypertrophy, kidney failure, and other diseases. This condition affects the elderly and even younger people due to unhealthy lifestyles and stress. Lack of physical activity can increase the risk of hypertension.

Objective: The goal of this study is to investigate the effect of a 6-minute walk on decreasing blood pressure.

Methods: Fourteen elderly respondents aged 60-85 years were selected through purposive sampling. The study involved performing a 6-minute walking exercise three times daily at 6:00 AM, 11: 00 AM, and 6: 00 PM for three sessions over two weeks. Blood pressure data was measured on the first day (pre-test), on the 7th day (middle test), and on the 14th day (post-test), with SPSS version 25.0 being used to process all measures that were taken both before and after the walking exercise.

Result: The study results showed that the pre-test systolic blood pressure was 151.78 ± 11.926, and the post-test systolic blood pressure was 151.74 ± 11.926, with a p-value of 0.901. Since the p-value is greater than 0.05, it was concluded that there was no significant difference in the average systolic blood pressure before and after the intervention. However, systolic blood pressure experienced a slight reduction after performing the six-minute walking exercise. The mean pre-test diastolic blood pressure in the intervention group was 92.43 ± 3.283, while the post-test diastolic pressure was 94.00 ± 3.283. With a p-value greater than 0.05, it was similarly concluded that there was no significant difference in the average diastolic blood pressure before and after the intervention.

Conclusion: Based on the research conducted, it can be concluded that systolic blood pressure decreased after the 6-minute walking exercise, while diastolic blood pressure increased after the same exercise.

Keywords: Hypertension, Elderly, Physical Activity

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INTRODUCTION

According to WHO, olderly refers to a group of people aged 60 years or older. The aging process is a continuous, natural process that begins at birth and is generally experienced by all living beings (Yohanita, 2009). WHO (2013) predicts that the global elderly population will increase to 11% of the 6.9 billion world population by 2020. The population of Indonesians aged 60 years and older has reached 24,754,500 people (9.34%) of the total population. Data from the Central Statistics Agency in 2019 indicates that the prevalence of elderly residents in West Java Province ranks fifth among the provinces with the highest elderly populations. Yogyakarta ranks first (12.48%), followed by East Java (9.36%), Central Java (9.26%), Bali (8.77%), and West Java (7.09%) of the total elderly population in Indonesia.(Rohimah *et al*., 2022). The aging process affects physical and mental changes, leading to a decline in the immune system of older adults, making them more vulnerable and prone to various diseases. According to 2018 Riskesdas data, the most common disease found among older adults is hypertension. Hypertension ranks first (57.6%) among the top six health issues affecting the elderly. The prevalence of hypertension among Indonesia's population has now reached 34.1%, up from 25.8% in 2013 (Rohimah *et al*., 2022).

Hypertension is a condition in which blood pressure rises to a level that begins to affect target organs in the body. This can cause severe damage, such as stroke (affecting the brain and heart blood vessels) and left ventricular hypertrophy. Hypertension can also lead to kidney failure and other diseases (Toding *et al*., 2012). This condition typically affects older adults but can now also affect younger individuals due to unhealthy lifestyles and stress-inducing living conditions.

Uncontrolled hypertension increases the risk of stroke by seven times, coronary heart disease by six times, and heart attack by three times. In many cases, hypertension is only detected during a physical examination for another health issue, which is why it is often called the "silent killer." Hypertension can lead to complications that affect various vital organs, including the heart (such as ischemic heart disease, left ventricular hypertrophy, and heart failure), the brain (stroke), the kidneys (kidney failure), the eyes (retinopathy), and the peripheral arteries (intermittent claudication). The severity of organ damage is influenced by how high the patient's blood pressure is, as well as the duration for which it remains untreated and uncontrolled (Rohimah *et al*., 2022).

Hypertension management can be approached in two ways: pharmacologically and non-pharmacologically. Pharmacological treatment, or the use of antihypertensive medications such as captopril, amlodipine, and others, can be a treatment option. he second method, non-pharmacological management, focuses on lifestyle changes, including weight reduction, which can lower blood pressure by 5-20 mmHg for every 10 kg lost through a combination of calorie restriction and increased physical activity. Following the DASH diet (Dietary Approaches to Stop Hypertension), which emphasizes higher consumption of fruits and vegetables, can help decrease blood pressure by 8-14 mmHg. Additionally, reducing daily salt intake may lead to a 2-8 mmHg drop in blood pressure. Lastly, engaging in light exercise, such as walking for 30 minutes, 3-5 times per week, can contribute to a reduction of 3.2-5.7 mmHg (JNC8, 2016).

Physical activity refers to any movement of the body that requires energy to carry out different tasks, ranging from daily routines after waking up to bedtime, depending on the intensity and type of muscle engagement (Sudibjo *et al*., 2013). Davis (2010) stated that regular physical activity can reduce atherosclerosis, one of the causes of hypertension. Moreover, engaging in regular physical activity can reduce systolic blood pressure by 10 mmHg and diastolic blood pressure by 7.5 mmHg.

