

The Influence of Combining Anti-Hypertension Exercise and Watermelon Juice on Blood Pressure Reduction in The Elderly Posyandu of Labruk Lor Village

Ridha Septrivinta^{1*}, R. Endro Sulistyono², Iin Aini Isnawati³

¹ Bachelor of Nursing Student, Faculty of Health Sciences, Hafshawaty Zainul Hasan University, Indonesia

² Diploma of Nursing Program, Faculty of Nursing, University of Jember, Indonesia

³ Bachelor of Nursing Program, Faculty of Health Sciences, Hafshawaty Zainul Hasan University, Indonesia

Correspondence should be addressed to:
Ridha Septrivinta
vintadata@gmail.com

Abstract:

The elderly are residents who have reached the age of 60 years or more. One of the diseases experienced by the elderly is hypertension. Hypertension is an increase in systolic blood pressure of at least 140 mmHg, and diastolic blood pressure of at least 90 mmHg. The management of hypertension is by pharmacology and non-pharmacology. One of non-pharmacological treatment by implementing the CERDIK program includes a diligent physical activity and a balanced diet. Antihypertensive exercise is an exercise that can increase the blood flow and oxygen supply to the heart muscle. The combination of drinking watermelon juice is done to prevent and reduce the hypertension. The purpose of this research is to determine the effect of antihypertensive exercise and watermelon juice on blood pressure in the elderly. This research used a quasi-experiment type of research with a pre-test – post-test approach with two group design. The samples of this study were 36 elderly with hypertension. The sampling technique used random sampling with a cluster sampling approach. The research instruments used modules and observations. The research was conducted from the 5th to the 19th of July 2024 at the elderly Posyandu in Labruk Lor Village, Lumajang District. Based on the results of the study, the average pre-test blood pressure value of the control and the experimental groups were almost entirely had hypertension. The research results showed that the average post-test blood pressure value of the control and intervention groups experienced a significant decrease. The results of the independent t test of the differences in blood pressure in the control and the experimental groups after being given antihypertensive exercise therapy and watermelon juice is by P value of 0.003 it can be concluded that there is a significant difference in elderly blood pressure between the control and experimental groups after being given therapy. The results of this study are expected to increase nurses' knowledge about the effects of exercise and diet in the management of hypertension in order to provide effective education to patients.

Article info:

Submitted:
04-11-2024
Revised:
16-12-2024
Accepted:
19-12-2024

Keywords:

antihypertensive exercise therapy; watermelon juice; elderly

DOI: <https://doi.org/10.53713/htechj.v2i6.291>

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INTRODUCTION

Elderly people are defined as individuals who have reached the age of 60 or older (Batara & Hamzah, 2021). Aging brings biological, social, and psychological limitations that affect daily life. The aging process is inevitable, leading to a decline in physical, psychological, and social aspects over time (Yaslina et al., 2021). With advancing age, the elderly are at higher risk for diseases such as hypertension, diabetes, coronary heart disease, and joint and kidney disorders. These age-

related diseases, or degenerative diseases, are often exacerbated by unhealthy lifestyle choices made earlier in life. Physical weakness, reduced agility, and decreased mobility are common among the elderly, alongside physiological changes (Triwijayanti & Murti Puspitaningrum, 2024).

Among non-communicable diseases, hypertension is especially prevalent in the elderly population, along with diabetes, stroke, arthritis, and gout (Akbar et al., 2020). Cardiovascular diseases, particularly hypertension, are among the most common conditions in this age group. If left untreated, hypertension can lead to complications such as stroke, heart failure, and vision problems, and in severe cases, it may even result in death (Fitri Amalia & Lidya Hendayani, 2022).

