



**THE EFFECT OF GYMNASTICS: AEROBIC LOW IMPACT ON REDUCING BLOOD PRESSURE IN HYPERTENSIVE ELDERLY**

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**ABSTRACT**

Hypertension is a non-communicable disease but is a major health problem in the world and is the third largest cause of premature death because its prevalence continues to increase. Prevention of hypertension that can be done is doing aerobic exercise, limiting salt intake. increase your intake of fruits, vegetables, and nuts, a healthy diet, a healthy lifestyle. to determine the Effect of Gymnastics: Aerobic Low Impact on blood pressure in elderly hypertensives in Cemani Village. Quasi-experimental research design (Ramadhani & Santik, 2021) with a pre-test-post test without a control group . The research instrument in this study was a respondent characteristic questionnaire containing gender, age, education and occupation. Sphygmomanometer tension Omron digital and stethoscope. Speakers and MP3s that have music as accompaniment during the intervention, SOPs that are used to explain the steps for Aerobic Low Impact exercises and observation sheets that contain notes on the results of blood pressure measurements before and after the intervention activities and observation sheets that list the participants' attendance. Data analysis in this study was univariate analysis in the form of frequency and percentage distributions and bivariate analysis using the Willcoxon Signed ranks test . The results showed a significant decrease in blood pressure after being given low impact aerobic exercise with an average of 145.79/88.14 mmHg decreased to 128.93/80.79 mmHg. is an effect of Aerobic Low Impact exercise on reducing blood pressure in the elderly.

**Keywords:** blood pressure; elderly; hypertension; low impact aerobics

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**INTRODUCTION**

Old age is the last period of human life, where during this period a person experiences various setbacks such as gradual physical, mental and social decline so that he cannot carry out his daily tasks, decline in bodily functions. Deterioration of body work functions in the elderly can cause hypertension. Hypertension in the elderly can be caused by decreased elasticity of the aortic wall, thickening of the heart valves which stiffen the valves, decreased ability to pump the heart, loss of elasticity of the peripheral blood vessels, and increased peripheral vascular resistance. (Nura r if AH & Kusuma H., 2018). Data from the World Health Organization (WHO) in 2020 shows that nearly 1.56 billion adults in the world have hypertension. Meanwhile, global hypertension is estimated at 22% of the world's total population. Hypertension is a non-communicable disease but is a major health problem in the

world and is the third largest cause of premature death because its prevalence continues to increase (Widia. et.al., 2021).

Hypertension data is based on measurements according to age group at Riskesdes in 2018 aged between 65-74 years by 63.2% and the prevalence of hypertension at ages over 75 years by 69.5% (Ministry of Health, 2019). Hypertension is also a disease that is often called a " silent killer " which sufferers often don't realize because there are no signs of symptoms, but symptoms such as dizziness, nosebleeds, abnormal heartbeat, blurred vision and ringing in the ears can occur when hypertension is at an advanced stage. more severe. If hypertension is not controlled, hypertension has the potential to cause chest pain, heart attack, stroke, and even sudden death. Therefore, routine blood pressure checks are very crucial to do as an effort to prevent hypertension and diseases that may arise as a result. The prevention of hypertension that can be done is exclusive breastfeeding for children, doing aerobic exercise, limiting salt intake. increase the intake of fruits, vegetables, and nuts, a healthy diet, a healthy lifestyle so that you can avoid the onset of hypertension.

One type of exercise that can lower blood pressure in people with hypertension that is easy to do and can be done anywhere is aerobic exercise such as gymnastics for the elderly. Doing aerobics regularly has been shown to reduce blood pressure by up to 5-7 mmHg in adults who have a history of hypertension. Aerobic exercise 30 minutes per day for 3 x a week can reduce blood pressure 5-7 mmHg (Pescatello, et.al., 2015). To get maximum results, do aerobic exercise 3-4 times a week with a duration of 45 minutes. S six elderly are very useful for stabilizing blood pressure, increasing endurance, work and function of the heart, lungs and blood vessels, increasing muscle strength and bone density, increasing body flexibility so as to reduce injuries, increasing body metabolism to prevent obesity and maintaining ideal body weight , reducing the risk of disease, as well as enhancing the hormonal system through increasing hormone sensitivity to body tissues, inhibiting degenerative or aging processes, increasing fitness.

