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Research Article

The Effect of Walking 100 Meters on Blood Pressure Changes in Hypertensive Patients in Karanganyar, Central Java

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ABSTRACT

Hypertension is a major risk factor for cardiovascular disease and remains highly prevalent in Indonesia. Simple physical activity, such as walking, can help reduce blood pressure.This study aimed to determine the effect of walking 100 meters on systolic and diastolic blood pressure among middle-aged hypertensive patients in Plesungan, Karanganyar.This study employed a quantitative pre-experimental one-group pretest–posttest design involving 39 middle-aged hypertensive patients selected using total sampling. Blood pressure was measured before and after a 100-meter walking intervention conducted for seven consecutive days. Data were analyzed using a paired t-test.The mean systolic blood pressure decreased from 165.53 mmHg to 154.02 mmHg (–11.51 mmHg), while diastolic blood pressure decreased from 99.51 mmHg to 89.31 mmHg (–10.20 mmHg). The paired t-test showed $p < 0.001$ for both parameters. Walking 100 meters significantly lowers systolic and diastolic blood pressure and can be recommended as a simple, non-pharmacological intervention for hypertension management.

INTRODUCTION

Hypertension, or high blood pressure, is a major risk factor for cardiovascular diseases, which remain the leading cause of mortality worldwide. More than 1.28 billion adults aged 30 - 79 years suffer from hypertension, with two-thirds living in low- and middle-income countries (World Health Organization, 2024). In Indonesia, the prevalence of hypertension among individuals aged ≥18 years reached 34.1% based on the 2018 Basic Health Research (Kementrian Kesehatan Republik Indonesia, 2020)

Hypertension is often called a "silent killer" because its symptoms are subtle but may lead to stroke, kidney failure, and cardiovascular complications if untreated (Lefferts et al., 2023). Management requires pharmacological therapy alongside non-pharmacological interventions such as physical activity. Regular exercise lowers peripheral resistance, improves endothelial function, and reduces both systolic and diastolic blood pressure (Lee et al., 2021)

Physical inactivity remains a global issue, with nearly 60% of adults failing to meet the WHO's recommendations. (World Health Organization, 2024) Similar trends are seen in Indonesia, with sedentary lifestyles increasingly common (Xavier et al., 2025) The American College of Sports Medicine (ACSM) recommends aerobic exercises such as walking, cycling, or swimming for blood pressure control (Blodgett et al., 2025). Walking, in particular, is light, inexpensive, and feasible across age groups. Studies confirm that regular walking can reduce blood pressure by 4–11 mmHg, depending on duration and intensity (Zhu et al., 2022)

Recent evidence strengthens this view. (Lefferts et al., 2023) demonstrated that increasing daily steps by 3,000 reduced systolic blood pressure by 7 mmHg among older adults with hypertension. Local studies in Indonesia also reported significant blood pressure reductions following brisk walking programs (Islami et al., 2024; Utomo et al., 2023). Moreover, a Cochrane systematic review (2023) concluded that walking interventions lower systolic and diastolic pressures by an average of 4.11 mmHg and 1.79 mmHg, respectively. These findings emphasize the relevance of walking as a community-based intervention. (Dif et al., 2023)

Most prior research employed longer walking durations (>30 minutes), such as in the study (Rahmayati et al., 2023). However, limited studies have examined the impact of very short walking distances, such as 100 meters, particularly in middle-aged community populations. This knowledge gap warrants further investigation, especially in areas with high hypertension prevalence, such as Plesungan Village, Karanganyar. Therefore, this study aims to determine the effect of walking 100 meters on changes in systolic and diastolic blood pressure in middle-aged hypertensive patients in the Plesungan area, Central Java.

METHOD

This study employed a quantitative pre-experimental one-group pretest–posttest design to examine changes in blood pressure before and after a walking intervention.

The study population consisted of all middle-aged patients with hypertension (aged 35-59 years) living in the Plesungan area, Karanganyar, totaling 39 individuals. A total sampling technique was applied, and all eligible participants were included in a single intervention group.

The study was conducted in Karanganyar, from March to August 2024. The intervention consisted of daily walking for 100 meters at a moderate pace for seven consecutive days, guided and supervised by the research team to ensure adherence and safety.

