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The effect of chayote jelly on blood pressure among older adults with hypertension

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Abstract

Background: Hypertension is a major health concern among older adults and increases the risk of cardiovascular complications. Dietary approaches may complement conventional hypertension management, including the use of chayote (*Sechium edule*).

Purpose: This study aimed to evaluate changes in blood pressure among older adults with hypertension following chayote jelly administration.

Method: This quantitative study involved 18 older adults with hypertension attending the Elderly Integrated Health Service Post in Malangan Hamlet, Sumberagung, Moyudan, Sleman, Indonesia. Participants were divided into an intervention group receiving chayote jelly (n = 9) and a control group (n = 9). Blood pressure was measured before and after the study period and recorded on an observation sheet. The Wilcoxon signed-rank test was used to analyse paired pre-test and post-test measurements.

Results: At post-test, 7 of 9 participants in the intervention group were classified as having normal blood pressure, compared with 0 of 9 participants in the control group. The manuscript data available for this revision do not include the actual pre-test and post-test systolic and diastolic blood pressure values (mmHg); therefore, the magnitude of change and the comparative effect between groups cannot be quantified.

Conclusion: The distribution of blood pressure categories shifted toward normal in the intervention group after the study period. Because actual blood pressure measurements and a verified between-group analysis are unavailable, these findings are preliminary and do not establish the effectiveness of chayote jelly.

Keywords: Blood Pressure; Chayote Jelly; Hypertension; Older Adults

INTRODUCTION

Changes in blood pressure are among the most common medical conditions affecting older adults. An increase in systolic blood pressure to ≥ 140 mmHg and diastolic blood pressure to ≥ 90 mmHg indicates hypertension (Pujiningrum et al., 2024). Hypertension also affects several aspects of older adults' lives, including their physical, emotional, and overall health (Nursyahrani et al., 2024). Although hypertension is a noncommunicable disease, it can pose serious health risks if left untreated or inadequately managed (Ledoh et al., 2024). Individuals with hypertension may experience dizziness and headaches due to changes in the blood vessels supplying the brain (Syarli & Arini, 2021). Shortness of breath and chest pain may also occur because the heart must work harder to pump blood throughout the body (Susanti &

Nurwiyeni, 2021). Older adults are particularly susceptible to hypertension due to aging, dietary patterns, genetic factors, and lifestyle habits (Nursyahrani et al., 2024).

The prevalence of hypertension is relatively high, with approximately 1.13 billion people worldwide living with the condition (Simamora & Kresnawati, 2021). In Indonesia, the prevalence of hypertension reached 34.1% in 2018, representing an increase compared with the 2013 figure (Ministry of Health of the Republic of Indonesia, 2019). The prevalence of hypertension increases substantially with age. It reaches 55.2% among individuals aged 55–64 years, 63.2% among those aged 65–74 years, and 69.5% among those aged 75 years and older. According to the 2018 Basic Health Research the prevalence of

hypertension in the Special Region of Yogyakarta (Daerah Istimewa Yogyakarta [DIY]) was 11.01%, higher than the national prevalence of 8.8%. Furthermore, reports from the Integrated Disease Surveillance System (Surveilans Terpadu Penyakit [STP]) for hospitals in DIY recorded 15,388 cases of essential hypertension (Supadmi et al., 2024).

Hypertension can have detrimental effects on health and lead to serious complications. It increases the risk of coronary heart disease, heart failure, and heart attacks among older adults (Kristinawati et al., 2025). Dietary quality, including the food and beverages consumed, influences nutritional intake and, consequently, an individual's health status (Sugiarto & Majida, 2025). Major contributing factors include unhealthy lifestyle habits, such as a high-sodium diet, inadequate fruit and vegetable consumption, smoking, excessive alcohol consumption, and insufficient physical activity (Ekasari et al., 2021). Chayote (*Sechium edule*) has potential antihypertensive properties, partly due to its flavonoid content (Juwariyah, 2021).

Flavonoids have been associated with protective effects on endothelial function and the inhibition of platelet aggregation, potentially reducing the risk of coronary heart disease and other cardiovascular diseases (Sijabat & Panjaitan, 2021). Chayote (*Sechium edule*) also contains nutrients and bioactive compounds, including protein, potassium, alkaloids, and flavonoids. Potassium plays an important role in regulating blood pressure, helping maintain fluid balance, and supporting muscle and nerve function (Putri, 2020).

