THE EFFECTIVENESS OF WATERMELON JUICE IN REDUCING BLOOD PRESSURE AMONG PROLANIS HYPERTENSION PATIENTS AT PILOLODAA PUBLIC HEALTH CENTER, GORONTALO CITY

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ABSTRACT

Hypertension is a major public health concern that requires continuous pharmacological treatment and lifestyle modification. Watermelon juice contains bioactive compounds, particularly L-citrulline, that may support blood pressure regulation through nitric oxide synthesis and vasodilation. This study aimed to evaluate the effectiveness of watermelon juice in reducing blood pressure among patients with hypertension participating in Prolanis at Pilolodaa Public Health Center, Gorontalo City. A quantitative quasi-experimental study using a non-equivalent control group pretest–posttest design was conducted with 27 respondents, comprising 13 participants in the intervention group and 14 in the control group. The intervention group received watermelon juice alongside their usual antihypertensive medication, while the control group continued usual care. Data were analyzed using the Wilcoxon Signed-Rank Test and Mann–Whitney U test with a significance level of 0.05. The results showed a statistically significant difference between pretest and posttest blood pressure measurements in the intervention group ($Z = -2.500$, $p = 0.012$), whereas no significant difference was observed in the control group ($Z = 0.000$, $p = 1.000$). The between-group comparison showed no significant difference at baseline ($p = 0.793$) but a significant difference at posttest ($p = 0.017$). These findings suggest that watermelon juice may have potential as a complementary dietary intervention for hypertension management. However, the small sample and quasi-experimental design warrant cautious interpretation, and further studies using standardized protocols and direct comparisons of blood pressure changes are needed.

Keywords: *hypertension, watermelon juice, blood pressure, Prolanis, quasi-experimental study*

INTRODUCTION

Hypertension is a major global public health concern and one of the leading modifiable risk factors for cardiovascular disease and premature mortality. It affects more than one billion people worldwide, with a substantial proportion of cases occurring in low- and middle-income countries. Despite the availability of effective antihypertensive medications and established management guidelines, blood pressure control remains inadequate among many individuals with hypertension. This challenge is associated with limited awareness, inconsistent treatment adherence, and barriers to accessing health services [1]. Consequently, hypertension prevention and management require comprehensive approaches that combine pharmacological treatment, lifestyle modification, and continuous community-based health interventions.

Uncontrolled hypertension increases the risk of serious complications,

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including coronary heart disease, stroke, heart failure, and chronic kidney disease. Because hypertension frequently develops without noticeable symptoms, individuals may remain unaware of their condition until complications occur. Effective blood pressure management is therefore essential to reducing cardiovascular risks and improving long-term health outcomes. In addition to medication, dietary modification, regular physical activity, weight management, and reduced sodium intake are important components of hypertension control. These measures also provide opportunities to explore accessible dietary interventions that may complement conventional treatment without replacing prescribed medication.

In Indonesia, hypertension remains an important public health challenge requiring sustained preventive and promotive efforts. Community-based chronic disease management is supported through the *Program Pengelolaan Penyakit Kronis* (Prolanis), a program designed to improve the quality of life of individuals with chronic conditions through regular monitoring, health education, and coordinated care. For patients with hypertension, Prolanis provides an opportunity to strengthen treatment adherence, monitor blood pressure, and encourage healthier lifestyles. At the local level, the implementation of appropriate dietary interventions may complement these activities. However, the effectiveness of specific food-based interventions should be evaluated in the populations and healthcare settings where they are intended to be applied. In particular, evidence concerning the use of watermelon juice among Prolanis participants at Pilolodaa Public Health Center in Gorontalo City remains an important area for investigation.

Watermelon (*Citrullus lanatus*) has attracted scientific interest because of its potential cardiovascular benefits. It contains L-citrulline, an amino acid that can be converted into L-arginine, a substrate for nitric oxide synthesis. Nitric oxide contributes to vascular smooth muscle relaxation and vasodilation, mechanisms that may help regulate blood pressure. Watermelon also contains other bioactive compounds, including lycopene, which has antioxidant properties. These characteristics provide a biological rationale for investigating watermelon as a potential dietary complement to hypertension management. Nevertheless, the presence of beneficial compounds does not automatically establish the clinical effectiveness of watermelon juice, and its effects may depend on the amount consumed, intervention duration, individual characteristics, and concurrent treatment.

