



THE EFFECT OF HYPERTENSION EXERCISES ON REDUCING BLOOD PRESSURE IN THE ELDERLY AT THE ELDERLY POSYANDU

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ABSTRACT

Hypertension is a common degenerative disease among older adults and can lead to serious complications if not well controlled. Non-pharmacological approaches, such as hypertension exercise, are recommended to support blood pressure management. This study aimed to determine the effectiveness of hypertension exercise in reducing blood pressure among older adults at the Elderly Health Post (Posyandu Lansia). A quasi-experimental study with a one-group pretest–posttest design was conducted. A total of 30 elderly participants were recruited using total sampling. Blood pressure was measured before and after the intervention. Hypertension exercise was administered in three sessions (February 18, 21, and 23, 2026). Data were analyzed using univariate and bivariate methods to assess changes in blood pressure. The findings showed a significant reduction in average systolic blood pressure after each session. In the first session, the mean systolic pressure decreased from 151.8 mmHg to 136.4 mmHg. Similar reductions were observed in the second and third sessions, indicating a consistent downward trend following the intervention. Hypertension exercise is effective in reducing blood pressure among older adults.

Keywords: blood pressure; community health; hypertension exercise; non-pharmacological therapy

How to cite (in APA style)

Nurlaili, Z., & Widodo, A. (2026). The Effect of Hypertension Exercises on Reducing Blood Pressure in the Elderly at the Elderly Posyandu. *Indonesian Journal of Global Health Research*, 8(4), 795–800. <https://doi.org/10.37287/ijghr.v8i4.2008>.

INTRODUCTION

Hypertension is one of the major health issues among older adults, with its prevalence continuing to rise with advancing age (Bajpai et al., 2023). The ageing process causes various physiological changes, particularly in the cardiovascular system, such as a decrease in blood vessel elasticity, thickening of the arterial walls, and an increase in peripheral resistance, all of which contribute to elevated blood pressure, particularly systolic pressure (Ahmed et al., 2024). This condition is further exacerbated by other risk factors such as obesity (Tiara, 2020). If not managed effectively, hypertension can lead to serious complications such as stroke, heart failure, chronic kidney disease, and other vascular disorders. Data from the Basic Health Research also indicate that the prevalence of hypertension is rising among those aged 60 years and over, necessitating sustained promotive and preventive efforts (Kementrian Kesehatan, 2023).

In primary healthcare in Indonesia, the management of hypertension is increasingly moving towards an integrated approach combining physical and mental health aspects (Nurafifah, 2021). The management of hypertension is not limited to pharmacological therapy, but also involves non-pharmacological approaches such as lifestyle modifications and regular physical activity (Zhao et al., 2024). One recommended form of intervention is hypertension exercise, which involves light to moderate-intensity physical activity tailored to the physiological condition of older adults (Kementrian Kesehatan Republik Indonesia, 2020). Simple, rhythmic, and controlled movements can improve vascular elasticity, enhance blood circulation, and reduce peripheral resistance, thereby contributing to a reduction in blood pressure (Charchar et al., 2024). Various studies also indicate

that physical activity-based interventions are effective as part of comprehensive hypertension management (Syavinka & Yuniartika, 2024).

A number of previous studies have demonstrated the effectiveness of exercise programs for older adults in lowering blood pressure. Research by (Awaliah et al., 2025) showed a significant reduction in systolic and diastolic blood pressure following the regular practice of exercise programs for older adults. Furthermore, research by Nugroho et al. (2023). A systematic review by Özsezer and Dağhan (2025) also reports that community-based physical activity interventions are effective in controlling blood pressure and improving quality of life, whilst Greydanus et al. (2023) confirm that structured physical activity provides significant physiological and psychosocial benefits. Physiologically, regular physical activity can effectively increase cardiac output, improve endothelial function, and reduce the activity of the sympathetic nervous system, which plays a role in raising blood pressure (Yuniartika et al., 2023). Home-based approaches also contribute to the sustainability of hypertension management in older adults (Hijrah et al., 2025). Therefore, hypertension exercises can serve as a safe and easily implementable complementary therapy.

