



## The Effect of Watermelon Juice Consumption on Reducing Blood Pressure in The Elderly

journal home page: <https://goicare.web.id/index.php/JNJ>

Amos Armando Marbun Lumban Gaol<sup>\*1</sup>, Diah Sulastri<sup>1</sup>, Sri Maryuni<sup>1</sup>



<sup>1</sup> Faculty of Health, Bachelor of Nursing Study Program, Mitra Indonesia University, Indonesia

### QUASI EXPERIMENTAL STUDY

#### ARTICLE HISTORY

Received: May 10, 2025

Revised: May 20, 2025

Accepted: June 19, 2025

DOI: 10.61716/jnj.v3i2.105

#### \*Corresponding author:

Amos Armando Marbun Lumban Gaol

Faculty of Health, Bachelor of Nursing, Study Program, Mitra Indonesia University, Indonesia Alamat : Dusun II Rt 002 Rw 001 Desa Gaya Baru II Kecamatan Seputih Surabaya Kabupaten Lampung Tengah Lampung

Email: [amosarmadom@gmail.com](mailto:amosarmadom@gmail.com)



#### Abstract

**Background:** Hypertension remains a leading global health concern, particularly among the elderly, and is a key risk factor for cardiovascular complications. In addition to pharmacological interventions, non-pharmacological therapies such as herbal remedies are gaining interest. Watermelon (*Citrullus lanatus*) contains bioactive compounds, including citrulline, potassium, and lycopene, that may contribute to blood pressure regulation. **Purpose:** This study aimed to investigate the effect of watermelon juice consumption on reducing blood pressure among elderly individuals with hypertension at the Gedong Air Health Center, Bandar Lampung, in 2025. **Methods:** A quasi-experimental study with a one-group pretest-posttest design was conducted involving 20 elderly respondents selected through random sampling. Participants consumed watermelon juice over a 7-day intervention period. Blood pressure measurements were taken before and after the intervention. Due to non-normal data distribution (Shapiro-Wilk  $p < 0.05$ ), the Wilcoxon signed-rank test was used for analysis. **Results:** Pre-intervention mean systolic and diastolic blood pressure were 168.00 mmHg and 99.40 mmHg, respectively. Post-intervention means decreased significantly to 135.05 mmHg and 85.50 mmHg. The Wilcoxon test revealed a statistically significant reduction in both systolic ( $Z = -3.929$ ,  $p = 0.001$ ) and diastolic ( $Z = -3.746$ ,  $p = 0.001$ ) pressures, indicating that watermelon juice effectively reduced blood pressure levels in the elderly sample. **Conclusion:** Watermelon juice demonstrated a significant antihypertensive effect in elderly individuals, suggesting its potential as a complementary non-pharmacological approach in managing hypertension. Further studies with larger samples and control groups are warranted.

**Keywords:** hypertension, watermelon, blood pressure, aged

### Introduction

Hypertension is a worldwide health problem and is one of the main risk factors for cardiovascular disease. Hypertension is a non-communicable disease [3]. Based on the research of [8], Hypertension is also referred to as “The Silent Killer”, because often people with hypertension for years do not feel any disturbance or symptoms. According to the [11]. Hypertension or high blood pressure can occur when there is an increase in systolic blood pressure of more than 140 mmHg and diastolic blood

pressure of more than 90 mmHg in two measurements, five minutes apart, in a calm/adequate rest.

Based on research [8], Factors that influence the occurrence of hypertension are divided into two major groups, namely factors that can be changed or cannot be changed, such as gender, age, genetics, and factors that can be changed, such as diet, exercise habits, and others. Hypertension is more common in middle-aged and elderly adults. More than half of the population aged 60-74 years have it, even this figure

increases to around 75% in those aged 75 years and above. If not treated properly, hypertension can lead to various serious complications such as heart attack, arteriosclerosis, blindness, heart failure, and impaired kidney function.

According to WHO, the current prevalence of hypertension globally is 22% of the total world population of these sufferers, only less than one third have made efforts to control their blood pressure[10]. In 2015, the World Health Organization (WHO) showed that around 1.13 billion people in the world suffered from hypertension, meaning that 1 in 3 people in the world were diagnosed with hypertension. The number of people with hypertension continues to increase every year, it is estimated that by 2025 it will amount to 1.5 billion people [9].