The government has established Minimum Service Standards (SPM) for the health sector, which specify the minimum types and quality of basic health services that citizens are entitled to receive as part of mandatory government responsibilities (Hidayati & Lazuardi, 2024). The performance target for community health centers in providing health services to patients with hypertension under the Minimum Service Standards is 100%. Accordingly, community health centers are required to deliver health services in accordance with the applicable Minimum Service Standards for Regional Public Service Agencies at Regional Technical Implementation Units (Muslimah et al., 2023).

RESEARCH METHOD

This study used a quasi-experimental pretest–posttest control-group design to examine changes in blood pressure among older adults with hypertension. It was conducted at the Elderly Integrated Health Service Post in Malangan Hamlet, Sumberagung, Moyudan, Sleman, Indonesia. Eighteen participants were recruited using total sampling and assigned to an intervention group ($n=9$) and a control group ($n=9$). The manuscript does not specify the allocation procedure or provide the full eligibility criteria; these details should be reported from the original study records.

The intervention group received chayote jelly made from chayote (*Sechium edule*), while the control group did not receive the jelly. The manuscript does not report the complete recipe, preparation procedure, serving size, administration frequency, or intervention duration. These details, as well as participants' antihypertensive medication use and adherence during the study, must be verified against the original protocol and study records before publication.

Blood pressure was assessed before and after the study period in both groups and recorded on an observation sheet. The manuscript does not identify the blood pressure monitor, the rest period before measurement, the number of readings taken at each assessment, or the criteria used to classify blood pressure. These procedures should be described accurately from the original data-collection protocol.

Participant characteristics and blood pressure categories were summarised descriptively. The manuscript reports use of the Shapiro–Wilk test and the Wilcoxon signed-rank test for paired pretest–posttest comparisons. The statistical output presented in Table 3 requires verification against the original analysis output before the p -values and test conclusions can be reported. A direct comparison of change scores between the intervention and control groups is also required to assess whether changes differed between groups.

Ethical approval was obtained from the Research Ethics Committee of Universitas 'Aisyiyah Yogyakarta (No. 4963/KEP-UNISA/XII/2025). The study report should confirm that all participants received information about the study and provided informed consent. Participant confidentiality should be maintained throughout data collection, analysis, and reporting.

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RESEARCH RESULTS

Table 1. Characteristics of Respondents (N=18)

Variable	Intervention Group	Control Group
Age (n/%) (Mean±SD) (Years) (Range)	(69.83±5.10) (60-78)	(67.72±4.99) (60-78)
60-<65	2/22.2	3/33.3
66-<70	2/22.2	4/44.5
70-<75	4/44.5	1/11.1
75-<80	1/11.1	1/11.1
Gender (n/%)		
Male	2/22.2	2/22.2
Female	7/77.8	7/77.8
Occupation (n/%)		
Homemaker	6/66.7	3/33.3
Laborer	2/22.2	3/33.3
Trader	1/11.1	3/33.3
Smoking Habit (n/%)		
Yes	0/0	1/11.1
No	9/100	8/88.9
Eating Habit (n/%)		
1 pinch of salt per meal	9/100	9/100
2 pinches of salt per meal	0/0	0/0
1 teaspoon of salt per meal	0/0	0/0

In Table 1, the largest age category in the intervention group was 70–<75 years (4 participants, 44.5%), whereas the largest category in the control group was 66–<70 years (4 participants, 44.5%). The reported mean age was 69.83 ± 5.10 years in the intervention group and 67.72 ± 4.99 years in the control group. Women accounted for 7 participants (77.8%) in each group. In the intervention group, 6 participants (66.7%) were homemakers; in the control group, homemakers, laborers, and traders each accounted for 3 participants (33.3%). All participants in the intervention group and 8 participants (88.9%) in the control group were non-smokers. All participants reported consuming one pinch of salt per meal.

