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Email : editorijhess@gmail.com

The Effect Of Brisk Walking Exercise On Blood Pressure In Elderly Hypertension In The Working Area Of The Gajah Ii Community Health Center

Cherlina Pramushinta[1)], Dewi Hartinah[2)],Muhamad Jauhar[3)]
[1,2,3)]Program Studi S1 Keperawatan Fakultas Ilmu Kesehatan Universitas Muhammadiyah Kudus

*Corresponding Author
Email : cherlinshinta02@gmail.com

Abstract

Hypertension is a non-communicable disease that often occurs in the elderly and can cause serious complications if not properly controlled. One non-pharmacological therapy that can be done is brisk walking exercise. This study aims to determine the effect of brisk walking exercise on blood pressure in elderly people with hypertension in the Gajah II Community Health Center work area. The study used a quasi-experimental design with a pretest-posttest approach with a control group. The study sample consisted of 36 respondents who were divided into an intervention group and a control group using a total sampling technique. The intervention group was given brisk walking exercise for 20–30 minutes three times a week for two weeks, while the control group was only given health education. Blood pressure was measured using a digital sphygmomanometer before and after the intervention. Data analysis used a paired sample t-test and an independent sample t-test. The results showed that the average systolic blood pressure in the intervention group decreased from 174.06 mmHg to 128.67 mmHg and diastolic from 101.39 mmHg to 83.11 mmHg. Statistical tests showed a significant effect of brisk walking exercise on reducing blood pressure, with a p-value of 0.001 for systolic and 0.011 for diastolic blood pressure. It was concluded that brisk walking exercise is effective as a non-pharmacological therapy to help control blood pressure in elderly hypertensive patients.

Keywords: Brisk Walking Exercise, Hypertension, Blood Pressure, Elderly, Non-Pharmacological Therapy.

INTRODUCTION

Hypertension, or high blood pressure, is a leading cause of global death in both developed and developing countries. It is known as the silent disease because it often has no symptoms, so many sufferers are unaware of their blood pressure before undergoing a test. However, hypertension is a non-communicable disease (NCD) that, if left untreated, can cause damage to the heart, kidneys, eyes, brain, and other organs (Nirnasari et al., 2022; Inayah & Reza, 2021). In Indonesia, hypertension cases continue to increase annually and have a significant impact on individuals, families, communities, and the nation. The burden on families is evident from the need for routine care to high medical costs. For the country, hypertension increases healthcare expenditures and reduces economic productivity (Solehudin et al., 2023; Pradono et al., 2020).

According to the World Health Organization (WHO, 2023), approximately 1.28 billion people aged 30–79 worldwide have hypertension, and only 21% are able to control their blood pressure. In Indonesia, the prevalence of hypertension reaches 34.1%–36% (Ministry of Health, 2023), while in Central Java, it is estimated that there are more than 8 million sufferers, or 38.2% of the population (Central Java Health Office, 2023). Based on the Demak Regency Health Profile (2023), the target population of hypertension sufferers aged 20 years and over reached 309,281, with the highest number of cases in the Gajah II Community Health Center (Puskesmas Gajah II) working area in Wilalung Village, with 212 cases. This data indicates that hypertension remains a health problem that requires serious attention.

The high incidence of hypertension is influenced by internal and external factors. Internal factors include age, gender, and family history, while external factors include obesity, stress, smoking, lack of physical activity, and excessive salt consumption (Hartinah et al., 2019; Purwanto & Rajab, 2023). Furthermore, increasing age causes decreased blood vessel elasticity, making blood pressure more susceptible to increases (Purwono et al., 2020). Uncontrolled hypertension can lead to serious complications such as stroke, heart disease, chronic kidney failure, blindness, and dementia.

Psychological impacts such as stress and anxiety can also worsen the patient's condition, increasing the risk of disability and death (Saudah et al., 2020).

Hypertension can be controlled through pharmacological and non-pharmacological therapies. However, poor medication adherence, lack of physical activity, and an unhealthy diet remain major barriers to hypertension management (Yusuf et al., 2023; Indriana et al., 2021). One recommended non-pharmacological intervention is regular physical activity such as brisk walking, a combination of brisk walking and aerobic exercise at a speed of 4–6 km/h for 20–30 minutes per day (Andrianti & Ikhsan, 2021). This exercise can increase heart capacity, improve blood flow, and help lower blood pressure without the side effects of medication.

