



## Relationship between Exercise with Blood Pressure Stability among Hypertension Elderly

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### ABSTRACT

**Objective:** This study aims to determine the relationship between elderly gymnastics and blood pressure stability in elderly hypertension in Porpri Posyandu Lansia Bunulrejo.

**Methods:** This research is correlated with a cross-sectional approach. Samples were chosen by using the purposive sampling technique with inclusion and exclusion criteria, which got 25 people. The variables measured in this study were the elderly gymnastic relationship and blood pressure stability. The test statistic used was Spearman rank correlation with a 95% confidence level.

**Results:** The results of bivariate analysis showed that there was a significant correlation between daily gymnastics and stabilizing blood pressure ( $p = 0,000$ ), with a correlation strength of 0,710.

**Conclusion:** From the research results, it can be concluded that there is a relationship between elderly gymnastics and blood pressure stability in people with hypertension.

**Keywords:** blood pressure, elderly, gymnastics, hypertension

### Introduction

The elderly are included in the risk group or risk population, whose numbers are increasing. Allender, Rector, and Warner (2014) say that a risk group is a group of people whose health problems tend to get worse due to contributing risk factors. Stanhope and Lancaster (2016) said that the elderly in the risk group have three characteristics of health risks: biological risks, which include age-related risks; social and environmental risks; and behavioral

or lifestyle risks. Kiik, Sahar, and Permatasari (2018). Elderly is a condition characterized by a person's failure to maintain balance against physiological stress conditions. This failure is related to a decrease in the ability to live and an increase in individual sensitivity (Haryono, 2012). Aging or old age is the process of slowly disappearing the ability of a tissue to repair, replace, and maintain normal body functions so that it cannot survive against infection and repair the damage suffered (Wahyudi 2012), while the definition of elderly according to the WHO is men and women who have reached the age of 60–74 years.

The elderly, the more degenerative diseases appear in them. One of them is hypertension. Hypertension is a multifactorial disease that arises due to the interaction of various factors. Increasing age will cause several physiological changes; in old age, there is an increase in peripheral resistance and sympathetic activity. Blood pressure will increase after the age of 45–55 years, and the arterial walls will be thickened by the accumulation of collagen in the muscle layer, so that the blood vessels will gradually narrow and become stiff (Setiawan, Greece, & Kusyati, 2014).

Elderly is a person who is over 60 years old (Law No. 13 of 1998). The population is increasing worldwide, with the proportion of people aged 65 and over falling from 6 percent in 1990 to 9.3 percent in 2020. This proportion is expected to increase to 16 percent in 2050, with around 80 percent of the elderly coming from developing countries. developing (BPS 2021). Blood pressure is now the third cause of death in this country after stroke and tuberculosis. This figure is 6.9 percent of the proportion of all causes of death in Indonesia (Mamba, 2017). One of the efforts to maintain the health of the elderly is through a healthy lifestyle that includes exercise, which can be done by anyone, especially the elderly. Physical activity for the elderly can be one of the interventions that can improve people's quality of life. Elderly gymnastics is a sport that can be done at any age. This exercise can really help the elderly body maintain physical fitness because it can help remove free radicals from the body (Manangkot, Valentin, and Sukawana 2016).

Several recent studies have shown that a combination of non-pharmacological therapies is very good for reducing the risk of hypertension. Meanwhile, non-drug therapy can be done by exercising regularly. One of the sports that can be done by seniors is gymnastics. Elderly gymnastics is a light exercise that is easy to do and not burdensome. Elderly exercise activities can train strong bones and encourage the heart to work optimally (Armilawati, 2008). Based on the background above, researchers are interested in conducting research with the title Relationship between Elderly Gymnastics Activeness and Blood Pressure Stability in Elderly Hypertension at PORPRI Elderly Bunulrejo Malang.

### **Objective**

In this study, researchers wanted to find a relationship between elderly exercise and blood pressure stability at PORPRI Posyandu Lansia Bunulrejo. The population of this study was some hypertensive elderly who took part in elderly exercise at PORPRI Posyandu Lansia Bunulrejo.

### **Method**

The research design used is correlation (correlation study). In this study, researchers wanted to find a relationship between elderly exercise and blood pressure stability at PORPRI Posyandu Lansia Bunulrejo. The population of this study consisted of some elderly hypertensives who participated in elderly exercise at PORPRI Posyandu Lansia Bunulrejo,

totaling 68 people. The sample in this study were elderly hypertensives who participated in elderly exercise at PORPRI Posyandu Lansia Bunulrejo with the following criteria: 1. Inclusion criteria a. Hypertensive elderly patients aged 45–75 years b. The patient is willing to be a respondent. c. hypertensive elderly patients who participate in elderly exercise, both active and inactive. 2. Exclusion criteria Patients with severe hypertension who have suffered complications such as stroke, kidney failure, and heart failure, as well as hypertensive patients accompanied by other diseases such as diabetes mellitus, And obtained the number of samples in this study were 25 people.