Table 2. Pretest & Posttest Frequency Distribution of Intervention and Control Groups

Variable	Pretest	Post-test	Difference
Intervention Group			
Normal	0	7	+7
Prehypertension	2	1	-1
Stage 1 hypertension	6	1	-5
Stage 2 hypertension	1	0	-1
Control Group			
Normal	0	0	0
Prehypertension	0	0	0

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Stage 1 hypertension	3	5	+2
Stage 2 hypertension	6	4	-2

At pretest, 6 participants (66.7%) in the intervention group were classified as having stage 1 hypertension, 2 (22.2%) as having elevated blood pressure, and 1 (11.1%) as having stage 2 hypertension. At post-test, 7 participants (77.8%) in this group were classified in the normal category, 1 (11.1%) in the elevated category, and 1 (11.1%) in the stage 1 hypertension category. In the control group, 6 participants (66.7%) were classified as having stage 2 hypertension at pretest. At post-test, 5 participants (55.6%) were classified as having stage 1 hypertension and 4 (44.4%) as having stage 2 hypertension. These are category counts; they do not indicate the magnitude of change in systolic or diastolic blood pressure in mmHg.

Table 3. Normality Test of Elderly Blood Pressure Data for Pretest and Posttest and Wilcoxon Test Results for Pre and Post Intervention and Control

Blood Pressure	N	Sig. Value	Result	P-Value
Systolic Pretest Control	9	0.00	Non-normal	0.105
Diastolic Pretest Control	9	0.48	Non-normal	
Systolic Posttest Control	9	0.03	Non-normal	
Diastolic Posttest Control	9	0.09	Non-normal	
Systolic Pretest Intervention	9	0.00	Non-normal	0.000
Diastolic Pretest Intervention	9	1.59	Normal	
Systolic Posttest Intervention	9	0.00	Non-normal	
Diastolic Posttest Intervention	9	0.09	Non-normal	

Based on Table 3. the Shapiro–Wilk normality test showed that some data were normally distributed, while others were not. Therefore, the data for the intervention and control groups were analyzed using a non-parametric test, namely the Wilcoxon signed-rank test. Statistically significant differences were found in both systolic and diastolic blood pressure in the intervention group, as well as in systolic blood pressure in the control group ($p < 0.05$). However, diastolic blood pressure in the control group did not show a statistically significant change ($p = 0.105 > 0.05$). The intervention group showed a greater change in blood pressure than the control group. These findings indicate that the alternative hypothesis (H_a) was accepted and the null hypothesis (H_o) was rejected, suggesting that the administration of chayote jelly had an effect on blood pressure among older adults in Malangan Hamlet.

DISCUSSION

Before the administration of chayote jelly, the blood pressure measurements showed that the majority of older adults in the intervention group in Malangan Hamlet, Sumberagung, Moyudan, Sleman,

had stage 1 hypertension, accounting for 6 participants (66.7%). Two participants (22.22%) were classified as having elevated blood pressure (prehypertension), while one participant (11.11%) had stage 2 hypertension. In the control group, 3 participants (33.33%) had stage 1 hypertension, while 6 participants (66.7%) had stage 2 hypertension.

The blood pressure findings were analyzed according to age. Previous theories indicate that age is one of the factors influencing hypertension. The prevalence of hypertension tends to increase with advancing age due to physiological changes in the blood vessels, heart, and hormones. After the age of 45 years, the arteries may become thicker due to collagen accumulation in the muscular layer. Over time, blood vessels narrow and become less elastic, increasing the likelihood of elevated blood pressure with age (Safitri & Romadhon, 2025).

Regarding age-related blood pressure characteristics, hypertension can affect individuals of all ages, but the risk increases with advancing age. The findings of this study indicated that hypertension was prevalent among participants aged 60 years and older. Following the intervention, the majority of

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participants in the intervention group had blood pressure within the normal range, whereas the control group showed no significant changes.

Most participants in this study were female. On average, female participants were classified as having stage 1 hypertension. Hormonal changes during the menopausal transition may contribute to an increased risk of hypertension in women. A decline in estrogen levels may affect vascular protection, including the maintenance of blood vessel elasticity and the reduction of atherosclerosis risk. As estrogen levels decrease, low-density lipoprotein (LDL) levels may increase while high-density lipoprotein (HDL) levels decrease, potentially accelerating plaque formation in blood vessels and increasing blood pressure. Hormonal changes may also increase sodium sensitivity, stimulate renin production, and activate the renin angiotensin aldosterone system (RAAS), all of which may contribute to elevated blood pressure in postmenopausal women (Nabila et al., 2025).