Research by Nirnasari et al. (2022) showed an average decrease in MAP of 17.95 after a brisk walking exercise intervention. Another study by Juksen et al. (2024) also demonstrated a decrease in diastolic blood pressure after regular exercise. The novelty of this study lies in the intervention's focus on the elderly, taking into account their physical condition, limited mobility, and the duration, frequency, and intensity of exercise tailored to the client's abilities. Besides being safe and affordable, this intervention is expected to become an innovation in nursing services for hypertension management.

Nurses play a crucial role as caregivers, educators, and researchers in this study. Nurses are tasked with monitoring the client's physical condition, providing education on the benefits and techniques of brisk walking exercise, and evaluating the effectiveness of the exercise on blood pressure (Saragih, 2022). Based on this phenomenon, researchers are interested in conducting research on the effect of brisk walking exercise on blood pressure in elderly people with hypertension in the Gajah II Community Health Center (Puskesmas Gajah II) work area.

RESEARCH METHODS

This study used a quasi-experimental design with a pre- and post-test design with a control group. Experimental research aims to determine the effect of one variable on another variable under strict control (Priadana & Sunarsi, 2021). In this study, the intervention group received brisk walking exercise after an initial blood pressure measurement (pretest), followed by a re-measurement (posttest) after the intervention. Meanwhile, the control group received only blood pressure measurements without any intervention. The study was conducted in Wilalung Village, Gajah District, Demak Regency, within the Gajah II Community Health Center (Puskesmas Gajah II) working area in August 2025. The intervention was conducted three times a week for two weeks.

The independent variable in this study was brisk walking exercise, a moderate physical exercise consisting of brisk walking with an aerobic pattern, performed for 20–30 minutes at a speed of 4–6 km/h, three times a week for two weeks. The exercise intensity was considered moderate, indicated by slightly faster breathing, but respondents were still able to speak. The dependent variables in this study were systolic and diastolic blood pressure, measured using a new Elvasense BP310 digital sphygmomanometer and a blood pressure observation sheet.

The population in this study was all elderly people with hypertension in Wilalung Village, within the Gajah II Community Health Center (Puskesmas). Based on data from the past three months, 36 elderly people with hypertension were recruited. The study sample used a total sampling technique, meaning all those who met the inclusion criteria were selected as respondents (Priadana & Sunarsi, 2021). The 36 respondents were divided into two groups: 18 respondents in the intervention group and 18 respondents in the control group. Inclusion criteria included elderly people diagnosed with hypertension by a healthcare professional, having a blood pressure of ≥140/90 mmHg, no extremity weakness, and no visual impairment. Exclusion criteria included elderly people with serious complications such as stroke, heart disease, or kidney failure, unwillingness to participate, or failure to follow the three-times-weekly intervention schedule.

Data collection was conducted after the researcher obtained permission from Muhammadiyah University of Kudus and the Demak Health Office. The researchers then conducted a data survey of hypertension patients at Gajah II Community Health Center and sought permission from the village midwife and the village head in Wilalung Village. Respondents who met the inclusion criteria were given an explanation of the study and signed a consent form. The researchers also provided the respondents and their accompanying family members with a standard operating procedure (SOP) for brisk walking exercises. The intervention group performed the exercises for 20–30 minutes in the morning before 11:00 a.m., three times a week for two weeks, while the control group received no intervention but continued education on hypertension management. After the intervention, blood pressure was measured again in both groups using an Elvasense BP310 digital sphygmomanometer, and the results were analyzed using computer software.

The research instruments used included the SOP for brisk walking exercises, an Elvasense BP310 digital sphygmomanometer, and a blood pressure observation sheet. The collected data were then processed through editing, coding, data entry, and tabulation (Priadana & Sunarsi, 2021). Variables such as gender, education, occupation, income, and medical history were coded to facilitate data processing. Data analysis was performed using univariate and bivariate methods. Univariate analysis was used to describe the distribution of respondent characteristics and blood pressure in the form of mean, median, standard deviation, minimum, maximum, frequency, and percentage. Bivariate analysis was conducted to determine the effect of brisk walking exercise on blood pressure in elderly hypertensive patients. Normality test using Shapiro Wilk was conducted to determine the distribution of data. If the data is normally distributed with a p value>0.05, a paired t-test was used to determine the difference in blood pressure before and after the intervention in each group, and an independent t-test to determine the effect of the intervention between the control group and the intervention group. A p value <0.05 indicates a significant difference or effect.