Blood pressure was measured using a validated digital sphygmomanometer (Omron, Japan) and confirmed by auscultation with a stethoscope. Measurements were taken in a sitting

position after a 5-minute rest, both before and after the intervention, and the average of two readings was recorded.

Additional research instruments included informed consent forms, demographic questionnaires (age, gender, education level, and duration of hypertension), and observation sheets to monitor participant compliance (Aji, Bhadowy, et al., 2025).

Data analysis was performed using the paired t-test to compare systolic and diastolic blood pressure values before and after the intervention. Normality of data distribution was assessed prior to inferential analysis. A significance level of $p < 0.05$ was applied.

RESULTS

This study examined changes in systolic and diastolic blood pressure before and after a 100-meter walking intervention among middle-aged patients with hypertension in the Plesungan area, Karanganyar. A total of 39 respondents completed the intervention. The results are presented descriptively to illustrate respondent characteristics and analytically to evaluate differences in blood pressure before and after the intervention.

Table 1. Demographic Characteristics of Respondents (n = 39)

Variable	Category	n	%
Age (years)	35 – 44	10	25.6
	45 – 54	11	28.2
	55 - 59	10	25.6
Gender	Male	14	35.9
	Female	25	64.1
Educational level	Primary School	20	51.3
	Secondary School	11	28.2
	Higher School	8	20.5
Duration of Hypertension	< 5 years	20	51.3
	≥5 years	19	48.7

Table 1 shows the demographic characteristics of the respondents. Most participants were aged 45–54 years (28.2%) and predominantly female (64.1%). More than half of the respondents had primary school education (51.3%). The duration of hypertension was relatively evenly distributed, with 51.3% of respondents having been diagnosed for less than five years.

Table 2. Blood Pressure Before and After the 100-Meter Walking Intervention (n = 39)

Blood Pressure	Pre-intervention Mean ± SD (mmHg)	Post-intervention Mean ± SD (mmHg)	Mean Difference (mmHg)
Systolic	165.54 ± 15.98	154.03 ± 14.37	−11.51
Diastolic	99.51 ± 6.59	89.31 ± 6.32	−10.20

The baseline measurements showed that participants had elevated blood pressure levels prior to the intervention. The mean systolic blood pressure before the intervention was 165.54 ± 15.98 mmHg, while the mean diastolic blood pressure was 99.51 ± 6.59 mmHg.

After seven days of a 100-meter walking intervention, both systolic and diastolic blood pressure values decreased. The mean systolic blood pressure decreased to 154.03 ± 14.37 mmHg, and the mean diastolic blood pressure decreased to 89.31 ± 6.32 mmHg. Overall, systolic blood pressure decreased by 11.51 mmHg and diastolic blood pressure decreased by 10.20 mmHg (Table 2).

Table 3. Frequency Distribution of Respondents Based on Blood Pressure Walking 100 Meters

Variabel	N	mean	Std Deviation	Median	Modus	Min	Max
Sitolik	39	11,5128	4,28505	10,00	10,00	2,00	20,00
Diastolik	39	10,2051	4,19385	10,00	10,00	1,00	20,00

The analysis of mean differences between pre- and post-test values provides a clearer picture of the effectiveness of walking: Systolic blood pressure decreased by an average of 11.51 mmHg (SD = 4.29), with a minimum reduction of 2 mmHg and a

maximum of 20 mmHg. Diastolic blood pressure decreased by an average of 10.21 mmHg (SD = 4.19), ranging from 1 mmHg to 20 mmHg.

These findings are consistent with global studies highlighting the impact of moderate physical activity, such as walking, on cardiovascular health. The data support the hypothesis that light aerobic activity helps regulate vascular tone, reduces peripheral resistance, and enhances cardiac output efficiency.

Table 4. Normality Testing (Shapiro-Wilk Test)

Variabel	Statistik	df	Sig.
Sistolik Pre test	0,945	39	0,054
Diastolik Pre test	0,945	39	0,113
Sistolik post test	0,953	39	0,101
Diastolik post test	0,948	39	0,070

Before conducting inferential analysis, the normality of data distribution was tested using the Shapiro-Wilk test, appropriate for sample sizes less than 50. The results for both systolic and diastolic pretest and posttest values showed: P-values > 0.05, indicating that all variables were normally distributed. Therefore, parametric testing using the paired t-test was deemed appropriate for analyzing the difference in mean values pre- and post-intervention.

