



The Effect of Elderly Gymnastics on Lowering Blood Pressure in Elderly Patients with Hypertension

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Abstract

Hypertension affects 50-60% of the elderly population due to a decrease in the physiological function of blood vessels that are at risk of causing cardiovascular complications. Blood pressure control is not only carried out with antihypertensive drugs, but also requires a non-pharmacological approach. One of the efforts that can be made is elderly gymnastics. Therefore, this study aims to analyze the effect of elderly gymnastics on the reduction of systolic and diastolic blood pressure in elderly with hypertension, both those who take antihypertensive drugs and those who do not, at Wisma Lansia J. Soenarti Nasution. This study uses a quantitative approach with an ex post facto design. The study subjects amounted to 20 elderly people with a total sampling technique. Blood pressure measurement was carried out using a digital sphygmomanometer after the implementation of elderly gymnastics during the period from September – December. Data were analyzed using the Shapiro-Wilk normality test and the Mann-Whitney non-parametric test. The results of the analysis show the value of Asymp.Sig.(2-tailed) of 0.000 ($p < 0.05$) across systolic and diastolic blood pressure measurements in each period, indicating a statistically significant difference. Elderly gymnastics was shown to have a blood pressure lowering and stabilizing effect in both groups, with blood pressure relatively lower in the group without the consumption of antihypertensive drugs. Elderly gymnastics has a significant effect on blood pressure control in the elderly with hypertension, both as non-pharmacological intervention and as a complementary therapy to antihypertensive treatment. These findings support the sustainable intergration of elderly gymnastics in elderly health programs.

How to Cite

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INTRODUCTION

Hypertension is one of the most common cardiovascular diseases in the world, including Indonesia. According to data from the Ministry of the Republic of Indonesia (2022), the prevalence of hypertension in Indonesia reaches around 34,1% in the adult population, with a higher rate in elderly group age 60 years and above reaching 50-60% (Makawekes et al., 2020). One of the diseases that many elderly people experience is hypertension. Hypertension in the elderly not only increases the risk of stroke, heart attack, and kidney failure but also worsens quality of life due to symptoms such as dizziness, fatigue, and cognitive impairment (Diniyah & Sudaryanto, 2024). Hypertension in the elderly occurs due to aging process, namely physiological deterioration that causes the strength of the heart pump to decrease so that contractions and the volume of the heart's work decrease, reduced elasticity of blood vessels due to lack of effectiveness of peripheral blood vessels for oxygenation (Yanti et al., 2021).

Hypertension in the elderly often involves pharmacological interventions, however, long term use of medications can cause side effects. Therefore, non-pharmacological strategies are the treatment of hypertension, especially for optimal prevention and control of blood pressure. One of the non-pharmacological interventions is regular physical activity such as elderly gymnastics (Sunarto et al., 2024). Elderly gymnastics is one of the non-pharmacological methods that can be applied as therapy to maintain blood pressure stability. These activities can help prevent loss of organ function as well as reduce the risk of various diseases, such as hypertension, diabetes mellitus, and coronary artery disease (Veri et al., 2022).

Gymnastics for the elderly is a type of exercise that is recommended for the people with hypertension and the elderly to lose weight and overcome stress. This activity is carried out for 30 minutes, with a frequency of at least twice per week. In addition, the goal is to improve blood circulation and oxygen supply to moving muscles and bones, especially the heart muscle so that it can lower blood pressure. After exercise, at rest the blood vessels will dilate or expand, causing blood flow to decrease temporarily, about 30-120 minutes, before returning to the initial blood pressure level. With regular and continuous exercise, blood vessels become more flexible, and the effects lowering blood pressure will last longer. Thus, the dilation of these blood vessels

causes blood pressure to drop after physical activity (Susanti et al., 2023).