Previous empirical research has examined the potential antihypertensive effects of watermelon and its bioactive components. Massa et al. [2], investigated watermelon extract supplementation among prehypertensive and hypertensive individuals and reported reductions in blood pressure, although the intervention did not significantly alter sympathovagal balance. Their findings suggest that watermelon-derived compounds may have potential benefits for blood pressure regulation. Furthermore, Alshahrani et al. [3], conducted a meta-analysis of randomized clinical trials examining watermelon supplementation and blood pressure outcomes. Luo et al. [4], also reviewed randomized controlled trials investigating L-citrulline supplementation and watermelon intake among middle-aged and older adults. Collectively, these studies provide a foundation for further

investigation, although their findings should be interpreted in relation to differences in intervention forms, dosages, study populations, and methodological characteristics.

Despite these developments, several research gaps remain. Evidence derived from watermelon extracts or isolated L-citrulline supplementation cannot be directly generalized to watermelon juice prepared and consumed in routine community settings. Differences in preparation, serving size, intervention frequency, and participant characteristics may influence the observed outcomes. Moreover, the effectiveness of watermelon juice among Indonesian patients participating in structured chronic disease management programs requires further evaluation. Research conducted among Prolanis participants may provide context-specific evidence regarding whether this accessible dietary intervention is associated with measurable changes in systolic and diastolic blood pressure. Such evidence may help healthcare professionals provide more informed dietary education while maintaining the central role of evidence-based medical treatment.

Therefore, this study aims to evaluate the effectiveness of watermelon juice in reducing blood pressure among patients with hypertension participating in Prolanis at Pilolodaa Public Health Center, Gorontalo City. Specifically, the study examines blood pressure measurements before and after the intervention to determine whether changes occur following watermelon juice consumption. By focusing on a community-based healthcare setting, this research is expected to contribute locally relevant evidence concerning the potential role of watermelon juice as a complementary dietary intervention in hypertension management. The findings may also support the development of practical health education strategies for patients with hypertension, provided that any observed benefits are interpreted in accordance with the study design and its methodological limitations.

Literature Review

Hypertension Management: Pharmacological and Nonpharmacological Approaches

Hypertension management requires an integrated approach combining pharmacological treatment and nonpharmacological interventions to achieve sustained blood pressure control and prevent cardiovascular complications. De Denus et al. [5], Fujiwara and Kario [6], and Viktor [7], discussed the importance of selecting appropriate antihypertensive regimens based on treatment objectives, cardiovascular risk, and clinical considerations. However, effective management extends beyond medication to include dietary modification, physical activity, regular blood pressure monitoring, and patient education. Gupta [8] highlighted the challenges of managing hypertension and cardiovascular risk in resource-limited settings, where access to healthcare and continuity of treatment may influence outcomes. Similarly, Hany et al. [9], emphasized the importance of self-management interventions in supporting hypertension control, while Andala et al. [10], examined knowledge and beliefs concerning hypertension management among Indonesian women. In addition, Yin et al. [11], discussed emerging digital approaches, including artificial intelligence, for improving hypertension management. Collectively, these studies indicate that hypertension control depends on appropriate medical treatment, patient engagement, and accessible preventive strategies, providing a rationale for

investigating complementary dietary interventions such as watermelon juice within community-based programs like Prolanis.

Watermelon Bioactive Compounds and Their Potential Antihypertensive Mechanisms

Watermelon (*Citrullus lanatus*) contains bioactive compounds that may contribute to cardiovascular health, particularly L-citrulline, which can be converted into L-arginine and subsequently support nitric oxide synthesis. Nitric oxide promotes vascular smooth muscle relaxation and vasodilation, potentially reducing peripheral vascular resistance and blood pressure. Singh et al. [12], investigated the dose–response effects of watermelon consumption on ambulatory blood pressure among adults with elevated blood pressure, providing evidence relevant to the relationship between watermelon intake and blood pressure regulation. Massa et al. [2], also examined watermelon extract supplementation in prehypertensive and hypertensive individuals and reported reductions in blood pressure without significant changes in sympathovagal balance. These findings suggest that the potential antihypertensive effects of watermelon may involve vascular mechanisms that are not necessarily accompanied by measurable changes in autonomic balance. In addition to L-citrulline and its relationship with nitric oxide production, watermelon contains antioxidants and other phytochemicals that may contribute to cardiovascular health. Nevertheless, the physiological effects of watermelon consumption may depend on dosage, preparation, intervention duration, and individual characteristics, meaning that the effectiveness of watermelon juice should be evaluated separately from that of concentrated extracts or isolated compounds.