Table 5. Paired t-test Results of Blood Pressure Before and After the Intervention (n = 39)

		Before		After		
Variable	N	Rata – rata (mmHg)	SD	Rata – rata (mmHg)	SD	P
Pre test TD sistolik	39	165,5385	15,97670	149,29	8.069	0,000
Pre test TD sistolik		154,0256	14,36825			
Post test TD diastolik	39	99,5128	6.59295	86.25	2.314	0.000
Post test TD diastolik		89,3077	6.31687			

The paired t-test analysis showed a statistically significant reduction in both systolic and diastolic blood pressure after the 100-meter walking intervention. Systolic blood pressure decreased from 165.54 ± 15.98 mmHg to 154.03 ± 14.37 mmHg, while diastolic blood pressure decreased from 99.51 ± 6.59 mmHg to 89.31 ± 6.32 mmHg. Both reductions were statistically significant ($p < 0.001$) (Table 3).

The paired t-test analysis revealed statistically significant changes in both systolic and diastolic blood pressure after the walking intervention: Both p-values were less than 0.05, confirming that the observed reductions in blood pressure were statistically significant. These results affirm the alternative hypothesis that walking 100 meters influences blood pressure in hypertensive patients. (Bress et al., 2024)

This study supports the assertion that simple, low-intensity physical activity, such as walking, can have a beneficial impact on cardiovascular parameters, particularly blood pressure. The mechanism of action is believed to involve: Reduction of sympathetic nervous system activity; Decreased total peripheral vascular resistance, Improved baroreflex sensitivity, and Decreased plasma volume and increased vessel elasticity. (Lu et al., 2019)

Such physiological adaptations can be achieved even with short-distance walking, making it a feasible intervention for middle-aged and elderly populations who may not be capable of more strenuous activity. The study's findings align with previous literature. Aji (2021) observed similar blood pressure reductions in hypertensive individuals after walking, and (Prima Trisna Aji, Arief Sofyan Baidhowy, Zuniati, 2025) described the underlying physiological responses that explain this effect. In another local study Aji et al. (2025), morning walks showed effectiveness in lowering blood pressure among the elderly with hypertension (Kiernan et al., 2024).

DISCUSSION

The results of this study showed that The results of this study showed that an intervention consisting of walking 100 meters daily for 7 consecutive days had a significant effect on reducing both systolic and diastolic blood pressure in middle-aged hypertensive patients in the Plesungan area, Karanganyar. This blood pressure reduction was supported by the paired t-test results, which revealed a p-value of <0.001 for both systolic and diastolic blood pressure, leading to the acceptance of the alternative hypothesis (Aji & Sani, 2021).

The study demonstrated that routinely walking 100 meters for 7 days significantly lowered both systolic and diastolic blood pressure in middle-aged hypertensive patients. Systolic blood pressure decreased from 165.53 mmHg to 154.02 mmHg, while diastolic blood pressure dropped from 99.51 mmHg to 89.31 mmHg. These reductions were statistically significant, with p-values less than 0.001 based on the paired t-test. (Baiq Eka Putri Saudia, 2021)

A decrease of 10–12 mmHg in systolic pressure and 10 mmHg in diastolic pressure is not only statistically significant but also clinically meaningful. According to a meta-analysis (Liu et al., 2024), a 10 mmHg reduction in systolic blood pressure can reduce the risk of stroke by 27% and coronary heart disease by 20%. More recent evidence reinforces this point: (Lefferts et al., 2023) reported that increasing daily walking steps by 3,000 was associated with a 7 mmHg reduction in systolic blood pressure among hypertensive adults, while Firmansyah and Hardianti (2024) confirmed that 20–30 minutes of consistent walking significantly reduced blood pressure in Indonesian patients. (Harahap et al., 2023)