RESULTS AND DISCUSSION

Characteristics of Hypertensive Clients

Table 1 shows that the mean age of hypertensive clients in the intervention group was 70.94 years with a standard deviation (SD) of 3.903 and an age range of 67–78 years. In the control group, the mean age was 71.39 years with an SD of 3.534 and an age range of 67–77 years. The median age in the intervention group was 69 years, while in the control group it was 70 years.

Table 1. Characteristics of Hypertensive Clients Based on Age (n=36)

Group	N	Mean	SD	Median	Min	Max
Intervensi	18	70,94	3,903	69	67	78
Kontrol	18	71,39	3,534	70	67	77

Based on the characteristics of the respondents, the majority of clients in the intervention and control groups were female (12 clients (66.7%). The highest education level was high school/equivalent, namely 12 clients (66.7%) in the intervention group and 10 clients (55.6%) in the control group. The majority of respondents were farmers (10 clients (55.6%) in both groups. Most respondents had incomes below the minimum wage in Demak Regency (16 clients (88.9%). A history of hypertension ≥6 months was found in 14 clients (77.8%) in the intervention group and 13 clients (72.2%) in the control group.

Table 2. Characteristics of Hypertension Clients Based on Gender, Education, Occupation, Income, and Medical History (n=36)

Characteristics	Intervensi f (%)	Kontrol f (%)
Gender		
Man	6 (33,3)	6 (33,3)
Woman	12 (66,7)	12 (66,7)
Education		
Elementary school/equivalent	2 (11,1)	3 (16,7)
Junior high school/equivalent	4 (22,2)	5 (27,8)
High school/equivalent	12 (66,7)	10 (55,6)
Work		
Doesn't work	2 (11,1)	2 (11,1)
Farmer	10 (55,6)	10 (55,6)
Trader	4 (22,2)	3 (16,7)
Factory workers	2 (11,1)	3 (16,7)
Income		
Have no income	2 (11,1)	2 (11,1)
< Demak Minimum Wage	16 (88,9)	16 (88,9)
History of Hypertension		
< 6 months	4 (22,2)	5 (27,8)
≥ 6 months	14 (77,8)	13 (72,2)

Average Systolic and Diastolic Blood Pressure

Before the intervention, the average systolic blood pressure in the intervention group was 174.06 mmHg and the diastolic blood pressure was 101.39 mmHg. After brisk walking exercise, blood pressure decreased to 128.67 mmHg systolic and 83.11 mmHg diastolic. In the control group, the average pre-intervention blood pressure was 178 mmHg systolic and 104.83 mmHg diastolic, while after the study, it decreased to 177.78 mmHg and 104.56 mmHg, indicating a relatively small decrease.

Table 3. Average Blood Pressure of the Intervention Group (n=18)

Blood pressure	Mean	SD
Sistolik Pretest	174,06	15,994
Diastolik Pretest	101,39	4,104
Sistolik Posttest	128,67	6,463
Diastolik Posttest	83,11	4,086

Table 4. Average Blood Pressure of the Control Group (n=18)

Blood pressure	Mean	SD
Sistolik Pretest	178,00	16,121
Diastolik Pretest	104,83	7,197
Sistolik Posttest	177,78	16,075
Diastolik Posttest	104,56	7,350

Normality and Homogeneity Test

The Shapiro-Wilk normality test results showed that the pretest systolic blood pressure data for the intervention group had a p-value of 0.002, indicating a non-normal distribution. The other variables had p-values >0.05 and were considered normal. To confirm these results, skewness and kurtosis tests were performed, with all data falling within the range of -2 to +2, thus deeming the data distribution normal.

