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Healthy heart exercises to control blood pressure in elderly with hypertension

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Abstract

Background: Hypertension is a common health problem among the elderly and can lead to serious complications if left uncontrolled. One non-pharmacological effort is healthy heart exercise, which increases blood vessel elasticity, improves circulation, and lowers blood pressure.

Purpose: To determine the effect of healthy heart exercise on blood pressure in elderly people with hypertension.

Method: This is a pre-experimental study with a time series design. The sample consisted of 23 elderly people selected using a purposive sampling technique. The intervention, which included healthy heart exercise, was conducted over three consecutive days, each lasting 30 minutes. The research instruments used were a mercury sphygmomanometer, a stethoscope, the Healthy Heart Exercise Standard Operating Procedure (SOP), and an observation sheet. Systolic and diastolic blood pressure data were measured daily before and after the intervention. Statistical analysis used a paired-sample t-test.

Results: Univariate analysis showed that the mean blood pressure before exercise on the first day was 149.65/89.48 mmHg, on the second day 148.96/88.00 mmHg, and on the third day 146.70/91.04 mmHg. Bivariate analysis showed a significant decrease after exercise, with blood pressure dropping to 145.48/87.30 mmHg on the first day, 145.65/84.52 mmHg on the second day, and 144.09/87.30 mmHg on the third day ($p=0.000 < 0.05$).

Conclusion: Elderly can consistently and regularly perform this heart-healthy exercise three times a week to obtain optimal benefits, as a therapeutic modality for controlling blood pressure.

Keywords: Elderly; Healthy Heart Exercise; Hypertension.

INTRODUCTION

An elderly person is an individual who has reached the age of 60 years or over (Raudhoh & Pramudiani, 2021). Increasing expected lifespan in older adults can impact various aspects of their lives, including changes in psychological, physical, biological, and social conditions. This can also lead to the emergence of more degenerative diseases as a result of the aging process (Maryam, Ekasari, Rosidawati, Jubaedi, & Batubara, 2008; Sumarni, Mamlukah, Suparman, Ropii, Lukman, Jamaludin, & Sudrajat, 2021).

The aging process is a natural phase in human life, which starts from birth until reaching old age (Miller, 2009; Fahriyah, Winahyu, & Ahmad, 2021). The aging process includes various theories of aging,

biological elements involved in accelerating aging, as well as other stages of the aging process at the cellular level, the aging process according to the body system, and psychological aspects of the aging process (Holidi, 2020). As age increases, physiological abilities decline. Various degenerative diseases begin to emerge, coupled with the accumulation of unhealthy lifestyle habits among the elderly, resulting in many health problems experienced by the elderly (Sholekah, Luthfa, & Aspihan, 2024). Common health problems experienced by the elderly include malnutrition, difficulty maintaining balance, and sudden confusion. In addition, there are several diseases that often

appear in the elderly, such as hypertension, hearing loss, vision problems, and osteoporosis (Ministry of Health of the Republic of Indonesia, 2025).

In 2023, Indonesia experienced 33.9% hypertension, while in West Java it was 34.4% (Ministry of Health of the Republik of Indonesia, 2023). According to data from the Cimahi City Health Office, the target for hypertension in 2024 reached 57,955. The three highest hypertension targets were found in the South Cimahi Community Health Center (6,853), the Central Cigugur Community Health Center (6,647), and the Cibereum Community Health Center (6,131) (Health Office of Cimahi City, 2024).

The physical impacts of hypertension can be identified through blockages in the coronary arteries and heart attacks, increased left ventricular size, heart failure, triggering cerebral vascular problems, and hardening of the coronary arteries, and are a major contributing factor to death (Seftiani, Hendra, & Maulana, 2018; Prastika, & Siyam, 2021). Hypertension has various effects on the elderly which include physical, mental, and economic aspects (Arindari & Puspita, 2022).

Nurses play a role in preventative measures through adopting a quality lifestyle, getting adequate sleep, quitting smoking, managing mental stress, and engaging in exercise such as yoga, walking, hypertension exercises, elderly exercises, and tera exercises (Moonti, Rusmianingsih, Puspanegara, Heryanto, & Nugraha, 2022; Ramadhani & Santik, 2022; Nindiana, Purwanto, & Nulhakim, 2023).

The results of the study demonstrate the impact of healthy heart exercise and its effect on blood pressure. A previous study found that the effect of heart exercise on blood pressure was found in 15 participants per group. The average blood pressure in the experimental group after the treatment was 133.00/83.53 mmHg, while the average blood pressure in the control group was 137.21/85.48 mmHg. In conclusion, heart exercise is effective in lowering systolic blood pressure in the elderly (Fadlilah & Sucipto, 2020).