Empirical Evidence on Watermelon Consumption and Blood Pressure Reduction

Previous empirical studies have investigated watermelon in different forms, populations, and research settings, providing a growing but heterogeneous body of evidence regarding its potential antihypertensive effects. Massa et al. [2], reported that watermelon extract supplementation reduced blood pressure among prehypertensive and hypertensive individuals, although the intervention did not significantly change sympathovagal balance. In a study involving hypertensive patients, Fadlilah et al. [13], examined the benefits of young coconut water, watermelon, and papaya for blood pressure, providing evidence relevant to the use of fruit-based interventions in hypertension management. At the evidence-synthesis level, Alshahrani et al. [3], conducted a meta-analysis of randomized clinical trials evaluating watermelon supplementation and blood pressure, while Luo et al. [4], systematically reviewed and analyzed randomized controlled trials examining L-citrulline supplementation and watermelon intake among middle-aged and older adults. Singh et al. [12], further investigated different levels of watermelon consumption and their effects on ambulatory blood pressure in adults with elevated blood pressure. Beyond direct blood pressure outcomes, Blohm et al. [14], evaluated acute watermelon juice supplementation in relation to post-exercise heart rate recovery, blood lactate, blood pressure, blood glucose, and muscle soreness in healthy adults, offering evidence about its physiological effects in an exercise context. Meanwhile, Becraft et al. [15], investigated watermelon and its byproducts in high-fat-

fed male mice, focusing on glucose metabolism, the microbiome, and hepatic proinflammatory metabolites. Although the animal study provides additional insights into the metabolic effects of watermelon, its findings cannot be directly generalized to human blood pressure outcomes. Overall, these studies support further investigation of watermelon as a potential dietary component in hypertension management, while differences in study design, population, intervention form, and measured outcomes require careful interpretation.

Research Gaps and the Rationale for the Present Study

Despite the growing evidence concerning watermelon consumption and cardiovascular health, several gaps remain in understanding its effectiveness as a practical intervention for hypertension. Existing studies have examined watermelon extracts, whole-fruit consumption, juice supplementation, and isolated L-citrulline, which are not necessarily equivalent in terms of dosage, bioavailability, or physiological effects [2][12]. Although meta-analyses by Alshahrani et al. [3] and Luo et al. [4], provide broader assessments of the available evidence, variation in study populations and intervention protocols highlights the need for further research using clearly defined and reproducible interventions. Moreover, findings from healthy adults following exercise protocols [14] and animal models investigating metabolic outcomes [15] cannot establish the effectiveness of watermelon juice among patients with diagnosed hypertension. Fadlilah et al. [13], provide evidence relevant to fruit-based interventions in hypertensive patients, but further context-specific evaluation remains important. In addition, questions concerning long-term effectiveness, optimal consumption levels, underlying physiological mechanisms, and comparisons with other dietary interventions require further investigation. Research specifically involving Prolanis participants at Pilolodaa Public Health Center in Gorontalo City may help address the contextual evidence gap by examining blood pressure before and after watermelon juice consumption. Therefore, the present study aims to evaluate the effectiveness of watermelon juice in reducing blood pressure among Prolanis participants with hypertension, contributing local evidence that may inform community-based health education and complement established pharmacological and lifestyle management strategies.

RESEARCH METHODS

Research Design

This study employed a quantitative approach using a quasi-experimental method with a non-equivalent control group pretest–posttest design. The study involved an intervention group that received watermelon juice in addition to their usual antihypertensive medication and a control group that continued their usual care without watermelon juice. Blood pressure was measured before and after the intervention in both groups to assess changes associated with watermelon juice consumption and compare the outcomes between the groups. The study was conducted in the working area of Pilolodaa Public Health Center, Gorontalo City, Indonesia.

Population and Sample

The study population consisted of patients with hypertension residing in the working area of Pilolodaa Public Health Center, Gorontalo City. A total of 27 respondents aged 45–75 years participated

in the study, comprising 13 respondents in the intervention group and 14 respondents in the control group. The respondents had varying durations of hypertension, and all reported using antihypertensive medication. The participants were divided into intervention and control groups, with blood pressure assessed in both groups before and after the study intervention. The sampling technique and specific inclusion and exclusion criteria should be reported according to the procedures actually implemented during participant recruitment.