Table 5. Shapiro Wilk Normality Test for Pretest Blood Pressure

Variables	Group	p Value
Sistolik Pretest	Intervention	0,002
	Control	0,362
Diastolik Pretest	Intervensi	0,063
	Kontrol	0,525

Table 6. Skewness and Kurtosis Test of Pretest Blood Pressure

Variables	Group	Skewness	Kurtosis
Sistolik Pretest	Intervention	1,93	-0,46
	Control	0,67	-0,77
Diastolik Pretest	Intervention	1,40	-0,36
	Control	-0,02	0,11

The results of the homogeneity test showed that the pretest blood pressure data between the intervention and control groups were homogeneous with a systolic p value of 0.665 and a diastolic p value of 0.300.

Table 7. Pretest Blood Pressure Homogeneity Test

Variables	p Value
Pretest Sistolik	0,665
Pretest Diastolik	0,300

Blood Pressure Differences Before and After Intervention

The results of the paired sample t-test showed a significant reduction in blood pressure in the intervention group. The average reduction in systolic blood pressure was 45.833 mmHg (p=0.000) and diastolic blood pressure was 18.278 mmHg (p=0.000). No significant reduction was found in the control group, with p values of 0.298 for systolic blood pressure and 0.236 for diastolic blood pressure.

Table 8. Paired Sample T-Test Results

Variables	Mean	SD	p Value
Pre-Post Sistolik Intervensi	45,833	13,544	0,000
Pre-Post Diastolik Intervensi	18,278	4,800	0,000
Pre-Post Sistolik Kontrol	0,222	0,878	0,298
Pre-Post Diastolik Kontrol	0,278	0,958	0,236

The Effect of Brisk Walking Exercise on Blood Pressure

The results of the independent sample t-test showed an effect of brisk walking exercise on blood pressure in elderly hypertensive patients. The p-value for the systolic posttest was 0.001 and the diastolic was 0.011, indicating a significant difference between the intervention and control groups after treatment.

Table 9. Results of the Independent Sample T-Test Posttest

Variables	p Value
Posttest Sistolik	0,001
Posttest Diastolik	0,011

Discussion

The results showed that the average age of respondents was in the elderly group, namely 70.94 years in the intervention group and 71.39 years in the control group. Increasing age causes a decrease in blood vessel elasticity, thereby increasing the risk of hypertension (Nurleny & Hidayati, 2025). These results align with research (Sari et al., 2020), which states that hypertension often occurs in people aged ≥70 years due to physiological changes in blood vessels. The majority of respondents were female, as evidenced by research (N. K. Y. Lestari & Saraswati, 2024) and (Mulia et al., 2020). The risk of hypertension in women increases after menopause due to a decrease in the hormones estrogen and progesterone, which function to maintain blood vessel elasticity (Ayukhaliza & Ismah, 2024). Most respondents had a high school education or equivalent. Education level influences a

person's ability to understand health information and adherence to hypertension management (Sulassri et al., 2023). The majority of respondents worked as farmers with incomes below the minimum wage in Demak Regency. This condition is associated with strenuous physical activity, exposure to weather, economic stress, and limited access to employment, which can increase the risk of hypertension (Muchlis et al., 2024; Khafidoh & Sari, 2024). Most respondents had also suffered from hypertension for ≥6 months, putting them at risk of complications if blood pressure is not controlled (Inayah & Reza, 2021).

Before the intervention, the intervention group had an average systolic blood pressure of 174.06 mmHg and a diastolic blood pressure of 101.39 mmHg, which is classified as stage 2 hypertension according to JNC VII (Rejo et al., 2021). This finding aligns with studies (Lestari et al., 2022) and (Mikawati et al., 2024), which showed that the blood pressure of hypertensive respondents was above the normal range before the intervention. After brisk walking exercise, blood pressure decreased to 128.67 mmHg systolic and 83.11 mmHg diastolic. These results are supported by research (Leli & Wahyuni, 2023) and (Fitriani et al., 2021), which states that regular physical activity can increase blood flow, decrease peripheral resistance, and improve cardiovascular function, resulting in more stable blood pressure. In the control group, the reduction in blood pressure was minimal because they were only given education about healthy eating, so the effects were more long-term than the physical activity intervention (Rohman et al., 2023).