1. Impact of a 100-Meter Walking Activity on Hypertension Management

Walking is a form of light aerobic exercise that is easy to perform across all age groups, including middle-aged and elderly individuals. This activity can enhance circulatory function, reduce peripheral vascular resistance, and activate the parasympathetic system, resulting in a relaxation effect on the body (Aji, Armiati, et al., 2025). This study demonstrates that walking a distance of only 100 meters can lead to an average reduction in systolic blood pressure by 11.51 mmHg and diastolic pressure by 10.20 mmHg. Even a modest decrease in blood pressure as little as 2 mmHg has been shown to reduce the risk of stroke by 10% and coronary heart disease by 7%. These findings are highly significant. (Malem et al., 2024)

2. Physiological Explanation

Physiologically, physical exercise such as walking stimulates various adaptations that lead to a reduction in blood pressure. These include peripheral vasodilation through increased production of nitric oxide (NO) by the endothelium, decreased sympathetic nervous system activity which reduces vascular tone and heart rate, and enhanced baroreceptor sensitivity, which helps lower total peripheral resistance (TPR), blood pressure, and resting cardiac output (Pesova et al., 2023)

Walking a distance of 100 meters is considered a light physical activity that is easy to perform and safe. A systematic review conducted by Li et al. (2023) found that simple physical activities, such as walking for at least ten minutes, can lower systolic blood pressure by up to 7.4 mmHg. Therefore, the results of this study are consistent with those global findings. Additionally, walking has the advantage of being highly flexible, not requiring any equipment, and being easily adapted to an individual's physical condition. In this study, a light but consistent walking routine proved capable of generating significant changes within a relatively short period (1 week) (Zhang et al., 2021).

This finding is also consistent with research by Aji (2021), which stated that high blood pressure in hypertensive patients can be reduced by improving blood circulation,

strengthening the heart, and increasing arterial elasticity all of which contribute to blood pressure reduction through activity therapy. Recent evidence by Blodgett et al. (2024) also demonstrated that short bouts of low-to-moderate intensity walking enhanced endothelial function and reduced resting blood pressure in older adults (Pujiyanto;, 2022).

Physical exercise also lowers levels of vasoconstrictor hormones such as angiotensin II and increases relaxation hormones such as prostacyclin. In this context, walking functions as a form of light exercise that still provides substantial benefits without requiring high intensity, which might be difficult for middle-aged individuals with hypertension to perform (Aji & Sani, 2021).

A person engaging in light physical activity will experience increased blood circulation throughout the body. This results in enhanced tissue metabolism and the excretion of metabolic waste through sweat and urine. This combination plays a role in maintaining stable blood pressure. As a low-intensity form of exercise, walking also has a positive effect on blood pressure control without increasing the risk of injury, which is especially important for middle-aged populations with physical limitations. (Monfared et al., 2024)

CONCLUSIONS AND RECOMMENDATION

This study demonstrates that walking 100 meters daily for 7 days leads to a significant reduction in both systolic and diastolic blood pressure among middle-aged hypertensive patients in the Plesungan area of Karanganyar. The average reduction in systolic blood pressure was 11.51 ± 4.28 mmHg, while diastolic blood pressure decreased by 10.20 ± 4.19 mmHg.

Effectiveness of Walking Intervention: The paired t-test results indicated a statistically significant difference in both systolic and diastolic blood pressure before and after the intervention (p-value < 0.001). This finding demonstrates that the 100-meter walking intervention is an effective non-pharmacological therapy for lowering blood pressure in hypertensive patients.

The Role of Independent Nursing Intervention: Walking 100 meters has been shown to be an effective independent nursing intervention that is affordable, safe, and easy for hypertensive patients to implement in order to significantly lower blood pressure.

Recommendations; Community nurses and clinical nurses are encouraged to incorporate physical exercise, specifically a 100-meter walk, into nursing interventions for hypertensive patients. This integration should occur in both healthcare facilities and community settings.

For hypertensive patients, patients with hypertension are advised to do walking activities of at least 100 meters routinely every day as part of a healthy lifestyle change that can support the success of therapy.

For health institutions and village governments, collaborative efforts are needed from village officials, health centers, and health workers to develop an organized walking group program for middle-aged and elderly people.

For further researchers, it is recommended to conduct further research with a longer intervention period, involving a larger control group, and considering additional variables such as body mass index (BMI), salt consumption, and stress levels in order to obtain a more comprehensive understanding.

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