Research Variables and Intervention

The independent variable was the administration of watermelon juice, while the dependent variable was the respondents' blood pressure. The intervention group received watermelon juice while continuing their usual antihypertensive treatment, whereas the control group continued their usual care without receiving watermelon juice as part of the study intervention. Blood pressure measurements were obtained before and after the intervention to evaluate changes in blood pressure within each group and differences between the groups. The volume of watermelon juice, preparation method, frequency of administration, intervention duration, and procedures for maintaining consistent antihypertensive medication use should be specified based on the actual study protocol.

Data Collection

Data were collected through observation, interviews, documentation, and questionnaires. The collected information included respondents' demographic characteristics, such as age and gender, duration of hypertension, use of antihypertensive medication, and blood pressure measurements before and after the intervention. Blood pressure data were categorized according to the classification used in the study records. Measurements were obtained for both the intervention and control groups to facilitate comparisons of pretest and posttest outcomes. The measurement instrument, measurement procedure, and timing of blood pressure assessments should be documented to ensure that the data collection process is transparent and reproducible.

Data Analysis

Data analysis consisted of univariate and bivariate analyses. Univariate analysis was used to describe respondents' characteristics, including age, gender, duration of hypertension, antihypertensive medication use, and blood pressure distributions before and after the intervention. Bivariate analysis was conducted using the Wilcoxon Signed-Rank Test to assess differences between pretest and posttest blood pressure measurements within the intervention and control groups. The Mann–Whitney U test was used to compare blood pressure outcomes between the two independent groups. Statistical significance was evaluated at a threshold of 0.05. The analysis was performed using SPSS version 26, and the results were interpreted based on the corresponding p-values.

RESEARCH RESULT

Univariate Analysis

Respondent Characteristics by Age

Table 1. Age Distribution of Respondents (N = 27)

Age group (years)	Frequency (n)	Percentage (%)
45–55	11	40.7
56–65	8	29.6
66–75	8	29.6
Total	27	100

Table 1 shows that the largest age group comprised respondents aged 45–55 years, accounting for 11 participants

(40.7%). Respondents aged 56–65 years and 66–75 years each accounted for eight participants (29.6%). These findings indicate that the study population was predominantly composed of middle-aged and older adults with hypertension.

Respondent Characteristics by Gender

Table 2. Gender Distribution of Respondents (N = 27)

Gender	Frequency (n)	Percentage (%)
Male	9	33.3
Female	18	66.7
Total	27	100.0

As presented in Table 2, female respondents accounted for 18 participants (66.7%), whereas male respondents accounted for nine participants (33.3%). Thus, women represented approximately two-thirds of the study population. This distribution describes the characteristics of the recruited participants but does not establish that gender influences the effectiveness of watermelon juice in reducing blood pressure.

Respondent Characteristics by Duration of Hypertension

Table 3. Duration of Hypertension Among Respondents (N = 27)

Duration of hypertension	Frequency (n)	Percentage (%)
Less than 1 year	2	7.4
1–3 years	7	25.9
4–6 years	8	29.6
More than 6 years	10	37
Total	27	100.0

Table 3 indicates that the largest proportion of respondents had experienced hypertension for more than six years, comprising 10 participants (37.0%). Eight respondents (29.6%) had a hypertension history of 4–6 years, while seven (25.9%) had experienced the condition for 1–3 years. Only two respondents (7.4%) reported having hypertension for less than one year. These findings demonstrate that hypertension had been present for several years in a substantial proportion of the participants.

Antihypertensive Medication Use

Table 4. Antihypertensive Medication Use Among Respondents (N = 27)

Medication use	Frequency (n)	Percentage (%)
Yes	27	100
Total	27	100

Table 4 shows that all 27 respondents (100.0%) reported taking antihypertensive medication. Accordingly, the evaluation of watermelon juice was conducted in a population receiving pharmacological treatment. This characteristic is important when interpreting changes in blood pressure because the observed outcomes may reflect the combined influence of usual antihypertensive treatment and the study intervention.