The prevalence of hypertension in Indonesia according to Riskesdes research, (2018) was 34.11%, an increase compared to the prevalence of hypertension in 2013 of 25.8%. In Indonesia, the estimated number of hypertension cases in Indonesia is 63,309,620 people, while the death rate in Indonesia due to hypertension is 427,218 deaths. Hypertension occurs in the age group 35-44 years (31.6%), age 45-54 years (45.3%), age 55-64 years (55.2%).

The prevalence of hypertension in Lampung Province has increased based on interview data, from 6.6% in 2007 to 7.4% in 2013. Meanwhile, based on measurement results, the prevalence rate rose from 24.1% in 2007 to 24.7% in 2013, and continued to increase to 29.7% in 2023 with a total of 18,762 cases. In Bandar Lampung City alone, the prevalence of hypertension in 2018 reached 36.77%, making it the city with the 5th highest case rate out of 15 districts/cities in Lampung Province [7]

Based on the health profile of Bandar Lampung City 2021, the highest prevalence of hypertension was recorded at the Gedung Air Health Center with a rate of 10.1%.

When compared to other health centers in the region, this rate is higher than Puskesmas Simpur (9.1%), Puskesmas Palapa (9.7%), Puskesmas Kebon Jahe (8.3%), Puskesmas Satelit (7.2%), Puskesmas Sawah Kampung (9.2%), Puskesmas Campang Raya (6.9%), Puskesmas Susunan Baru (7.6%), Puskesmas Kemiling (5.9%), and Puskesmas Pinang Jaya (9.6%). Thus, Gedung Air Health Center has the highest hypertension prevalence rate in Bandar Lampung City. If hypertension is not treated immediately, complications will arise including stroke, heart attack, pulmonary edema, kidney failure, blindness, and decreased hearing function [2].

According to data at the Gedong Air Health Center in the year (2024) hypertension cases, the number of cases found during January - October was recorded as many as 8,645 people with hypertension to get health services. Monthly achievements show a significant increase. In January, the number of patients served reached 652 patients (7.54%). This number increased to 684 patients in February, bringing the total achievement to 1,336 patients (15.46%). In March, there was an additional 479 patients (accumulated 20.9%), followed by April with 189 patients (accumulated 23.1%). A significant increase occurred in May, with 2,071 patients (47.1% accumulation). In June, there was an additional 965 patients, bringing the total number of patients to 5,040 (58.2%). The biggest spike occurred in July, with 3,865 patients served, bringing the total achievement to 8,905 patients (103.7%), exceeding the annual target of Puskesmas Gedong Air (2024).

Hypertension is the most common disease found in the elderly and this can have an impact on the heart and stroke. Hypertension is a disease that requires lifelong treatment so that in its

management, pharmacological and non-pharmacological therapies must be given, which aim to help accelerate blood pressure reduction [5]. One alternative treatment that can be an option to lower blood pressure is herbal therapy. Herbal therapy is a complementary therapy using plants that have medicinal properties. Indonesia is known to have many medicinal plants. These plants have been widely used by the community in treating hypertension. The antihypertensive properties of these herbal plants include potassium, antioxidant content, diuretic content, antiadrenergic, and vasodilator [6].

Treatment of hypertension according to [8] hypertension treatment is divided into two types of therapy, namely pharmacology and non-pharmacology. Treatment with pharmacological therapy is carried out using antihypertensive drugs, such as diuretics, sympatholytics, alpha-adrenergic blockers, adrenergic neuron blockers, and arteriolar vasodilators that work directly by relaxing the smooth muscles of blood vessels, especially arteries, thus causing vasodilation. One alternative non-pharmacological therapy is the consumption of watermelon.

This fruit contains various substances that play a role in lowering blood pressure, such as beta-carotene, potassium, and the amino acid L-arginine, which helps maintain blood pressure balance. Potassium in watermelon also supports heart function and helps normalize blood pressure. In addition, lycopene in watermelon is a powerful antioxidant superior to vitamins C and E, while watermelon seeds are rich in nutrients, including yellow oil (20%-45%), protein (30%-40%), citrulline, vitamin B12, and the enzyme urease.