As a community-based health service, the elderly health post plays a strategic role in promotive and preventive efforts against non-communicable diseases, including hypertension. The regular implementation of hypertension exercises at Posyandu has been shown to be an effective and sustainable intervention in controlling blood pressure in older adults, and is supported by the involvement of families and the community in the management of hypertension (Mengesha et al., 2024). Based on the above, although various studies have demonstrated the effectiveness of hypertension exercise programmes at both national and international levels, the routine implementation of such programmes at elderly health posts still requires evaluation based on local data. Therefore, this study was conducted to analyse the effectiveness of hypertension exercise programmes in lowering blood pressure among the elderly at the Elderly Health Post as part of promotive and preventive efforts to control hypertension in the community.

METHOD

This study employed a quasi-experimental design using a one-group pretest–posttest approach to evaluate the effectiveness of hypertension exercise in reducing blood pressure among older adults. The study was conducted from March 4 to March 18, 2026, at the Elderly Integrated Health Post (Posyandu Lansia). The study population comprised all elderly individuals registered and actively participating in Posyandu activities, totaling approximately 30–40 individuals based on Posyandu records. A total of 30 respondents were selected using purposive sampling based on predetermined inclusion criteria, including elderly individuals diagnosed with hypertension, having adequate communication abilities, and willingness to participate throughout the study. Blood pressure measurements were conducted using a digital sphygmomanometer to obtain systolic and diastolic values before (pretest) and after (posttest) the intervention. The intervention consisted of structured hypertension exercise performed in three sessions during the study period, following a predetermined schedule. Each session was designed with light to moderate intensity movements appropriate for older adults. Data analysis was carried out in two stages. Univariate analysis was used to describe the mean blood pressure values of the respondents. Furthermore, bivariate analysis using the paired t-test was performed to determine the differences in blood pressure before and after the hypertension exercise intervention. Ethical considerations were applied by ensuring that all participants provided informed consent prior to data collection, and confidentiality of respondent data was maintained throughout the study.

RESULT

Before detailed statistical analysis, the findings indicated a general trend of decreased blood pressure in older adults following hypertension exercise. Measurements across three sessions showed consistent reductions in both systolic and diastolic values, with a tendency toward more

stable levels over time. This suggests that regular hypertension exercise may provide sustained physiological benefits, including improved vascular elasticity and blood circulation. Overall, the preliminary results indicate that the intervention was effective in lowering blood pressure prior to further univariate analysis.

Table 1.
Descriptive Statistics Blood Pressure at First Meeting (n=30)

Variables	Mean	Standard Deviation	Minimum	Maximum
First Meeting				
Pre Systolic	151.80	14.87	138	189
Post Systolic	136.43	12.94	122	163
Pre Diastolic	85.43	12.11	67	120
Post Diastolic	76.83	9.88	61	100
Second Meeting				
Systolic Pre	147.30	8.74	133	166
Post Systolic	133.20	8.72	116	152
Pre Diastolic	81.90	7.95	65	99
Post Diastolic	75.90	5.07	70	89
Third Meeting				
Systolic Pre	142.93	5.78	130	151
Post Systolic	129.63	6.46	118	143
Pre Diastolic	77.43	6.75	67	93
Post Diastolic	74.23	5.65	63	82

At the first session (Table 1), the mean systolic blood pressure decreased markedly from 151.80 ± 14.87 mmHg to 136.43 ± 12.94 mmHg, while the mean diastolic pressure declined from 85.43 ± 12.11 mmHg to 76.83 ± 9.88 mmHg. A similar pattern was observed in the second session, where systolic blood pressure decreased from 147.30 ± 8.74 mmHg to 133.20 ± 8.72 mmHg, and diastolic pressure decreased from 81.90 ± 7.95 mmHg to 75.90 ± 5.07 mmHg. In the third session, the reduction trend continued, with systolic blood pressure decreasing from 142.93 ± 5.78 mmHg to 129.63 ± 6.46 mmHg and diastolic pressure from 77.43 ± 6.75 mmHg to 74.23 ± 5.65 mmHg.