Several previous studies have shown that elderly gymnastics according to research conducted by (Ramadhani & Santik, 2022) started that elderly gymnastics is able to maintain blood pressure balance so that it can lower blood pressure in the elderly if done for 30 minutes per session with a frequency twice a week for four weeks. Gymnastics for the elderly can also improve muscle strength, body coordination and body health. Likewise, the result of (Sinandang et al., 2025) the results showed that the average arterial pressure core (MAP) before the elderly was 116.15 mmHg, and after the elderly gymnastics was found to decrease to 104.68 mmHg. Based on the results of the Wilcoxon test, the p value is 0.000 (<0.05). There was a significant effect of elderly gymnastics on average arterial pressure (MAP) in elderly with hypertension in Gyan Hamlet, Prambanan District, Sleman Regency.

Based on the findings of several previous studies, elderly gymnastics has been proven to be an effective non-pharmacological intervention in lowering blood pressure in the elderly with hypertension. This study provides a scientific contribution through a comparative analysis of the influence of elderly gymnastics on the reduction of systolic and diastolic blood pressure based on the status of longitudinal and repeated consumption of antihypertensive drugs in several observation periods at Wisma Lansia J. Soenarti Nasution. This comprehensive approach provides a more in-depth evaluation of the role of elderly gymnastics as a non-pharmacological intervention for people with hypertension as well as complementary therapies that support the effectiveness of sustainable medical treatment. Most of the studies were conducted in the context of formal health facilities such as health centers or general communities, using a simple pre-post design, and have not specifically analyzed the difference in the effects of gymnastics on the elderly who take antihypertensive drugs and those who do not take drugs. In addition, there are still limited studies that observe repeated changes in blood pressure over several periods of time in social service environments such as Wisma Lansia J Soenarti Nasution. Based on the research gap, further studies are needed to evaluate the effect of elderly gymnastics on lowering blood pressure in the elderly with hypertension in the context of social services and considering the status of antihypertensive drug consumption. However, the effectiveness of this intervention still needs to be further researched in different

groups of the elderly and in different context. Therefore, this study aims to analyzed the effect of elderly gymastics on reducing blood pressure in elderly people with hypertension at Wisma Lansia J. Soenarti Nasution.

METHOD

This study uses a quantitative approach with an ex post facto method. This approach was chosen because it is to research the cause and effect relationship to a phenomenon that has occurred without the treatment or manipulation of variable of by the researcher. In this study, the researcher did not provide direct intervention, but observed and analyzed changes in blood pressure of the elderly who had participated in the elderly gymnastics program regularly at wisma Lansia J. Soenarti Nasution. The independent variable in this study was elderly gymnastics, while the bound variable was systolic and diastolic blood pressure. In addition, the grouping variable analyzed was the status antihypertensive drug consumption. The design was chosen because it is suitable to examine the influence of physical activity that has taken place naturally in a community on the physiological condition of the elderly, especially blood pressure.

The subject in this study are all elderly people who live and participate in elderly gymnastics activities at Wisma Lansia J. Soenarti Nasution, Bandung City. The sampling technique used was total sampling, namely all elderly people who met the inclusion criteria and were willing to be respondents to be included in the study, so that the number of subject 20 people. Inclusion creteria include: (1) the elderly aged ≥ 60 years, (2) participating in regular elderly gymnastics activities (3) willing to be research respondents, and (4) allowing regular blood pressure measurements. Furthermore, the research subjects were grouped based on the status of antihypertensive drug consumption into two groups, namely the elderly who took antihypertensive drugs and elderly who did not take antihypertensive drugs, with the aim of analyzing the difference in blood pressure changes between the two groups.

This reserch is carried out though several structured stages to ensure that the data collection process runs systematically and in accordance with the research objectives. The intial stage of the research began with the coordination and management of research permits to the manager of Wisma Lansia J. Soenarti Nasution, Bandung City. After obtaining permission, the researcher indentified the research subjects based on the

inclusion criteria that had been set, namely the elderly aged ≥ 60 years, participating in regular elderly gymnastics activities, willing to be respondents, an allowing regular blood pressure measurements. Furthermore, the reseacher provided and explanation to the respondents about the objectives, benefits, and procedures of the research before the implementation of data collection.