The data collection instrument in this study was observation by researchers to observe the independent variable, namely elderly exercise performed four times a week. With his assessment of hypertensive elderly who do elderly exercise regularly given a value of 2, elderly who rarely do elderly exercise are given a value of 1, and elderly who have never done or only done once are given a value of 0. Meanwhile, to observe the dependent variable carried out by researchers, they still use ordinal because the measurement of blood pressure will result in normal-high blood pressure if the systolic is 120–139 mmHg, stage 1 hypertension if the systolic is 140–159 mmHg, and stage 2 hypertension if the systolic is 160–179 mmHg. This study uses the Spearman Rank correlation test with a degree of confidence of 95% where the value = 0.05; significant if  $p < 0.05$ , then the research conducted has a relationship, but if  $p > 0.05$ , then the research has no relationship.

## Results

General data on respondent characteristics on the relationship between elderly gymnastics and blood pressure stability in elderly hypertension at PORPRI Posyandu Bunulrejo Elderly

Table 2. Characteristics of Respondents Based on Gender

Variable	f	%	% Valid	% Kumulative
Male	2	8,0	8,0	8,0
Woman	23	92,0	92,0	100,0
<b>Total</b>	<b>25</b>	<b>100,0</b>	<b>100,0</b>	

From the table above, it was found that more than half of the respondents were female. Women with a total of 23 people, or 92%, and a small number of male respondents with a total of 2 people, or 8%.

Table 3. Characteristics of Respondents Based on Age

Variable	f	%	% Valid	% Kumulative
45-59	15	60,0	60,0	60,0
60-74	7	28,0	28,0	88,0
75-90	3	12,0	12,0	100,0
<b>Total</b>	<b>25</b>	<b>100,0</b>	<b>100,0</b>	

From the table above, it was found that most of the respondents were aged between 45 and 59 years, namely 15 people or 60%; almost half of the respondents were aged between 60 and 74 years, namely 7 people or 28%; and very few respondents were aged between 75 and 90 years, namely 3 people or 12%.

Table 4. Characteristics of Respondents Based on Activeness

<b>Variable</b>	<b>f</b>	<b>%</b>	<b>% Valid</b>	<b>% Kumulative</b>
Active Elderly	21	84,0	84,0	84,0
Less Active Elderly	4	16,0	16,0	100,0
<b>Total</b>	<b>25</b>	<b>100,0</b>	<b>100,0</b>	

From the table above, it was found that almost all of the active respondents participated in elderly gymnastics as many as 21 people, or 84% and 4 other people were less active because there were still people working, namely around 16%.

Table 5. Characteristics based on systolic blood pressure before elderly exercise

<b>Variable</b>	<b>f</b>	<b>%</b>	<b>% Valid</b>	<b>% Kumulative</b>
Systolic Blood Pressure 130-139 mmHg	11	44,0	44,0	44,0
Systolic Blood Pressure 140-159 mmHg	7	28,0	28,0	72,0
Systolic Blood Pressure 160-179 mmHg	7	28,0	28,0	100,0
<b>Total</b>	<b>25</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>

From the table above, it was found that almost all respondents had hypertension before doing elderly exercise.

Table 6. Characteristics based on systolic blood pressure after elderly exercise

<b>Variable</b>	<b>f</b>	<b>%</b>	<b>% Valid</b>	<b>% Kumulative</b>
The systolic blood pressure decreased by 10-20 mm Hg	4	56,0	56,0	56,0
Systolic blood pressure decreased 21-30 mm Hg	5	20,0	20,0	76,0
Systolic blood pressure decreased >30 mm Hg	14	16,0	16,0	92,0
Fixed Systolic Blood Pressure	2	8,0	8,0	100,0

From the table above, it was found that the blood pressure of almost all respondents experienced stability after doing regular exercise four times a week.

Table 7. Relationship between elderly gymnastics and blood pressure stability in the elderly with hypertension

			<b>Elderly Exercise Activeness</b>	<b>Decreasing Elderly Exercise Blood Pressure</b>
<b>Spearman's rho</b>	<b>Elderly Exercise Activeness</b>	<b>Correlation Coefficient</b>	1,000	.710**
		<b>Sig. (2-tailed)</b>		,000
		<b>N</b>	25	25
	<b>Blood Pressure After Elderly Exercise</b>	<b>Correlation Coefficient</b>	.710**	1,000
		<b>Sig. (2-tailed)</b>	,000	
		<b>N</b>	25	25

Based on table 4.11 above, the correlation coefficient value is 0.710 and the sig 2 tailed value is 0.000, where the sig value is (0.000 0.05), so  $H_0$  is rejected, which means there is a relationship between elderly exercise and blood pressure stability in elderly hypertension at PORPRI Posyandu Elderly Bunulrejo. Spearman's correlation value (r) is (+) 0.710, which indicates that the correlation (r) is positive and has strong strength (Dahlan, 2004). So there is a relationship between elderly exercise and blood pressure stability.