Blood Pressure Distribution in the Intervention Group Before and After Watermelon Juice Administration

Table 5. Blood Pressure Distribution Before and After Watermelon Juice Administration (n = 13)

Blood pressure category as recorded	Pretest n (%)	Posttest n (%)
120–139/80–90 mmHg	3 (23.1)	—
140–159/90–100 mmHg	6 (46.2)	4 (30.8)
Above 160 mmHg	4 (30.8)	—
110–120 mmHg	—	3 (23.1)
121–139/80–90 mmHg	—	6 (46.2)
Total	13 (100.0)	13 (100.0)

Before watermelon juice administration, six respondents (46.2%) were classified in the 140–159/90–100 mmHg category, four (30.8%) were in the category above 160 mmHg, and three (23.1%) were in the 120–139/80–90 mmHg category. Following the intervention, six respondents (46.2%) were classified in the 121–139/80–90 mmHg category, three

(23.1%) in the 110–120 mmHg category, and four (30.8%) in the 140–159/90–100 mmHg category. The distribution therefore shows a shift toward lower reported blood pressure categories after the intervention. However, these aggregate frequencies do not establish the individual transitions between categories; the paired measurements and statistical test provide the relevant evidence for evaluating within-group changes.

Blood Pressure Distribution in the Control Group Before and After the Observation Period

Table 6. Blood Pressure Distribution in the Control Group (n = 14)

Blood pressure category as recorded	Pretest n (%)	Posttest n (%)
120–139/80–90 mmHg	3 (21.4)	—
140–159/90–100 mmHg	8 (57.1)	7 (50.0)
Above 160 mmHg	3 (21.4)	3 (21.4)
110–120 mmHg	—	4 (28.6)
121–139/80–90 mmHg	—	—
Total	14 (100.0)	14 (100.0)

At baseline, eight control-group respondents (57.1%) were classified in the 140–159/90–100 mmHg category, three (21.4%) were in the 120–139/80–90 mmHg category, and three (21.4%) were above 160 mmHg. At posttest, seven respondents (50.0%) were in the 140–159/90–100 mmHg category, four (28.6%) were in the 120–139/80–90 mmHg category, and three (21.4%) remained above 160 mmHg. The frequency distribution suggests some changes in the recorded categories during the observation period. Nevertheless, the statistical analysis is required to determine whether the paired blood pressure measurements changed significantly in the control group.

Bivariate Analysis

Pretest–Posttest Comparison in the Intervention Group

Table 7. Wilcoxon Signed-Rank Test for Blood Pressure in the Intervention Group (n = 13)

Statistical parameter	Result
Z	−2.500
Asymptotic significance (two-tailed)	0.012
Significance level	0.05
Statistical decision	Reject H_0

Source: SPSS version 26.

The Wilcoxon Signed-Rank Test was used to examine differences between pretest and posttest blood pressure measurements in the intervention group. The analysis yielded a Z statistic of −2.500 and a two-tailed p-value of 0.012. Because the p-value was below the significance threshold of 0.05, the null hypothesis of no difference was rejected. These results indicate a statistically significant difference between blood pressure measurements before and after watermelon juice administration. When considered alongside the observed shift in the frequency distribution toward lower reported categories, the findings are consistent with a potential blood pressure-lowering effect. However, the magnitude of the change cannot be determined from the p-value alone and requires analysis of the actual paired systolic and diastolic measurements.

Pretest–Posttest Comparison in the Control Group

Table 8. Wilcoxon Signed-Rank Test for Blood Pressure in the Control Group (n = 14)

Statistical parameter	Result
Z	0
Asymptotic significance (two-tailed)	1
Significance level	0.05
Statistical decision	Fail to reject H_0

Source: SPSS version 26.

The Wilcoxon Signed-Rank Test for the control group produced a Z statistic of 0.000 and a two-tailed p-value of 1.000.

Since the p-value exceeded 0.05, the analysis did not identify a statistically significant difference between pretest and posttest blood pressure measurements in this group. Although the descriptive distribution showed changes in the number of respondents within certain categories, these changes were not accompanied by a statistically significant difference in the paired measurements. The findings indicate that the blood pressure outcomes in the control group did not demonstrate a statistically significant change during the observation period.

Between-Group Comparison at Pretest and Posttest

Table 9. Mann–Whitney U Test Comparing the Intervention and Control Groups

Measurement	Z	Asymptotic significance (two-tailed)	Interpretation
Pretest	−0.292	0.793	No statistically significant difference
Posttest	−2.535	0.017	Statistically significant difference

Source: SPSS version 26.