The data collection stage was carried out by measuring systolic and diastolic blood pressure using a digital sphygmomanometer wich was carried out on the elderly who participated in a routine elderly gymnastics program at the guest-house. Blood pressure measurement were carried out periodically in several observation periods, namely from September to December with the aim of observing repeated changes in blood pressure after the implementation of elderly gymnastics. All measurement result are systematically recorded in the blood pressure observation sheet to ensure order and accuracy of the data

In addition to blood pressure measurement, the researcher also made direct observati-on on the involvement and participation of the elderly during elderly gymnastics activities. The process of gymnastics activities was documented through photos, videos, and field notes as supporting data that served to strengthen the description of the research implementation. The blood pressure data that has been collected is then grouped based on the status of antihypertensive drug consumption, namely the elderly group who take medication and the elderly group who do not take medication. This grouping was carried out the facilitate comparative analysis of changes in blood pressure between groups before the data was statistically analyzed.

Data analysis in this study was carried out using the SPSS version 27 program. The initial statistical analysis began with a normality test using the Shapiro-wilk test to determine the didtribution of systolic and diastolic blood pressure data. The results of the normality test showed that the data was not normally distributed, so the analysis was continud using a non-parametric statistical tes. The hypotesis test was conducted using the Mann-Whitney U Test to analyze the defference in blood pressure between the elderly group taking antihypertensive drugs and the elderly group not taking antihypertensive drugs in each observatiom period. All statistical test were conducted with a confidance level of 95% and significance value of $\alpha = 0.05$, where the p value < 0.05 showed a statistically significant difference, while the p value ≥ 0.05 showed no significant difference. The result of statistical analysis are

then presented in the form of a table and interpreted to answer the formulation of the problem and draw conclusions from the research.

RESULTS AND DISCUSSION

Table 1. Respondens Characteristics

Characteristics		N	(%)
Gender	Male	10	50
	Women	10	50
Age	60-74 Years	10	50
	75-90 Years	10	50
History of Hypertension	Yes	10	50
	No	10	50
Taking Medication	Yes	10	50
	No	10	50

This study involved 20 respondents from Wisma Lansia J. Soenarti Nasution. The demographic sample consisted of gender, age, history of hypertension and taking antihypertensive medications. All variables had an evenly balanced frequency distribution among the 20 respondents. Gender characteristics consisted of males 50% and females 50%, while in terms of age, respondents were evenly divided between the age groups 60-74 years 50% and 75-90 years 50%. Regarding health conditions, as many as 50% of respondents had a history of hypertension and the other 50% did not, which percentage was directly proportional to the behavior of drug users where there were 10 people 50% who took drugs and 10 people 50% who did not take drugs.

The hypothesis must be tested empirically because it is a temporary answer to the problem that has been formulated. This is done to find out if the data collected supports or contradicts the hypothesis. This study used the non-parametric mann-whitney test through the SPSS 27 program to determine the effect of grouping on the blood pressure condition of the respondents.

Table 2. Mann-Whitney U Test

Variables	Period	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
Systolic	September	2,603.000	-19.985	.000
	October	21,683.000	-12.177	.000
	November	5,892.000	-18.439	.000
	December	16,099.000	-14.946	.000
Diastolic	September	17,974.000	-12.858	.000
	October	39,746.000	-3.792	.000
	November	16,280.000	-13.579	.000
	December	38,653.000	-4.281	.000

Table 2 based on the result of statistical

analysis, the Asymp value was obtained Sig. (2-tailed) of 0.000 ($p < 0.05$) on all systolic and diastolic blood pressure measurement in each observation period. These results show that there was a statistically significant difference in the blood pressure of the elderly during the study period. The Z value produced each month indicates a consistent direction of change in blood pressure, both in systolic and diastolic blood pressure. This indicates that the changes in blood pressure that occur are not accidental, but occur consistently during the implementation of elderly gymnastics.

The study aims to analyze the effect of elderly gymnastics on systolic and diastolic blood pressure in elderly people with hypertension, both those who take antihypertensive drugs and those who do not. Based on the results of statistical analysis using the mann-whitney non-parametric test, it was found that there was a significant difference between the two groups in all blood pressure measurements from September to December ($p < 0.05$). These findings show that elderly gymnastics has a significant impact on blood pressure control in the elderly. Consistently, the results of the mann-whitney test show Asymp values. Sig. (2-tailed) = 0.000 in all systolic and diastolic blood pressure variables, indicating a significant difference between the elderly group who did elderly gymnastics without antihypertensive drugs and the group who did elderly gymnastics with the consumption of antihypertensive drugs. This difference is also reflected in the mean rank value, where the group without antihypertensive drugs tends to have lower blood pressure ratings than the group that takes medication, even though both underwent regular elderly exercise interventions.