The results of the paired sample t-test showed a significant difference in blood pressure before and after the intervention in the intervention group, with a p-value of 0.000, for both systolic and diastolic blood pressure. These results align with research (Lestari et al., 2022) and (Mulia et al., 2020), which demonstrated that brisk walking exercise is effective in lowering blood pressure. This exercise, a moderate-intensity aerobic activity involving large muscles, can increase muscle contraction, heart rate capacity, and oxygen and nutrient supply to body tissues (Masadah et al., 2021). In contrast, the control group showed no significant changes because education without physical activity had no direct effect on blood circulation and heart function (Julistyanissa et al., 2022).

Results of an independent sample t-test showed a significant effect of brisk walking exercise on reducing blood pressure in elderly hypertensives, with a p-value of 0.001 for systolic blood pressure and 0.011 for diastolic blood pressure. This finding aligns with studies (Lestari et al., 2022) and (Juksen et al., 2024), which found brisk walking exercise to be effective in lowering both systolic and diastolic blood pressure. This activity can increase metabolism, burn fat, improve heart and lung function, and provide psychological benefits such as reducing stress and improving sleep quality (Fitriani et al., 2021). The WHO also recommends regular physical activity as a baseline treatment for hypertension before pharmacological therapy (Yu et al., 2021). However, this exercise is not recommended for seniors with severe hypertension, unstable heart disease, or musculoskeletal disorders, as it can exacerbate health conditions (Fitriani et al., 2021).

The limitations of this study lie in the physical condition and time constraints of the respondents, which were difficult to control during the intervention. Some seniors were unable to follow the full exercise schedule, requiring researchers to find replacement participants to meet the sample size.

CONCLUSIONS

The results showed that the average age of the elderly in the intervention group was 70.94 years, while in the control group it was 71.39 years. The majority of hypertensive clients in both groups were female (12 clients (66.7%), with a high school or equivalent education level. Most worked as farmers (10 clients (55.6%). Most respondents had incomes below the Demak Regency minimum wage (UMR), 16 clients (88.9%), and the majority had suffered from hypertension for ≥6 months (14 clients (77.8%) in the intervention group and 13 clients (72.2%) in the control group.

Blood pressure decreased in the intervention group after brisk walking exercise. Before the intervention, the average systolic blood pressure was 174.06 mmHg and diastolic blood pressure was 101.39 mmHg, while after the intervention, it decreased to 128.67 mmHg and 83.11 mmHg. Meanwhile, the control group did not show a significant reduction in blood pressure as in the intervention group. Statistical tests showed a significant difference in blood pressure before and after the intervention in the intervention group with a p-value of 0.000 ($p<0.05$) for both systolic and diastolic blood pressure. Conversely, no significant difference was found in the control group with a p-value of 0.298 for systolic blood pressure and 0.236 for diastolic blood pressure.

The study also demonstrated that brisk walking exercise significantly reduced blood pressure in elderly hypertensive patients in the Gajah II Community Health Center (Puskesmas Gajah II) work area. This was demonstrated by the results of an independent sample t-test for systolic blood pressure with a p-value of 0.001 ($p<0.05$) and diastolic blood pressure with a p-value of 0.011 ($p<0.05$). Therefore, brisk walking exercise can be an effective non-pharmacological therapy to help control blood pressure in elderly hypertensive patients.

The community, especially the elderly, is encouraged to practice brisk walking exercise regularly 2–3 times a week before 11 a.m., wearing appropriate footwear. This activity will be more beneficial if conducted in groups or with a companion to increase motivation and consistency for the elderly. Healthcare workers at Gajah II Community Health Center are also expected to develop a brisk walking exercise program through elderly community health posts (Posyandu) or healthy exercise groups as a non-pharmacological therapy for hypertension, with regular monitoring and evaluation to ensure optimal implementation.

Educational institutions are expected to develop learning related to non-pharmacological brisk walking exercise therapy for the elderly with hypertension, particularly in the fields of community nursing and geriatric nursing. Furthermore, students are encouraged to engage in community service related to the application of this exercise to improve the quality of life of the elderly. Future researchers are advised to conduct studies with longer intervention durations, add supporting variables such as quality of life and daily physical activity, and compare brisk walking exercise with other non-pharmacological interventions to obtain more comprehensive research results.

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