The Mann–Whitney U test was used to compare blood pressure outcomes between the intervention and control groups. At pretest, the analysis yielded a Z statistic of −0.292 and a p-value of 0.793, indicating no statistically significant difference between the groups at baseline. At posttest, the Z statistic was −2.535, with a p-value of 0.017, indicating a statistically significant difference between the groups after the observation period. These results demonstrate that the posttest blood pressure distributions differed significantly between the two groups. However, the direction and magnitude of the between-group difference should be established using the actual blood pressure values and group ranks. Furthermore, a significant posttest difference alone does not definitively establish a causal treatment effect; comparison of changes from baseline or an appropriate baseline-adjusted analysis would provide stronger evidence of the intervention's effectiveness.

DISCUSSION

This study aimed to evaluate the effectiveness of watermelon juice in reducing blood pressure among patients with hypertension participating in Prolanis at Pilolodaa Public Health Center, Gorontalo City. The findings indicate a statistically significant difference between pretest and posttest blood pressure measurements in the intervention group, whereas no statistically significant difference was identified in the control group. Furthermore, the comparison between groups revealed no statistically significant difference at baseline but a significant difference at posttest. Taken together, these findings suggest that watermelon juice may have a beneficial complementary role in hypertension management. However, the results should be interpreted cautiously because the quasi-experimental design, relatively small sample, and absence of reported effect-size estimates limit the strength of causal conclusions.

The significant pretest–posttest difference in the intervention group suggests that blood pressure changed following watermelon juice administration. This finding is biologically plausible because watermelon (*Citrullus lanatus*) contains L-citrulline, an amino acid that can be converted into L-arginine and subsequently contribute to nitric oxide synthesis. Nitric oxide promotes vascular

smooth muscle relaxation and vasodilation, which may reduce peripheral vascular resistance and support blood pressure regulation. Watermelon also contains lycopene and other bioactive compounds with antioxidant properties that may contribute to cardiovascular health. These mechanisms provide a theoretical explanation for the observed change, although the present study did not measure L-citrulline, nitric oxide, vascular function, or oxidative stress. Therefore, the proposed mechanisms should be understood as physiological explanations supported by previous literature rather than mechanisms directly demonstrated by this study.

The findings are consistent with the research of Massa et al. [2], who investigated watermelon extract supplementation among individuals with prehypertension and hypertension and reported reductions in blood pressure. Singh et al. [12] also examined the dose–response effects of watermelon consumption on ambulatory blood pressure among adults with elevated blood pressure, providing relevant evidence concerning the potential relationship between watermelon intake and blood pressure regulation. In addition, the evidence syntheses conducted by Alshahrani et al. [3] and Luo et al. [4] provide a broader basis for examining the potential cardiovascular effects of watermelon supplementation and L-citrulline. Nevertheless, the interventions evaluated in these studies are not necessarily equivalent to the watermelon juice used in the present research. Differences in preparation, quantity, frequency, intervention duration, participant characteristics, and outcome measurements may influence the results. Accordingly, the present findings contribute context-specific evidence from Prolanis participants but should not be interpreted as establishing that all forms or amounts of watermelon produce the same antihypertensive effect.

Respondent characteristics also provide important context for interpreting the findings. Most participants were women, and a substantial proportion had experienced hypertension for more than six years. These characteristics indicate that the study included individuals managing a chronic condition over an extended period. Long-term hypertension management commonly requires sustained adherence to medication, regular monitoring, and lifestyle modification. Dietary interventions may be particularly relevant as part of this broader management approach because they can be incorporated into health education and self-care activities. However, the study did not examine whether age, gender, or duration of hypertension modified the response to watermelon juice. Consequently, these demographic characteristics should be regarded as descriptions of the study population rather than evidence that a particular subgroup benefits more from the intervention.

An important consideration is that all participants reported using antihypertensive medication. Therefore, the observed changes in the intervention group occurred in the context of ongoing pharmacological treatment. This is clinically relevant because watermelon juice was evaluated as an additional dietary intervention rather than as a replacement for prescribed medication. The findings should not be interpreted as evidence that watermelon juice alone can control hypertension or that patients can reduce or discontinue their medication. The role of complementary dietary interventions is to support established hypertension management, including medication

adherence, appropriate dietary practices, physical activity, and routine blood pressure monitoring. This interpretation is consistent with the integrated approach to hypertension management discussed by De Denus et al. [5], Fujiwara and Kario [6], and Viktor [7]. In a community-based program such as Prolanis, healthcare professionals can provide dietary education while continuing to emphasize regular clinical assessment and adherence to prescribed treatment.