The results of the study showed that elderly gymnastics had a significant effect on lowering blood pressure in the elderly, both on systolic and diastolic blood pressure after routine gymnastics program interventions. The findings are consistent with recent empirical research that found the effect of physical exercise on lowering blood pressure in the elderly with a strong statistically significant value ($p < 0.05$). In the elderly who performed elderly gymnastics without the consumption of antihypertensive drugs, the results showed that blood pressure could be maintained in a relatively stable range during the intervention period. This indicates that elderly gymnastics is effective as a non-pharmacological therapy, especially in the elderly with mild to moderate hypertension that can still be controlled without treatment. These findings support current clinical

recommendations that place physical activity as an early strategy in the management of hypertension, especially in the elderly population, due to the lower risk of side effects compared to long term pharmacological therapy. The results of this study are consistent with scientific evidence showing that moderate intensity physical activity such as elderly gymnastics significantly lowers systolic and diastolic blood pressure in the hypertensive population as a major component in the management of non-pharmacological hypertension (Shariful Islam et al., 2023). These findings are also in line with previous research according to which non-pharmacological interventions have been shown to have a significant impact on blood pressure reduction, implementation of non-pharmacological interventions early as an initial before or in conjunction with pharmacological treatment, with a low risk of side effect (Tsai et al., 2025).

While in the elderly who did elderly gymnastics with the consumption of antihypertensive drugs although the blood pressure was relatively higher than the elderly who did gymnastics without the consumption of antihypertensive drugs, the results of the analysis showed that elderly gymnastics still made a significant contribution in stabilizing blood pressure. This shows that elderly gymnastics functions as an effective complementary therapy supporting antihypertensive treatment. These findings are in line with a meta-analysis (Zhang et al., 2025) that reports that the combination of aerobic and resistance exercise can lower systolic blood pressure by approximately 11 mmHg and diastolic blood pressure by approximately 6 mmHg in hypertension elderly, thus providing a synergistic effect when combined with pharmacological therapy.

Elderly gymnastics is a form of structured physical exercise that includes light aerobic components, rhythmic movements, and repetitive large muscle involvement. Regular physical activity such as gymnastics has an important role in regulating the cardiovascular system of the elderly, especially in lowering systolic and diastolic blood pressure (Zhang et al., 2025). Physiologically, the decrease in blood pressure due to gymnastics in the elderly can be explained through several mechanisms. Regular physical exercise is known to improve vascular endothelial function, as well as decrease peripheral resistance. In addition, physical activity also plays a role in lowering the activity of the sympathetic nervous system and increasing baroreceptor sensitivity, which collectively contributes to more stable blood pressure regulation. Some studies have also shown that

group exercise such as resistance training, combination exercises or ongoing exercise programs such as gymnastics for the elderly can clinically lower blood pressure values after a few weeks to months of intervention. Based on the study (Li et al., 2024), the combination of aerobic exercise and resistance showed an average decrease in systolic blood pressure of about 11.17 mmHg and diastolic blood pressure of 5.93 mmHg in the elderly with hypertension. Thus, elderly gymnastics which is a combination of various light to moderate intensity movement, can be seen as an effective physical exercise to control blood pressure in the medium term, especially if it is done regularly according to sports guidelines for the elderly.