In 2023, the World Health Organization (WHO) reported that approximately 1.28 billion people globally suffer from hypertension, meaning one in three individuals is diagnosed with the condition. Countries such as the United States, China, India, Indonesia, and Russia contribute over 50% of global hypertension cases. In Indonesia, the prevalence of hypertension among individuals aged 75 and older reaches 69.5%, with East Java showing one of the highest rates at 36.3% (Purwaningsih, 2023; Putra & Susilawati, 2022). Preliminary studies in 2024 at Rogotrunan Health Center found a lack of adherence to hypertension medication, contributing to high blood pressure, with elderly patients averaging blood pressures around 160/90 mmHg. In Labruk Lor Village, there were 172 elderly residents with hypertension (33.8%) in 2023, a higher percentage than in surrounding areas.

Hypertension is a major risk factor for congestive heart failure, stroke, vision impairment, and kidney disease, increasing the likelihood of complications if blood pressure remains uncontrolled. Without treatment, hypertension can reduce life expectancy by 10 to 20 years. Limited public awareness of hypertension management contributes to rising rates (Dewi et al., 2024). Managing hypertension includes pharmacological approaches (medication) and non-pharmacological interventions. Adherence to medication remains an issue; studies indicate that 26.5% of patients are not consistent with medication, and 13.5% do not take it at all, leading to complications (Divandra & Mayasari, 2023). Non-pharmacological management, known as CERDIK, includes regular health checks, avoiding smoking, maintaining physical activity, balanced diet, adequate rest, stress management, and complementary therapies like anti-hypertension exercise (Julistyannis & Chanif, 2022).

Lowering blood pressure by 10 mmHg systolic and 5 mmHg diastolic can reduce stroke and heart failure risk by 25%, coronary artery disease, and mortality by 15% (Oh & Cho, 2020). Thus, organizations like the American Heart Association (AHA) and the European Society of Hypertension provide guidelines recommending both pharmacological and non-pharmacological management for hypertension, particularly among the elderly. Non-pharmacological therapies such as regular physical activity, dietary modifications, and stress management have become preferred alternatives due to their safety and ability to enhance the effectiveness of hypertension medications (Oliveros et al., 2020). However, these approaches often require more time and commitment than pharmacological treatments.

Anti-hypertension exercise aims to improve blood circulation and oxygen supply to active muscles, especially the heart (Priliana et al., 2024; Pujiati et al., 2024). Research by (Sakinah et al., 2022) and others (Faizah & Supratman, 2023; Tina et al., 2021) demonstrates the significant impact of anti-hypertension exercise in lowering blood pressure among the elderly. According to Dina Sobarina's 2022 review, anti-hypertension exercise with a frequency of 1-2 times per week for 15-30 minutes has effectively lowered blood pressure.

In addition to exercise, certain fruits, particularly watermelon (*Citrullus Vulgaris*), can also aid in hypertension management. Watermelon contains citrulline, potassium, water, and vitamins C, A, and K, all of which support blood pressure reduction (Laksana et al., 2022; Triwijayanti & Murti Puspitaningrum, 2024). Potassium reduces sodium effects, helping to lower blood pressure, while

citrulline is believed to support vasodilation, enhancing blood flow and reducing peripheral resistance (Arianto et al., 2021; Sari et al., 2017).

Given the elevated hypertension risk in the elderly, this study aims to assess the combined effects of anti-hypertension exercise and watermelon juice consumption on blood pressure reduction among hypertensive elderly individuals at the Labruk Lor Village Posyandu. This combination approach offers an innovative method to lower high blood pressure and builds upon previous research findings.

METHOD

This study utilized a quasi-experimental design with a pretest-posttest approach across two groups to evaluate different interventions. The population included 172 elderly individuals with hypertension at the Labruk Lor Village Elderly Posyandu in Lumajang Regency. From this population, a sample of 36 participants was selected using multistage random sampling with a cluster approach, dividing them into an experimental group and a control group. Each group consisted of 18 participants, with the experimental group receiving antihypertensive exercises and watermelon juice as the intervention.

Initially, blood pressure measurements were taken for both groups (pretest). Following the intervention, post-test measurements were collected to assess the effects of the treatment on blood pressure. This design was structured as Q1 (control pretest), Q2 (control posttest), Q3 (experimental pretest), and Q4 (experimental posttest), with data analysis performed using the Independent Samples T-Test to determine the significance of the results.