A study on 20 participants showed that the results before and after the heart exercise intervention showed an average value of 166.50 mmHg. After the heart exercise, the average blood pressure was 137.50 mmHg. Meanwhile, diastolic blood pressure before cardiac exercise was recorded at an average of 104.00 mmHg, and after, the average value was

79.00 mmHg (Baeha, Tobing, Waruwu, BZebua, & Nababan, 2020).

Healthy heart exercise is a series of physical activities designed to consider the importance of heart movement, large muscle mass, and joints, so that the body can obtain an optimal oxygen supply. Healthy heart exercise is particularly beneficial for older adults with a history of hypertension because it increases the energy needs of cells, tissues, and organs. This results in increased cardiac output and increases arterial blood pressure. After arterial blood pressure increases, the next step is to enter a resting phase. During this phase, sympathetic nervous system activity and epinephrine levels decrease, while sympathetic nerve activity increases, ultimately leading to a decrease in heart rate, which in turn lowers blood pressure (Saragih, Ginting, Barus, & Sitepu, 2023).

RESEARCH METHOD

This experimental study used pre-experimental, pre-test, and post-test designs, employing a time series design. The aim was to measure the impact of healthy heart exercise on lowering blood pressure in elderly people with hypertension, both before and after the intervention (post-test). The population consisted of elderly people in Cigugur Tengah Community Health Center with a history of hypertension, with a sample size of 23. The sampling method used was purposive sampling.

The inclusion criteria in the study were elderly aged ≥ 60 years; elderly with hypertension accompanied by blood pressure $\geq 140/90$ mmHg; elderly able to do physical activity; elderly taking antihypertensive medication. The exclusion criteria in the study were elderly with hypertension accompanied by systolic blood pressure > 180 mmHg and diastolic blood pressure > 110 mmHg (grade 3 hypertension); elderly with complaints of dizziness, headache, chest pain, fatigue, weakness; elderly with a history of other diseases such as stroke, kidney failure, heart failure, and diabetes mellitus (DM).

The steps taken included a pre-test, which measured blood pressure before the healthy heart gymnastics (intervention), and a post-test, which measured blood pressure 10 minutes after the intervention. The intervention was conducted in the afternoon and was administered three times, once daily, for 30 minutes.

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The measuring instruments used in the study were the Healthy Heart Gymnastics Standard Operating Procedure (SOP), a mercury sphygmomanometer, and a stethoscope. Univariate analysis in the study explained the mean values. Bivariate analysis used

paired sample t-tests for statistical analysis. This study passed ethical approval from the Unjani Health Sciences Research Ethics Committee, with the permit number 021/KEPK/FITKes-Unjani/VII/2025, in July 2025.

RESEARCH RESULTS

Table 1. Characteristics of Participants (N=23)

Variable	Results
Age (Mean±SD)(Range)(Year)	(61.5±5.73)(60-69)
Gender (n/%)	
Female	17/73.91
Male	6/26.08
Duration of Hypertension (n/%)	
≤ 5 years	10/43.48
> 5 years	13/56.52

Table 1 shows that of the 23 elderly with a history of hypertension, the average age was 61.5 years (SD±5.73). Most of the participants were women (73.91%), and half of the participants had suffered from hypertension for > 5 years (56.52%).

Table 2. Effect of Blood Pressure Before and After

Blood Pressure	The First Day			The Second Day			The Third Day		
	(Mean±SD) (Min-Max)	S.E	p-value	(Mean±SD) (Min-Max)	S.E	p-value	(Mean±SD) (Min-Max)	S.E	p-value
Before									
Systole	(149.65±6.596) (146.80-152.50)	1.375		(148.96±5.321) (146.66-151.26)	1.110		(146.70±4.456) (144.77-148.62)	0.929	
Diastol	(149.65±6.596) (86.30-92.65)	1.531		(88.00±5.878) (85.46-90.54)	1.226		(91.04±4.507) (89.09-92.99)	0.940	
After			0.000			0.000			0.000
Systole	(145.48±6.557) (142.64-148.31)	1.367		(145.65±4.657) (143.64-147.67)	0.971		(144.09±3.884) (142.41-145.77)	0.810	
Diastol	(87.30±7.022) (84.27-90.34)	1.464		(84.52±5.230) (82.26-86.78)	1.091		(87.30±4.771) (85.24-89.37)	0.995	