As physical activity levels rise, the body's need for oxygen-rich blood also increases. To meet this demand, the heart pumps more blood. Several factors influence blood pressure, including cardiac output, arterial tension, blood volume, and blood viscosity. Blood pressure is commonly measured as a ratio of systolic to diastolic pressure, with a normal reading for adults being approximately 120/80 mmHg. For those aged 60 and above, the average blood pressure is typically around 140/90 mmHg (Makawekes *et al*., 2020).

Physical activity plays a role in influencing blood pressure levels. A sedentary lifestyle can increase the risk of hypertension by contributing to weight gain. Individuals who engage in less physical activity often have a higher heart rate, forcing the heart muscles to work harder with each beat. The stronger

and more frequent the heart's contractions, the greater the pressure exerted on the arteries (Anggara and Prayitno, 2013). Elevated blood pressure due to insufficient physical activity can lead to various complications, including coronary heart disease, kidney disorders, and stroke. This study aims to examine the impact of a 6-minute walk on lowering blood pressure.

METHOD

Sample

The study involved 14 elderly respondents aged 60-85, selected through purposive sampling with inclusion criteria of being 60-85 years or older and not taking antihypertensive medications. Exclusion criteria included smokers, alcoholics, individuals with diabetes mellitus, and those experiencing severe stress. Respondents were required to complete and sign an informed consent form.

Research Design

The research design used in this study is Quasi-experimental (quasi-experimental). According to Creswell (2015) Quasi-Experimental is an experimental plan that is carried out without randomization (random) but involves placing participants into groups.

Research Method

The research was conducted by doing walking exercises for 6 minutes 3 times a day, namely in the morning (06.00), afternoon (11.00) and evening (06.00). This research was conducted 3 times in two weeks. Blood pressure data was measured on the first day (Pre-test), data on the 7th day (mid-test), and data on the 14th day (post-test) using a blood pressure device (tensiometer), all three data were measured before and after doing walking exercises and then processed using SPSS version 25.0.

RESULT

A. Systolic Blood Pressure 6 Minutes Walking Exercise

Table 1. Systolic Blood Pressure Report 6 minutes walking exercise

Responden	Age	Pre Test (Day 1)	Middle Test (Day 7)	Post Test (Day 14)	Mean	Hypertension clasification
1	73	156	173	145	158	Hipertensi Tingkat 1
2	74	140	149	149	146	Hipertensi Tingkat 1
3	84	143	147	176	155,33	Hipertensi Tingkat 1
4	78	171	147	141	153	Hipertensi Tingkat 1
5	85	141	145	148	144,67	Hipertensi Tingkat 1
6	82	153	144	142	146,33	Hipertensi Tingkat 1
7	74	142	147	165	151,33	Hipertensi Tingkat 1
8	67	145	141	149	145	Hipertensi Tingkat 1
9	71	188	176	175	179,67	Hipertensi Tingkat 1
10	74	149	144	148	147	Hipertensi Tingkat 1
11	75	161	149	144	151,33	Hipertensi Tingkat 1
12	63	151	145	147	147,67	Hipertensi Tingkat 1
13	73	143	147	140	143,33	Hipertensi Tingkat 1
14	72	142	142	146	143,33	Hipertensi Tingkat 1
Total Mean		**151,78**	**149,71**	**151,074**	**150,86**	

B. Diastolic Blood Pressure 6 minutes walking exercise

Table 2. Diastolik Blood Pressure Report 6 Minutes Walking Exercise

Responden	Age	Pre Test (Day 1)	Middle Test (Day 7)	Post Test (Day 14)	Mean	Hypertension Clasification
1	73	90	92	90	90,67	Pre- Hipertensi
2	74	91	93	98	94	Hipertensi Tingkat 1
3	84	92	90	92	91,33	Hipertensi Tingkat 1
4	78	93	95	81	89,67	Pre- Hipertensi
5	85	90	92	90	90,67	Hipertensi Tingkat 1
6	82	95	91	95	93,67	Hipertensi Tingkat 1
7	74	95	90	97	94	Hipertensi Tingkat 1
8	67	91	95	93	93	Hipertensi Tingkat 1
9	71	90	97	94	93,67	Hipertensi Tingkat 1
10	74	94	93	96	94,33	Hipertensi Tingkat 1
11	75	92	92	99	94,33	Hipertensi Tingkat 1
12	63	93	90	100	94,33	Hipertensi Tingkat 1
13	73	97	92	96	95	Hipertensi Tingkat 1
14	72	91	92	95	92,67	Hipertensi Tingkat 1
Total	**74**	**92,43**	**92,43**	**94**	**92,95**	

C. Frequency Distribution of Blood Pessure Levels of Hypertensive Elderly in the Intervention Group

Table 3. Frequency Distribution of Blood Pressure Levels of Hypertensive Elderly in the Intervention Group

Parameter	Pre-test (Mean ± SD)	Post-Test (Mean ± SD)	Nilai *P-Value*	Keterangan
Sistolik	151,78 ± 11.926	151,74 ± 11.926	0.901	Tidak signifikan P>0,05
Diastolik	92,43 ± 3.283	94,00 ± 3.283	0.352	Tidak signifikan P>0,05

Based on Table 3, The intervention group had an average pre-test systolic blood pressure of 151.78 ± 11.926, while the average post-test systolic blood pressure was 151.74 ± 11.926, with a p-value of 0.901. Since the p-value is greater than 0.05, H0 is accepted, and H1 is rejected. This indicates that there is no significant difference in the average systolic blood pressure before and after the intervention.