Regarding blood pressure based on sex, most female participants in the intervention group experienced a reduction in blood pressure following the intervention. In contrast, the control group showed no substantial changes, with most participants remaining in the stage 1 or stage 2 hypertension categories.

Most participants were housewives, and their blood pressure was generally classified as stage 1 hypertension. Previous research suggests that low levels of physical activity among housewives may reduce the elasticity of the cardiovascular system (Muslimah et al., 2023). Conversely, regular physical activity may help maintain cardiovascular function and vascular elasticity. Although arterial blood pressure temporarily increases during physical activity, regular exercise can contribute to better long-term blood pressure regulation. Housewives may also experience fatigue and stress, which can contribute to increased blood pressure and the risk of hypertension (Sijabat & Panjaitan, 2021).

The participants in this study had various occupations and activity levels, including housewives, laborers, and traders. In the intervention group, all participants experienced a reduction in blood

pressure following the administration of chayote jelly and the monitoring of their daily activity patterns.

Most participants in this study were non-smokers. Previous research has indicated that smoking can contribute to hypertension because cigarettes contain nicotine, an addictive substance that stimulates the release of catecholamines. Increased catecholamine levels may increase myocardial irritability, elevate heart rate, and trigger vasoconstriction, or the narrowing of blood vessels. These effects can ultimately increase blood pressure (Efriandi et al., 2023).

Regarding smoking habits, most participants were female non-smokers. Among the two participants who smoked, the participant in the intervention group experienced a reduction in blood pressure, whereas the participant in the control group did not show a reduction.

Most participants reported consuming approximately one pinch of salt per main meal, equivalent to approximately 0.5 grams. Excessive salt (sodium) consumption can contribute to the development of hypertension. Sodium chloride (table salt) and monosodium glutamate (MSG) are common dietary sources of sodium. The World Health Organization (WHO) recommends limiting salt intake to less than 5 grams per day (Tsuroyya et al., 2025).

Regarding daily salt consumption, most participants reported consuming approximately one pinch of salt with each main meal. In the intervention group, blood pressure decreased alongside dietary monitoring throughout the study. Although participants in the control group reported similar salt consumption, their dietary habits were not monitored or controlled during the study. Consequently, no significant reduction in blood pressure was observed in the control group.

Following the administration of chayote jelly, accompanied by monitoring of daily physical activity and dietary patterns among older adults at the Elderly Integrated Health Service Post (Posyandu Lansia) in Malangan Hamlet, a significant difference in blood pressure reduction was observed between the intervention and control groups.

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In the intervention group, participants whose blood pressure was predominantly classified as stage 1 hypertension before the intervention experienced a reduction in blood pressure, with most reaching the normal blood pressure category after the intervention. In contrast, the control group, which did not receive chayote jelly, continued to include many participants with stage 1 and stage 2 hypertension after the post-test, with no statistically significant changes observed.

These findings suggest that the administration of chayote jelly, combined with monitoring of daily physical activity and dietary patterns, may contribute to blood pressure reduction among older adults in Malangan Hamlet. However, because the intervention also involved monitoring physical activity and dietary habits, the observed changes cannot be attributed solely to chayote jelly.

CONCLUSION

The distribution of blood pressure categories shifted toward the normal category in the intervention group during the study period. However, the actual systolic and diastolic measurements and a verified between-group comparison are not available in the current manuscript. The findings should therefore be interpreted as preliminary and cannot establish that chayote jelly caused a reduction in blood pressure.

SUGGESTION

Older adults with hypertension should continue to follow clinical advice, monitor their blood pressure, and maintain a balanced diet. Chayote jelly should not replace prescribed antihypertensive treatment. Future studies should use a larger sample, describe the intervention protocol in full, document antihypertensive medication use and co-interventions, standardise blood pressure measurement, and report verified systolic and diastolic values in mmHg with within-group and between-group analyses.

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