RESULT

Table 1. Characteristics of Respondents (n=36)

Characteristics	Intervention Group	Control Group	Total
Age			
59 - 63 years	12 (66.7%)	11 (61.1%)	23 (63.9%)
64 - 68 years	6 (33.3%)	7 (38.9%)	13 (36.1%)
Gender			
Male	3 (16.7%)	3 (16.7%)	6 (16.7%)
Female	15 (83.3%)	15 (83.3%)	30 (83.3%)
Occupation			
Unemployed	30 (83.3%)	9 (50.0%)	14 (38.9%)
Private Sector	8 (44.4%)	5 (27.8%)	13 (36.1%)
Retired / Gov (PNS/TNI/POLRI)	5 (27.8%)	4 (22.2%)	9 (25.0%)
Education			
Middle School	4 (22.2%)	3 (16.7%)	7 (19.4%)
High School	9 (50.0%)	11 (61.1%)	20 (55.6%)
Higher Education	5 (27.8%)	4 (22.2%)	9 (25.0%)

The study sample, consisting of 36 elderly respondents from Labruk Lor Village, shows that the majority of respondents fall within the age range of 59-63 years (63.9%), with a predominance of females (83.3%). Most respondents had completed high school education (55.6%) and a substantial portion were unemployed (38.9%). These demographic characteristics suggest a group primarily within the older adult range, with a moderate educational background and varied employment history, reflecting typical profiles for elderly study populations in this region.

Table 2. Blood Pressure Data Before and After Intervention of Antihypertensive Exercises and Watermelon Juice in Control and Intervention Groups for Hypertensive Patients at the Elderly Posyandu of Labruk Lor Village (n=36)

Group		Mean (mmHg)	SD	95% CI
Pretest	Control	169/99	0.616	1.25-1.86
	Intervention	162/96	0.511	1.19-1.70
Posttest	Control	160/96	0.383	0.98-1.36
	Intervention	145/85	0.575	1.99-2.56

The study examined blood pressure levels among elderly patients with hypertension in Labruk Lor Village before and after interventions involving antihypertensive exercises and watermelon juice. Pretest results revealed that the control group had an average blood pressure of 169/99 mmHg (SD: 0.616), while the intervention group had a lower average of 162/96 mmHg (SD: 0.511). Post-intervention, the control group's blood pressure decreased to 160/96 mmHg (SD: 0.383), whereas the intervention group showed a significant reduction to 145/85 mmHg (SD: 0.575). The findings indicate that the intervention effectively lowered blood pressure in the elderly participants.

Table 3. Comparison of Average Changes in Blood Pressure Between Control and Intervention Groups (n=36)

Variables	N	Rerata	Rerata - 95%CI	P-Value
Control	18	0.365	0.441-1.107	0.004
Intervention	18	0.591	2.005-2.672	

The table compares the average changes in blood pressure between the control and intervention groups, each consisting of 18 participants. The control group had a mean change of 0.365 (with a standard deviation range of 0.441-1.107), while the intervention group had a mean change of 0.591 (standard deviation range: 2.005-2.672). The statistically significant p-value of 0.004 indicates a meaningful difference between the groups, suggesting that the intervention had a positive effect on reducing blood pressure levels.

DISCUSSION

Blood Pressure Before Intervention

The initial pretest blood pressure measurements showed that the average blood pressure in the control group was 169/99 mmHg, while the intervention group recorded an average of 162/96 mmHg. These figures, well above the normal threshold of 140/90 mmHg, indicate the prevalence of hypertension among the elderly participants at the Labruk Lor Village Elderly Posyandu. Hypertension is typically influenced by factors like lifestyle choices and physical activity levels, which often decline with age and can exacerbate blood pressure issues (Lukitaningtyas & Cahyono, 2023).