## Discussion

General data in this study included the characteristics of respondents based on gender, age, education, and occupation. It also displayed specific data for respondents, which included knowledge of the elderly, degrees of hypertension, and differences in systolic and diastolic blood pressure before and after elderly exercise. namely the Bunulrejo Elderly PORPRI, which is located at Jalan Panglima Sudirman No. 104, Bunulrejo Village, Malang City. The chief executive of the Bunulrejo Elderly Posyandu is Mrs. The Bunulrejo Elderly Porpri is part of the working area of the Kedungkerep Health Center, which is located on Jalan Sulfat No. 1. The distance from Porpri to the Health Center is approximately 1 km.

From this research, most of the respondents were aged between 45 and 59 years, and the respondents were mostly women. There was a relationship between elderly exercise and blood pressure stability. Women experiencing menopause are prone to hypertension and other cardiovascular diseases. This is exacerbated by menopause, which usually starts at an early age, when individuals at this age tend to do moderate physical activity, change in body composition, and decrease the function of several organs of the body with age (Widyaningrum 2013). In line with the research of Hermawan (Hernawan 2017) and Mulyadi (Mulyadi et al. 2019), there is an effect of hypertension exercise on elderly blood pressure.

Hypertension can occur in men and women over the age of 45. The frequency of hypertension is higher in women. Slightly compared to men under 45 years, while men aged 45–64 years and women tend to experience hypertension, which has the same prevalence in women. over 65 years of age have a greater tendency to experience hypertension than men (Kristiani et al., 2010). Gymnastics is a sport that can be said to be safe for the elderly because it has a small risk of injury, is fun, and is easy to do. Gymnastics is currently one of the sports

choices for the elderly. Elderly gymnastics is effective for increasing public health status (Clean and Healthy Behavioral Health, Muhammad Faizal, and Citra Delima Bangka Belitung College of Health Sciences 2020) and lowering blood pressure (Yanti et al. 2021).

From the results of the study, before doing elderly exercise, as many as 11 respondents (56%) were included in the category with systolic blood pressure 140 mmHg, 7 respondents (28%) were included with systolic blood pressure of 140–160 mmHg, and 7 respondents (28%) were included with systolic blood pressure >160 mmHg. This shows that most of the respondents have actively participated in elderly exercise, but there are also those whose blood pressure is not stable because some of the respondents have a history of other diseases and do not maintain their diet patterns. The hypertension experienced by respondents is influenced by various kinds of risk factors, both of which can be controlled, such as sports activities, consuming table salt, obesity, and stress, as well as uncontrollable risk factors such as age, sex, and heredity (Harrison, Wilson, and Kasper, 2011).

The elderly can get hypertension due to decreased organ function in the cardiovascular system, heart valves that thicken and become stiff, and a decrease in the elasticity of the aorta and other large arteries (Ismayadi, 2010). In addition, there is an increase in peripheral vascular resistance when the left ventricle pumps, so systolic pressure and afterload increase (Gunawan, 2010). Structural and functional changes in the peripheral vascular system result in changes in blood pressure that occur in old age. These changes include atherosclerosis, loss of elasticity of the connective tissue, and a decrease in relaxation of the smooth muscle of the blood vessels, which results in a decrease in the ability to distend and stretch the blood vessels (Gunawan, 2010).

One of the factors that can lead to increased blood pressure in the elderly is a lack of physical activity, such as exercising regularly (Harrison, Wilson, and Kasper 2010). Lack of physical exercise, such as gymnastics, can lead to hypertension due to decreased cardiac output (cardiac output), so that pumping to the heart becomes less. Lack of physical activity training can cause stiffness in the blood vessels, so that blood flow is blocked and can cause hypertension (Giriwijoyo, 2011).

Factors that affect hypertension in the elderly are caused by increasing age, where in elderly people, the heart will shrink a little, which has decreased a lot, namely the left ventricular cavity due to reduced activity and decreased heart muscle cells, causing a decrease in heart muscle strength. The more a person gets older, the maximum heart rate and other functions of the heart gradually decrease. In the elderly, blood pressure will rise gradually, which can cause hypertension (Azizah, 2011). Judging from the blood pressure in the elderly who have hypertension, there was a decrease in the average systolic and diastolic blood pressure. The decrease in systolic and diastolic blood pressure in elderly people with hypertension occurred because elderly exercise resulted in a decrease in cardiac output and a decrease in total peripheral resistance, resulting in a decrease in blood pressure (Sherwood, 2010).

## **Conclusion**

From general data, it was found that almost all respondents actively participated in elderly gymnastics, in line with research conducted by Abdurrachim (Abdurrachim, Hariyawati, and Suryani 2017) that the more often physical activity is carried out, the more normal the systolic and diastolic blood pressure will be. Physical activity in the form of sport is a health maintenance and muscle-strengthening exercise that aims to enrich and improve basic motor

skills. Programed and regular exercise (3-5 times a week) improves cardiovascular function, improves breathing, prevents muscle wasting, prevents calcification or hardening of the joints, and prevents obesity (Arif, Rusnoto, and Hartinah 2013). It was concluded that exercise can be applied as a management strategy for hypertension, not only for prevention but also to maintain the health of the elderly.

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