From the results of the preliminary survey in Cemani Village, it was found that the number of elderly people with hypertension was as much as a total of 100 elderly people in Cemani Village. The number of elderly people with hypertension has increased from the previous year. This is because there are still many elderly people with hypertension who have unhealthy lifestyles. The elderly diligently take blood pressure-lowering drugs and routine blood pressure control once a week, but this is not balanced with a healthy lifestyle. This is supported by their average high cholesterol level. Even though he is diligent in taking medication and controlling blood pressure, food intake and fulfillment of nutrition are still not well controlled and are lazy to do light activities or even exercise. In early December 2022 researchers conducted interviews with several elderly people with hypertension in Cemani Village. The results of interviews conducted with 16 elderly people with hypertension said that so far they were only diligent in taking blood pressure-lowering drugs, routine blood pressure control according to the schedule from the puskesmas and rarely doing sports, only doing daily physical activities as usual. Elderly people with hypertension had done sports together, namely elderly gymnastics which was programmed from the puskesmas twice, but this program was no longer continued. The formulation of the problem in this study is whether there is an effect of gymnastics: Aerobic Low Impact on blood pressure in elderly hypertensives in Cemani Village? Research Objectives : to determine the Effect of Gymnastics: Aerobic Low Impact on blood pressure in elderly hypertensives in Cemani Village

**METHOD**

*Quasi experimental* research design (Ramadhani & Santik, 2021) with a *pre-test-post test without a control group*. This design seeks to reveal a causal relationship in the experimental group. This design provides treatment to the experimental group. The population in this study were elderly people with hypertension in Cemani Village with inclusion criteria : Elderly aged between 60-75 years , in good health , blood pressure  $\geq 140/90$  mmHg , willing to be a respondent. While the exclusion criteria in this study are: Elderly who have comorbidities such as stroke, diabetes mellitus, heart, chest pain, lung , elderly who have just recovered from illness , elderly who are not willing to be respondents. The population in this study amounted to 16 people. Sampling technique with total sampling in this study was 16 respondents sufferers of hypertension in December 2022, but there were 2 respondents who did not participate regularly during 3 activity sessions, so 2 respondents were dropped out so that the sample/respondents totaled 14 people. The independent variable in this study was the intervention of low-impact aerobics, which means rhythmic exercise with light movements for the elderly, while the dependent variable in this study was basal blood pressure measured before and after the intervention (Widjayanti, et. al., 2019)

The research instrument used in this study was a respondent characteristic questionnaire containing gender, age, education and occupation. Sphygmomanometer tension Omron digital and stethoscope. Speakers and MP3s that have music as accompaniment during the intervention, SOPs that are used to explain the steps for *Aerobic Low Impact exercises* and observation sheets that contain notes on the results of blood pressure measurements before and after the intervention activities and observation sheets that list the participants' attendance. Treatment / The intervention begins with the initial blood pressure measurement (*pre-test*), giving six *low impact aerobics treatments* for 45 minutes during 3 activity sessions for a week then the blood pressure is measured again to evaluate (*post-test*). Data analysis in this study is univariate analysis and bivariate analysis. The univariate analysis was in the form of frequency and percentage distributions , while the bivariate analysis used the *Willcoxon Signed ranks test*.

**RESULTS**

Table 1.  
Respondent characteristics (n= 14)

| Characteristics    | f  | %    |
|--------------------|----|------|
| Age                |    |      |
| 60-64              | 2  | 14.3 |
| 65-69              | 3  | 21.4 |
| 70-74              | 9  | 64.3 |
| Gender             |    |      |
| Male               | 0  | 0    |
| Female             | 14 | 100  |
| Level of education |    |      |
| Elementry Scool    | 1  | 7.1  |
| Junior High School | 3  | 21.4 |
| Senior High School | 8  | 57.1 |
| S1/Bachelor Degree | 2  | 14.3 |
| Occupation         |    |      |
| Housewife          | 12 | 85.7 |
| Teacher            | 2  | 14.3 |

Table 2.