Hypertension risk factors are multifaceted, ranging from biological elements such as age and gender to lifestyle choices, including diet and exercise (Miyusliani Santi & Yunita Jasrida, 2011). Consistent with (Triandini, 2022) findings, factors like gender-particularly post-menopausal status in women and age significantly affect hypertension. Age, specifically for those over 60, is a primary risk factor, with 50-60% of this demographic experiencing elevated blood pressure levels due to the natural degenerative changes in blood vessels.

Unhealthy lifestyles can amplify these risks, leading to additional complications like heart disease and stroke, which are more prevalent in hypertensive individuals. Lifestyle modification, therefore, plays a crucial role in hypertension management. Limited physical activity, for instance, contributes to poor cardiovascular health and is recognized as a significant factor for elevated blood pressure (Priono & Kustina, 2017).

Blood Pressure After Intervention with Antihypertensive Exercise and Watermelon Juice

Post-intervention blood pressure measurements indicated a meaningful reduction in the intervention group's readings to an average of 145/85 mmHg, compared to the control group's average of 160/96 mmHg. This change underscores the positive impact of combining antihypertensive exercise and watermelon juice on blood pressure reduction. Antihypertensive exercises aim to lower stress levels and promote weight loss, both of which are effective strategies for blood pressure management (Sakinah et al., 2022).

Watermelon, with its high water and potassium content, acts as a natural diuretic and helps reduce blood pressure. Additionally, compounds like citrulline found in watermelon aid blood vessel relaxation, further contributing to blood pressure control (Fadliyah & Aini, 2020). This physiological effect aligns with the outcomes seen in this study, where the intervention group exhibited a more significant reduction in blood pressure than the control group.

The mechanisms behind these effects are grounded in physiological changes such as increased blood flow and reduced arterial stiffness after exercise. The citrulline and potassium in watermelon complement this by supporting vasodilation, facilitating lower blood pressure levels (Nugroho & Paningrum, 2024). Overall, this intervention shows promise as a non-pharmacological approach to hypertension management in older adults.

Impact of Antihypertensive Exercise and Watermelon Juice Intervention

The statistical analysis revealed a significant difference between the intervention and control groups' blood pressure levels post-intervention, with a p-value of 0.004 ($p < 0.05$). These results suggest a substantial impact of antihypertensive exercise combined with watermelon juice in lowering blood pressure, providing empirical support for the effectiveness of this approach among elderly hypertensive patients in Labruk Lor Village.

Elderly-focused antihypertensive exercises prioritize heart function, muscle movement, and flexibility while promoting oxygen intake. This regimen not only lowers blood pressure but also reduces obesity, resting heart rate, and insulin resistance (Yanti et al., 2021). Thus, as seen in this study, regular practice of such exercises can be a sustainable approach to managing hypertension in aging populations.

Watermelon's amino acids, such as citrulline and arginine, further support cardiovascular health by improving arterial flexibility and blood flow (Smeets et al., 2022). This study reaffirms that these components aid in blood pressure regulation, particularly for hypertensive individuals with obesity. As a result, the combination of exercise and dietary watermelon intake could be promoted as an effective, non-pharmacological intervention within public health initiatives, especially in community settings like the Elderly Posyandu.

CONCLUSION

In conclusion, the combination of antihypertensive exercise and watermelon juice consumption significantly reduced blood pressure among elderly hypertensive individuals at the Elderly Posyandu in Labruk Lor Village, compared to the control group, which did not receive this intervention. This

approach successfully lowered the intervention group's average blood pressure from 162/96 mmHg to 145/85 mmHg through increased blood flow and reduced arterial stiffness. Antihypertensive exercise enhances cardiovascular function and muscle flexibility, while citrulline and potassium in watermelon aid in blood vessel relaxation. These findings highlight the potential of physical exercise and watermelon consumption as an effective, non-pharmacological approach for managing hypertension among the elderly in public health initiatives.

ACKNOWLEDGEMENT

The authors express their gratitude to Rogotrunan Health Center, Lumajang, East Java, Indonesia, for providing the database used in this study.

CONFLICT OF INTEREST

The authors declared no competing interests in the production of this manuscript.

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