The elderly gymnastics program that is carried out regularly has a blood pressure reduction effect on both groups both those who regularly take antihypertensive drugs and those who do not take drugs. Scientific research supports the findings. Meta-analysis of cardiovascular health shows that structured aerobic exercise and gymnastics can lower blood pressure in people with hypertension, due to the mechanism of decreasing vascular resistance and improving vascular function through vasodilation and adaptation of the cardiovascular system as a result of exercise. That is especially seen in repetitive and physiologically consistent aerobic exercise to help lower blood pressure both in individuals without medication and those who have undergone pharmacological therapy (Zhu et al., 2022). Furthermore, systematic studies also reported that the combined effect of physical exercise on antihypertensive therapy is complementary, not just additive so that physical activities such as gymnastics are able to strengthen drug work indirectly through increased vascular response and regulation of the autonomic nervous system. Although the absolute effect to lowering blood pressure in patients taking medication may be smaller than in non-medication, physical activity still contributes significantly to lowering blood pressure for both (Pescatello et al., 2021). The findings are also consistent with a review of studies stating that non-pharmacological interventions such as gymnastics, yoga, or aerobic exercise consistently show good results in lowering blood pressure in hypertensive patients in general, including those in medical control, because physical activity works through a variety of different physiological pathways of pharmacological drug mechanisms (Verma et al., 2021). The findings have important clinical implications, particularly in the context of elderly health services. Elderly gymnastics is

a relatively safe, easy to implement, and low-cost intervention so it has the potential to be integrated into promotive and preventive programs in nursing homes, public health service centers, and elderly communities. In addition, the results of this study strengthen the evidence that physical activity based interventions are not only useful as independent therapy, but also as a complement to pharmacological therapy in the management of hypertension in the elderly.

However, this study has several limitations that need to be considered in interpreting the results. The research design that was not fully experimental limited the ability to control factors, such as variations in antihypertensive type and doses, medication adherence levels, dietary patterns, physical activity outside of the gymnastics program, and the presence of comorbidities that have the potential to effect blood pressure. In addition, this study has not involved the measurement of supporting physiological parameters, such as body mass index, heart rate, or cardiovascular fitness level, which can provide a more comprehensive understanding of the mechanism of the effects of gymnastics on the elderly. The limited number of respondents and the scope of the study location also have the potential to limit the generalization of results in the broader elderly population. Based on the findings and limitations, further research is recommended to use experimental designs, such as randomized controlled trials, to strengthen causal evidence regarding the effectiveness of elderly gymnastics in lowering blood pressure. In addition, the addition of additional physiological variables such as body mass index, heart rate and physical fitness level to clarify the mechanism of working of elderly gymnastics on the cardiovascular system as well as the control of factors including the type and dose of antihypertensive drugs, diet, stress level and other physical activities need to be carried out more strictly. Research with a larger sample size and involving various health services or the elderly community is also needed to increase the external validity and generalizability of the research results, so that the role of elderly gymnastics as a non-pharmacological intervention in the management of hypertension in the elderly can be proven more strongly and comprehensively.

CONCLUSION

Based on results of the study and discussion, it can be concluded that elderly gymnastics has a real and consistent impact on systolic and diastolic blood pressure in elderly people with hy-

pertension, both in the group that does not take antihypertensive drugs and in the group that is in pharmacological therapy. The findings provide a measurable and stable change between the two groups, reflecting that elderly exercise contributes significantly to blood pressure control in the elderly population. The elderly group who performed elderly gymnastics without the consumption of antihypertensive drugs showed relatively lower and stable blood pressure values during the intervention period, which suggests that elderly gymnastics is effectively used as a non-pharmacological intervention, particularly in the elderly with mild to moderate hypertension who can still be controlled without treatment. Meanwhile, in the elderly group taking antihypertensive drugs, although blood pressure tends to be higher than the group without drugs, elderly gymnastics plays a crucial role in strengthening stability in maintaining blood pressure so that it does not experience a drastic spike, so that it can be seen as a complementary therapy that supports the effectiveness of pharmacological treatment. Thus, the results of this study confirm that elderly gymnastics is a safe, amplifiable, relatively low-cost intervention, and both as an independent non-pharmacological therapy and as a supportive therapy in medical management. However, this study has limitations, including the relatively limited number of samples, and the lack of control of several factors such as diet, daily physical activity levels outside of interventions, stress levels, and adherence to antihypertensive drug consumption. Therefore, further studies are recommended to use experimental designs with stricter controls, involving larger sample counts and diverse study locations, as well as incorporating additional variables such as quality of life, and cardiorespiratory fitness.

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