The average difference in systolic and diastolic blood pressure before being given *Aerobic Low Impact* exercises in the Elderly with Hypertension (n=14)

| Variable  | Means  | SD     | Min | Max |
|-----------|--------|--------|-----|-----|
| systolic  | 145.79 | 17,738 | 117 | 168 |
| Diastolic | 88,14  | 9,953  | 80  | 100 |

Table 3.

The average difference in systolic and diastolic blood pressure after being given *Aerobic Low Impact exercise* in the elderly with hypertension (n=14)

| Variable  | Means   | SD     | Min | Max |
|-----------|---------|--------|-----|-----|
| systolic  | 12 8,93 | 10.425 | 118 | 130 |
| Diastolic | 80.00 _ | 0.000  | 80  | 89  |

Table 4.

Analysis of the average blood pressure after being given *Aerobic Low Impact exercises* in the Elderly with Hypertension (n=14)

| Blood pressure | Means   | SD     | <i>PV aluminum</i> |
|----------------|---------|--------|--------------------|
| Systolic       |         |        |                    |
| Pre-test       | 145.79  | 17,738 | 0.002 *            |
| Post test      | 12 8,93 | 10.425 |                    |
| Diastolic      |         |        |                    |
| Pre-test       | 88,14   | 9,953  | 0.008*             |
| Post test      | 80,79   | 2,424  |                    |

The results of research conducted in Cemani Village in December 2022 on 14 elderly people suffering from hypertension found data that in general hypertension sufferers were female (100%), in accordance with research conducted by Putriastuti, 2016 which stated that the majority of hypertension sufferers were of the female, with the most age being 70-74 years (64.3%) with the highest education level being high school, namely 57.1%. This is in accordance with research conducted by Fetriwahyuni, et.al. which states that systolic blood pressure will increase in connection with a decrease in blood vessel elasticity, and generally hypertension attacks women over the age of 45 years.

In general, blood pressure will increase as a person ages and at that age many physiological changes occur so that the risk of developing hypertension becomes greater, because the arteries will lose their elasticity and flexibility . The prevalence of hypertension increases with age (Ministry of Health, 2019). All respondents were female because when data collection was carried out in the morning so only women were in the research location, and the men went to work so there were no research locations. where women will experience an increased risk of high blood pressure during menopause. This is due to a reduction in estradiol and a decrease in the ratio of estrogen and progesterone ratio which results in endothelial dysfunction and increases BMI ( *Body Mass Index* ) which causes an increase in sympathetic nerve activation. This sympathetic nerve activation will release renin and angiotensin II stimulants. An increase in angiotensin and endothelin can cause oxidative stress which can lead to hypertension or high blood pressure (Sartika *et al* ., 2020). This result is in accordance with previous studies which stated that most of the characteristics were elderly people over 46 years old and female Ferawati. et. Al (2020)

Most of the respondents had high school education, 8 people (57.1%) and most of them were housewives, 12 people (85.7%). The results of this study are in line with Sriningsih's theory in

Chrisnawati *et al.* ., (2021) which states that the higher a person's education, the faster they receive and understand information so that the knowledge possessed is also higher. Most of the respondents' occupations were being housewives as many as 12 people (85.7%). The work of a housewife can cause a person to be easily exposed to stress. The results of the study showed a significant decrease in blood pressure after being treated with *low impact aerobic* exercise namely the average systolic from 145.79/88.14 mmHg decreased to 128.93/80.79 mmHg. According to Mayumi in 2013 in Ubaidilah (2020) that physical activity such as aerobic exercise performed by the elderly, in the body will cause contraction of the skeletal (skeletal) muscles and this can cause a mechanical or chemical response. The occurrence of a mechanical response in the muscles when they contract and relax will cause the performance of the venous valves to be more optimal so that blood returning to the right ventricle will increase (Vranandhes, 2018).