Based on Table 3, The intervention group had an average pre-test diastolic blood pressure of 92.43 ± 3.283, while the average post-test diastolic blood pressure was 94.00 ± 3.283. Since the p-value is greater than 0.05, H0 is accepted, and H1 is rejected. This suggests that there is no significant difference in the average diastolic blood pressure before and after the intervention.

DISCUSSION

Walking is a light, simple, inexpensive exercise that can be performed by all hypertension

patients. The goal of morning walking is to activate the cells or tissues in the body and to stretch the joints, ankle muscles, and body to encourage more movement. It is beneficial for sweat to be released from the body to help neutralize toxins, leaving the body feeling refreshed and energized after exercise (Silwanah *et al*., 2020).

Blood pressure is categorized into two types: systolic and diastolic. Systolic pressure refers to the highest pressure exerted when the heart's left ventricle pumps blood into the arteries, whereas diastolic pressure is the lowest pressure recorded when the heart is at rest. Blood pressure is typically expressed as a ratio of systolic to diastolic pressure. Individuals with hypertension who participate in physical activities, such as morning walks or regular exercise, can help lower the ratio between their systolic and diastolic pressure (Adam, 2019).

Research by Rahadiyanti (2013) found that a decrease in blood pressure among hypertension patients after walking is influenced by several physiological mechanisms. These include reduced sympathetic nervous system activity, lower total peripheral vascular resistance, decreased cardiac output, increased baroreflex sensitivity, and reduced plasma volume. Similarly, Kowalski (2010) stated that this form of exercise is effective in enhancing maximal heart rate capacity, stimulating muscle contractions, breaking down glycogen, and improving oxygen and tissue utilization. Additionally, it can help prevent plaque buildup by promoting better fat metabolism and improving glucose utilization.

During walking, blood pressure experiences a significant temporary increase. Intense walking can elevate blood pressure from 110-120 mmHg to 150-200 mmHg. However, after the activity ends and the body rests for about 10-30 minutes, blood pressure decreases below normal levels and remains low for approximately 30-120 minutes (Cahyaningrum, 2023). With repeated walking sessions, the duration of this lowered blood pressure extends further. Consequently, engaging in regular exercise can help reduce blood pressure. The most effective type of exercise for this purpose is moderate-intensity aerobic activity, such as walking, performed 3 to 5 times per week for at least 30 minutes (Surbakti, 2014).

There is an acute blood pressure response during exercise, which depends on the type of exercise performed. In walking, an aerobic exercise, the initial response is a linear increase in systolic blood pressure, which occurs alongside a linear increase in systolic pressure as the exercise intensity increases, secondary to an increase in cardiac output. This decrease in resistance is more evident in systolic blood pressure. After walking for a certain period, hypertensive patients experience a reduction in blood pressure as well as improved heart function (Janet *et al*., 2003).

Based on Table 3, The average systolic blood pressure before the intervention was 151.78, while the average post-test systolic value was 151.74 ± 11.926, with a p-value of 0.901. Since the p-value exceeds 0.05, H0 is accepted, and H1 is rejected, indicating no significant difference in average blood pressure before and after the intervention. However, systolic blood pressure showed a slight decrease following the 6-minute walking exercise. A study by Madini et al. (2018) found that during light physical activity, such as walking, blood vessels in active muscles undergo vasodilation, increasing blood flow to supply oxygen. In some cases, this process can lower peripheral vascular resistance, leading to a slight reduction in systolic pressure, particularly at low to moderate exercise intensity or in individuals with specific conditions.

Based on Table 3, The average diastolic blood pressure in the intervention group before the test was 92.43 ± 3.283, while the post-test average was 94.00 ± 3.283. Since the p-value is greater than 0.05, H0 is accepted, and H1 is rejected, indicating no significant difference in average blood pressure before and after the intervention. However, diastolic blood pressure increased following the 6-minute walking exercise. According to a study by Madini et al. (2018), diastolic blood pressure generally remains stable or may slightly rise during exercise. This increase can be attributed to reflex mechanisms, such as heightened sympathetic nervous system activity, which causes vasoconstriction in blood vessels of inactive body areas. This response helps maintain overall blood pressure, even as blood flow is redirected to active muscles.

CONCLUSION

The study results indicate a decrease in systolic blood pressure following the 6-minute walking exercise. This reduction may occur because,

during light physical activity like walking, blood vessels in active muscles undergo vasodilation, increasing blood flow to supply the necessary oxygen. Conversely, diastolic blood pressure showed an increase after the exercise. This is because diastolic pressure typically remains stable or may slightly rise during physical activity. The increase may be attributed to reflex mechanisms, such as heightened sympathetic nervous system activity, which causes vasoconstriction in blood vessels of inactive body areas. This process helps regulate blood pressure during exercise, even as more blood is directed to the working muscles.

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