Table 2.
Average Blood Pressure Before and After Intervention at Three Meetings (n=30)

Variables	Meeting	Pretest (Mean $\pm$ SD)	Posttest (Mean $\pm$ SD)	p-value
Systolic	Meeting 1	151.80 ± 14.87	136.43 ± 12.94	0.001
	Meeting 2	147.30 ± 8.74	133.20 ± 8.72	0.001
	Meeting 3	142.93 ± 5.78	129.63 ± 6.46	0.001
Diastolic	Meeting 1	85.43 ± 12.11	76.83 ± 9.88	0.001
	Meeting 2	81.90 ± 7.95	75.90 ± 5.07	0.001
	Meeting 3	77.43 ± 6.75	74.23 ± 5.65	0.001

Overall (Table 4), both systolic and diastolic blood pressure showed a gradual and consistent downward trend from the first to the third session, indicating a sustained improvement following repeated hypertension exercise interventions. At the first session (Table 5), systolic blood pressure decreased by 15.37 mmHg and diastolic by 8.60 mmHg, with both showing significant results ($p = 0.001$).

Table 5.
Paired Samples Test

Variable	Mean Pre	Mean Post	Mean Difference	Standard Deviation	t	df	Sig. (2-tailed)
First Meeting							
Systolic	151.80	136.43	15.37	6.42	13.12	29	0.001
Diastolic	85.43	76.83	8.60	5.11	9.22	29	0.001
Second Meeting							
Systolic	147.30	133.20	14.10	5.87	12.43	29	0.001
Diastolic	81.90	75.90	6.00	4.12	7.98	29	0.001
Third Meeting							
Systolic	142.93	129.63	13.30	4.95	14.68	29	0.001
Diastolic	77.43	74.23	3.20	3.87	4.53	29	0.001

There was a decrease in mean systolic blood pressure from 151.80 mmHg to 136.43 mmHg and diastolic from 85.43 mmHg to 76.83 mmHg. The test results showed a p-value of 0.001 (<0.05), indicating a significant difference between before and after the intervention. There was a decrease in mean systolic blood pressure of 14.10 mmHg and diastolic blood pressure of 6.00 mmHg. The significance value showed $p = 0.001$ (<0.05), indicating that the intervention still had a significant effect at the second meeting. At the third meeting, blood pressure continued to decrease, with systolic values dropping by 13.30 mmHg and diastolic values by 3.20 mmHg. A p-value of 0.001 (<0.05) indicates that the intervention remained significantly effective

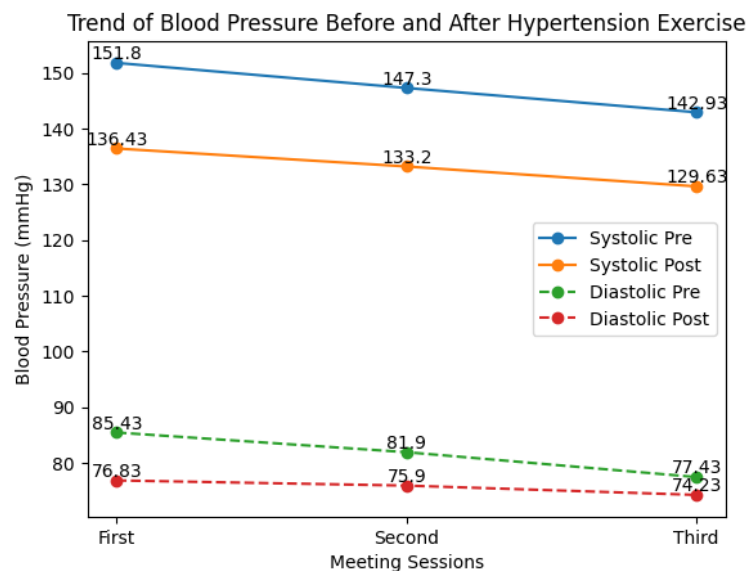


Figure 1. Blood pressure trends across sessions

The graph shows a consistent downward trend in systolic and diastolic blood pressure from the first to the third session, for both pre-test and post-test values. The most pronounced decrease is observed in systolic pressure, whilst diastolic pressure also shows a steady downward trend.