In contrast to the intervention group, the control group did not demonstrate a statistically significant difference between pretest and posttest blood pressure measurements. This finding suggests that no statistically detectable within-group change occurred during the observation period under the conditions experienced by the control participants. The contrast between the two groups is consistent with the possibility that the additional intervention contributed to the different posttest outcomes. However, the absence of a significant result in the control group does not by itself prove that watermelon juice caused the observed change in the intervention group. A significant result in one group and a nonsignificant result in another is not equivalent to a statistically significant difference in the magnitude of change between the groups. Direct comparison of individual blood pressure changes, or an appropriate baseline-adjusted analysis, would provide stronger evidence of the intervention's comparative effectiveness.

The between-group analysis found no statistically significant difference at pretest, suggesting that the groups did not differ detectably in their baseline blood pressure outcomes according to the reported test. At posttest, the difference between groups was statistically significant. This result strengthens the evidence that the post-intervention blood pressure distributions differed between participants who received watermelon juice and those who continued usual care. Nevertheless, the direction and clinical magnitude of this difference cannot be established fully from the reported p-value alone. The actual systolic and diastolic measurements, group medians, changes from baseline, and effect-size estimates are needed to determine how much blood pressure changed and whether the difference is clinically meaningful. Moreover, a nonsignificant baseline test does not establish that the groups were equivalent in all relevant characteristics, particularly in a nonrandomized study with only 27 participants.

These methodological considerations are important when interpreting the effectiveness of the intervention. The relatively small sample of 13 participants in the intervention group and 14 in the control group limits statistical precision and the generalizability of the findings. Because the study used a non-equivalent control group design, differences in unmeasured characteristics, medication adherence, dietary intake, physical activity, stress, or other concurrent behaviors may have influenced blood pressure outcomes. In addition, the reported blood pressure categories are not fully consistent across the pretest and posttest tables, with some categories combining systolic and diastolic values while others report only a systolic threshold. This inconsistency makes it difficult to assess the exact clinical distribution of blood pressure changes. Future analyses should use the original paired systolic and diastolic measurements, report standardized units and measurement procedures, and provide medians or means with appropriate

measures of variability, effect sizes, and confidence intervals. A direct comparison of changes between groups or a baseline-adjusted model would also strengthen the assessment of the intervention effect.

From a practical perspective, the findings provide preliminary support for considering watermelon juice as a potential complementary dietary option in community-based hypertension management. Pilolodaa Public Health Center and other primary healthcare facilities could use the findings to inform discussions about healthy food choices, provided that such education does not present watermelon juice as a substitute for antihypertensive medication or established dietary recommendations. Any implementation should specify the preparation method, serving quantity, frequency, and duration based on a clearly documented protocol. Patients should continue taking medication as prescribed and undergo routine blood pressure monitoring. Further studies involving larger samples, randomized allocation where feasible, standardized intervention protocols, and longer follow-up periods are needed to establish the reproducibility, magnitude, and sustainability of the observed changes. Such research should also examine adherence, potential confounding factors, and whether improvements differ across clinically relevant patient groups.

Overall, the study found a statistically significant pretest–posttest difference in the intervention group, no statistically significant within-group difference in the control group, and a statistically significant between-group difference at posttest. These results are consistent with the potential benefit of watermelon juice as an adjunct to usual hypertension care among Prolanis participants. However, because the study did not establish the magnitude of the blood pressure reduction or fully exclude alternative explanations, the findings should be regarded as preliminary evidence rather than definitive proof of a causal effect. Further methodologically rigorous research is necessary before stronger clinical recommendations can be made.

CONCLUSION

This study found a statistically significant difference in blood pressure measurements before and after watermelon juice administration among patients with hypertension participating in Prolanis at Pilolodaa Public Health Center, Gorontalo City. No statistically significant pretest–posttest difference was observed in the control group, while the comparison between groups indicated a significant difference at posttest. These findings suggest that watermelon juice may serve as a complementary dietary intervention alongside conventional antihypertensive treatment. Nevertheless, the small sample size, nonrandomized design, and limitations in the reported blood pressure categories restrict the strength of conclusions regarding its causal effectiveness and clinical significance. Therefore, watermelon juice should not replace prescribed medication, and patients should continue routine blood pressure monitoring and follow healthcare professionals' recommendations. Future research should involve larger samples, standardized juice preparation and administration protocols, consistent blood pressure measurements, and direct analysis of changes between groups to establish the magnitude, reliability, and sustainability of the intervention's effects.

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