Table 3 shows that the average blood pressure on the first, second, and third days before the healthy heart exercise was 149.65/89.48 mmHg, 148.96/88.00 mmHg, and 146.70/91.04 mmHg, respectively. The standard deviations for systolic blood pressure before the healthy heart exercise were 6.596 mmHg, 5.321 mmHg, and 4.456 mmHg, respectively. The standard deviations for diastolic blood pressure before the healthy heart exercise were 7.341 mmHg, 5.878 mmHg, and 4.507 mmHg. Meanwhile, the average blood pressure on the first, second, and third days after healthy heart exercise was 145.48/87.30 mmHg, 145.65/84.52 mmHg, 144.09/87.30 mmHg with the standard deviation of systolic blood pressure after healthy heart exercise was 6.557 mmHg, 4.657 mmHg, and 3.884 mmHg. The standard deviation of diastolic blood pressure was 7.022 mmHg, 5.230 mmHg, and 4.771 mmHg. The results of statistical tests showed that there was a significant effect on the average systolic and diastolic blood pressure on the first, second, and third days before and after healthy heart exercise in elderly people with hypertension in RW 09, Cigugur Tengah Community Health Center working area with a p value of 0.000 at alpha 5% (0.05).

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DISCUSSION

Mean Blood Pressure Values Before Healthy Heart Exercise in Elderly with Hypertension

As we age, the processes associated with aging and their destructive nature will impact many aspects of an individual. Some physical transformations that occur in older adults include changes in the cardiovascular system. Changes in the cardiovascular system among the elderly include an increase in heart size and an enlarged left ventricle. This condition can reduce the heart's ability to stretch. These changes are caused by modifications in the connective tissue, which can potentially lead to various diseases, such as heart failure and high blood pressure (Sari, Hidayati, & Wibowo, 2024).

According to the World Health Organization, there are a number of modifiable risk factors for individuals with hypertension. These include unhealthy diets, such as excessive salt consumption, consuming foods high in saturated and trans fats, and low fruit and vegetable consumption. In addition, lack of physical activity, smoking, alcohol consumption, and weight problems such as being overweight or obese can also be changed (World Health Organization, 2023). The study, conducted on the first, second, and third days, revealed that all participants had poor eating habits and did not adhere to a low-salt diet properly. Participants reported still consuming fried foods and salted fish. Foods rich in fat and salt that we enjoy every day can increase the risk of hypertension. The fats in these foods can adhere to the surface of blood vessel walls, causing plaque to form, reducing the width of the blood vessels (Annisaa, Anam, Sasikirana, Dianingati, & Wulandari, 2020). On the third day, there was an increase in average diastolic blood pressure before the healthy heart exercise program, reaching 91.04 mmHg and after the healthy heart exercise program, reaching 87.30 mmHg. Several participants reported having difficulty sleeping at night. Poor sleep quality can affect the stress hormone cortisol and the sympathetic nervous system, leading to increased blood pressure. Poor sleep results in higher blood pressure, which can lead to hypertension, a trigger for various diseases (Assiddiqy, 2020).

These results align with previous research which found that elderly people aged 60–70 years tend to have high blood pressure before the healthy heart exercise program, due to decreased blood vessel

elasticity and cardiovascular function due to the aging process. The results of 21 elderly participants who received treatment before the healthy heart exercise program showed an average blood pressure of 156/87 mmHg. The results of the study on 21 participants after receiving the healthy heart exercise intervention showed an average decrease in blood pressure to 130/68 mmHg with a p-value of $0.000 < \alpha = 0.05$. This means that H_0 is rejected and H_a is accepted, indicating a significant change in systolic and diastolic blood pressure after receiving healthy heart exercise therapy (Liando, Podung, & Tombokan, 2024). This similarity indicates that age, lack of regular physical activity, and unhealthy lifestyle habits contribute to the high initial blood pressure before the healthy heart exercise intervention.

The results of the reduction in systolic and diastolic blood pressure before and after the healthy heart exercise performed for three consecutive days, on the first, second, and third days, showed a decrease. One factor contributing to the significant decrease in blood pressure was the participants' ability to perform the healthy heart exercise properly and correctly. Participants actively participated in each movement, following the standard operating procedure (SOP) for healthy heart exercise, including warm-up, core exercises, and cool-down movements, thus maximizing the benefits of healthy heart exercise. Participants who participated in the healthy heart exercise continued to take their blood pressure-lowering medication (amlodipine).