DISCUSSION

This study provides evidence that hypertension exercise produces a significant reduction in both systolic and diastolic blood pressure among older adults. From a temporal perspective, the most pronounced decrease occurred during the first session, indicating an immediate physiological response to physical activity. This acute effect can be explained by post-exercise hypotension, a well-documented phenomenon characterized by transient vasodilation and reduced peripheral vascular resistance following exercise.

Across the second and third sessions, blood pressure continued to decline, although the magnitude of reduction became more moderate. This pattern suggests a transition from acute to adaptive physiological responses (Aoto et al., 2025). Repeated exposure to structured exercise likely enhances endothelial function, increases nitric oxide bioavailability, and improves arterial compliance, leading to more stable blood pressure regulation over time (Mengesha et al., 2024). The observed gradual stabilization aligns with the theory of cardiovascular adaptation, in which consistent physical activity promotes long-term homeostatic balance.

Importantly, the findings highlight a cumulative effect of the intervention, where repeated sessions contribute to sustained improvements rather than isolated short-term changes. This supports the concept that non-pharmacological interventions, particularly exercise-based approaches, require continuity to achieve optimal outcomes (Widodo et al., 2024). The progressive reduction observed in baseline (pretest) values across sessions further indicates that participants may have experienced carry-over effects between interventions, reflecting improved baseline cardiovascular status (Poli et al., 2024). These results are consistent with prior studies demonstrating that regular physical activity

significantly reduces blood pressure in hypertensive populations (Nurhidayah & Rosyid, 2026). Moreover, they are supported by broader evidence from cardiovascular research, which emphasizes the role of exercise in modulating autonomic nervous system balance, specifically by decreasing sympathetic activity and enhancing parasympathetic tone. Such mechanisms are critical in reducing vascular resistance and improving cardiac efficiency (Harahap et al., 2025).

From a clinical perspective, the magnitude of systolic blood pressure reduction observed in this study (approximately 13–15 mmHg per session) is particularly meaningful, as even modest reductions in systolic pressure are associated with a substantial decrease in cardiovascular risk (Nandini et al., 2025). This suggests that hypertension exercise may serve not only as a complementary therapy but also as a potentially impactful public health strategy, especially in resource-limited community settings.

Despite these promising findings, several methodological limitations must be acknowledged. The absence of a control group restricts causal inference, as other factors such as medication adherence, dietary changes, or daily activity patterns may have contributed to the observed outcomes. Additionally, the short intervention period limits the ability to assess long-term sustainability and adherence. Future research should employ randomized controlled trials with larger sample sizes, longer follow-up periods, and better control of confounding variables to strengthen the evidence base.

Finally, the implementation of hypertension exercise within a community-based setting such as Posyandu Lansia underscores its feasibility and scalability. Beyond physiological benefits, such interventions may also foster social engagement and behavioral adherence, which are essential components of successful long-term hypertension management. Integrating structured exercise programs into routine community health services could therefore represent a strategic approach to addressing the growing burden of hypertension among older adults.

CONCLUSION

Hypertension exercise was found to be effective in significantly reducing both systolic and diastolic blood pressure among older adults. The reduction occurred consistently across three sessions, indicating both immediate and cumulative effects of the intervention. Therefore, hypertension exercise can be recommended as a simple, safe, and non-pharmacological strategy for blood pressure control in community-based elderly populations.

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