Increased cardiac return will affect the increased strain that occurs in the left ventricle of the heart so that the cardiac output of blood in the heart will increase 4 to 5 times faster than the cardiac output at rest. The chemical response caused by *low impact aerobic elderly exercise* will result in a decrease in pH and  $PO_2$  levels, lactic acid will accumulate, adenosine and  $K^+$  by metabolism during active muscle contraction. The accumulation that occurs in these metabolic substances causes dilation of blood vessels which can reduce arterial pressure. This lasts only temporarily because there is an arterial baroreceptor response with an increase in heart rate and refill the stroke causing blood pressure to increase. Giving elderly exercise treatment measures can reduce systolic blood pressure, diastolic blood pressure, and average arterial blood pressure in the elderly. One of the results of regular physical exercise is dilation of blood vessels so that high blood pressure can decrease. Meanwhile, according to Saing (2016) quoted by Segita R. (2020) that factors that can influence the occurrence of high blood pressure or hypertension are lack of exercise, excess weight gain, and lifestyle (diet with high salt consumption, habits and physical activity). People who exercise 2 times a week will experience an increase in cardiorespiratory endurance and regular exercise can reduce the risk of heart disease, because aerobic exercise is very beneficial for improving and maintaining healthy heart, lung, blood circulation, muscles and joints endurance. -Joints, as well as *low impact aerobic* exercises have a big influence on the body, especially on the endurance of the lungs and heart.

Based on the results of statistical processing, the results of the analysis test with *the Wilcoxon Signed Rank Test* obtained the *Asymp value. Sig (2-tailed) 0.002* ( $p < 0.05$ ) for systolic blood pressure and *Asymp values. Sig (2-tailed) 0.008* ( $p < 0.05$ ) for *diastolic blood pressure*. This means that there is an effect of *Aerobic Low Impact exercise* on reducing systolic and diastolic blood pressure in elderly hypertensives in Cemani Village. In this study, researchers carried out gymnastic actions on the elderly for one week, carried out 3 times with a duration of 30-45 minutes. The results of this study can be strengthened by the results of research conducted by Sari, Novita and Sugiharto, 2021 which reported that a decrease in blood pressure in the elderly who were given the intervention of *low impact aerobic exercise* resulted in a decrease in blood pressure of 10.16 in systolic and 5.02 in diastolic. Another supporting study is Ramadhani AI (2021) with the results of the study obtained a *p-value* difference in the difference in systolic blood pressure (*pre-test-post test*) in the treatment and control groups using the *Wilcoxon test* of 0.00 ( $P < 0.05$ ). While the *p value* of the difference in diastolic blood pressure (*pre-test-post*) in the treatment group and control group using the *Wilcoxon test* is 0.00 ( $0p < 0.05$ ). This means that there is an effect of elderly exercise on blood pressure in hypertension sufferers. In addition, this research is also in line with research conducted by Hidayah H. (2019) that from the analysis of elderly respondents with

hypertension, it shows a *p* value of  $0.000 < 0.005$  for systolic blood pressure and  $0.004 < 0.005$  for diastolic blood pressure, which means there is an effect of exercise *low impact aerobics* on blood pressure changes in elderly people with hypertension at the Jati Asih Elderly Posyandu, Geger District, Madiun Regency. Based on the description above, it can be concluded that *Aerobic Low Impact Exercise* has an effect on reducing blood pressure in elderly people with hypertension, so that it can be used as a non-pharmacological therapy and a companion to pharmacological therapy in the management of hypertension ( Pujiastuti & Thessalonika. M, 2022)

## CONCLUSION

The results of this study indicate that the characteristics of respondents based on age are mostly 70-74 years old, most are female, with high school education and housewife jobs. The results of the study showed a significant decrease in blood pressure, both systolic and diastolic, so it can be concluded that there is an effect of *Aerobic Low Impact exercise* on reducing blood pressure in the elderly. Recommendation: Collaboration with the village government / health center staff is needed, in this case cadres spread across each posyandu to motivate and move the elderly to take part in this low impact aerobics so that the elderly who suffer from hypertension have a good lifestyle to lower their blood pressure.

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