Average Blood Pressure Values After Healthy Heart Exercise in Elderly with Hypertension

After performing healthy heart exercise for three consecutive days within one week, the participants' systolic and diastolic blood pressure decreased on the first, second, and third days. Healthy heart exercise is a physical activity designed with a primary focus on heart performance, large muscle activity, and joint flexibility, in addition to optimizing oxygen intake. Increasing muscle and joint flexibility can help reduce potential stiffness in both, which can be addressed through a healthy heart exercise program and various other relevant types of exercise (Saragih et al., 2023).

The process by which blood pressure decreases in elderly individuals due to healthy heart exercise is that this activity improves heart performance and

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blood flow back to the heart. Afterward, the patient enters a physiological recovery phase with reduced sympathetic nervous system activity and stress hormones such as epinephrine. This condition affects blood pressure reduction by reducing the activity of the renin-angiotensin-aldosterone system (RAAS), as well as effects similar to natural beta blockers, namely reducing renin production and dilating blood vessels (Septiani, 2025).

These results align with a research which stated that healthy heart exercise is a type of aerobic physical activity that functions to increase blood vessel elasticity, improve blood circulation, and reduce total peripheral resistance, resulting in lower blood pressure. The results of the study on 20 participants showed that the average systolic and diastolic blood pressure before doing healthy heart exercise was 160.6/88.13 mmHg and the average systolic and diastolic blood pressure after doing healthy heart exercise was 146.8/82.8 mmHg with a p-value of $0.000 < \alpha = 0.05$, indicating a decrease in blood pressure in hypertensive patients after healthy heart exercise. These similar findings strengthen the evidence that healthy heart exercise can be a simple, inexpensive, and safe non-pharmacological intervention to help control blood pressure in elderly people with hypertension. Planned exercise movements (warm-up, main phase, cool-down) promote the activation of the parasympathetic nervous system and reduce the function of the sympathetic nervous system, which contributes to reduced levels of stress hormones such as epinephrine and cortisol (Sukmawaty, 2022).

Reducing the renin-angiotensin-aldosterone system (RAAS) also helps enlarge blood vessel diameter and reduce fluid retention, thus enhancing the blood pressure-reducing effect. Based on the discussion of the research results in Table 2, the researchers concluded that healthy heart exercise, performed regularly for three consecutive days, significantly reduced systolic and diastolic blood pressure in elderly people with hypertension in Cigugur Tengah Community Health Center.

The Effect of Healthy Heart Exercise on Lowering Blood Pressure in Elderly Patients with Hypertension

Cardiovascular exercise performed at moderate intensity (70-80%) for 20-40 minutes per session, performed 2-3 times per week, can lower blood pressure in individuals with hypertension by 3.346% (systolic) and 4.273% (diastolic). A consistent

reduction in blood pressure of 5-10 mmHg is a non-drug treatment for hypertension patients that can improve blood flow and stabilize heart valves, thus preventing blood pressure spikes (Ariani, Lestari, & Praghlapati, 2020; Saragih et al., 2023).

These results align with research that found an effect on blood pressure in 18 participants after receiving healthy heart exercise at the Sumberlawang Community Health Center. The average blood pressure of participants before the healthy heart exercise session was 156.28/85.78 mmHg, and the average blood pressure of participants after the healthy heart exercise session was 146.67/83.61 mmHg. The p value was <0.05 , indicating that H_0 was rejected and H_a was accepted. The conclusion is that healthy heart exercise and hypertension exercise have an effect on blood pressure in hypertension patients at the Sumberlawang Community Health Center (Lufianti & Ernawati, 2024). The significant reduction in blood pressure in this study was also influenced by participants' compliance with each healthy heart exercise session according to the SOP, consistent implementation of the intervention for three consecutive days, and continued pharmacological therapy with antihypertensive medications. The combination of non-pharmacological and pharmacological therapies resulted in a decrease in blood pressure.

The advantage of this study compared to previous research lies in the use of a time series design, conducted over three consecutive days within one week. This study involved 23 homogeneous participants, divided into two healthy heart exercise sessions on one intervention day. The goal was to increase the effectiveness of healthy heart exercise for elderly people with hypertension, thus optimizing its benefits. A limitation of this study is that the intervention lasted only three consecutive days, making it incapable of representing the long-term effects of healthy heart exercise on blood pressure. Furthermore, the participants were not on a low-salt diet and were still taking amlodipine.

CONCLUSION

Healthy heart exercise can control blood pressure in elderly people with hypertension. Elderly people can perform it easily and independently, thus improving their health and quality of life.

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SUGGESTION

The research results are expected to provide additional scientific evidence regarding the benefits of healthy heart exercise not only in controlling blood pressure but also in improving sleep quality in elderly people, thereby broadening the scope of effective non-pharmacological interventions for elderly health.

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