The active compound curcumin in the seeds is also known to stimulate kidney function and help keep blood pressure stable. Not only that, the amino acid citrulline in watermelon plays a role in

lowering blood pressure, while its carotenoids can prevent hardening of artery and vein walls, thus helping to reduce the risk of hypertension [8].

From the initial pre-survey conducted by interview on November 18, 2024 in the working area of Puskesmas Gedong Air to 10 people with hypertension, 7 of them took antihypertensive drugs but the elderly still had bad habits in terms of hypertension treatment, such as consuming excess salt and drinking coffee which was an example of bad habits, and 3 of them had made a healthy lifestyle by reducing salt consumption, conducting non-pharmacological treatment independently with makeshift ingredients such as bay leaf decoction, soursop leaves, sledri leaf decoction and conducting routine checks at posyandu prima. These various phenomena encourage researchers to conduct research on "The Effect of Watermelon Juice Consumption on Lowering Blood Pressure in the Elderly at the Gedong Air Health Center, Bandar Lampung in 2024".

## Methods

This study employed a quasi-experimental design using a one-group pretest-posttest approach to evaluate the effect of watermelon juice consumption on blood pressure among elderly individuals with hypertension. A total of 20 participants were selected through random sampling at the Gedong Air Health Center, Bandar Lampung. Inclusion criteria included individuals aged  $\geq 60$  years with a diagnosis of hypertension and the ability to consume watermelon juice daily for 7 consecutive days. Blood pressure was measured using a calibrated digital sphygmomanometer before and after the intervention. The intervention consisted of 250 mL of fresh watermelon juice administered once daily. Data normality was assessed using the Shapiro-Wilk test, and differences in pre- and post-intervention values were analyzed

using the Wilcoxon Signed Rank Test with significance set at  $p < 0.05$ .

## Result

**Table 1.** Distribution Characteristics Respondent

characteristics	n	%
Age		
Mean	65	
Median	63	100%
Min	60	
Max	85	
Gender		
Female	17	85
Male	3	15
<b>Total</b>	<b>20</b>	<b>100,0</b>

Based on Table 1, it is known that the frequency distribution of respondents based on age group has, average (mean) of 65 years, a median of 63 years, then at a minimum of 60 years and a maximum of 85 years. Based on gender, 17 respondents (85%) were female, while 3 respondents (15%) were male.

Based on Table 2, it is known that the mean systolic and diastolic blood pressure before watermelon juice consumption is 168.00 mmHg and 99.40

mmHg. With a 95% confidence level, the average systolic blood pressure before watermelon juice consumption is in the range of 160.021 mmHg to 175.79 mmHg. The 95% confidence level of the average diastolic blood pressure before being given watermelon juice consumption is in the range of 99.44 mmHg to 105.36 mmHg.

The average systolic and diastolic blood pressure after being given watermelon juice consumption is 135.05 mmHg and 85.50 mmHg. With a 95% confidence level, the average systolic blood pressure after watermelon juice consumption is in the range of 132.72 mmHg to 139.38 mmHg. The 95% confidence level of the average diastolic blood pressure after consumption of watermelon juice in the range of 83.11 mmHg to 87.89 mmHg. Standard deviation of systolic before watermelon juice consumption is 16.639 mmHg and diastolic 12.738 mmHg. Standard deviation of systolic after watermelon juice consumption is 7.119 mmHg and diastolic 5.104 mmHg. where the lowest systolic and diastolic blood pressure before watermelon juice consumption is 150 mmHg and 90 mmHg. The lowest systolic and diastolic blood pressure after being given watermelon juice is 80 mmHg and 80 mmHg.

**Table 2.** Distribution: Mean blood pressure before (pre-test) and after (post-test) given watermelon juice therapy

Variable	Mean	Median	SD	Min	Max	95% CI
<b>Systole before</b>	168.00	160.00	16.639	150	200	160.021-175.79
<b>Systole after</b>	135.05	130.50	7.119	80	95	132.72-139.38
<b>Diastole before</b>	99.40	100.00	12.738	90	147	93.44-105.36
<b>Diastole after</b>	85.50	85.00	5.104	80	95	83.11-87.89

The highest systolic and diastolic blood pressures before watermelon juice consumption were 200 mmHg and 147 mmHg. The highest systolic and diastolic blood pressures after watermelon juice consumption were 95 mmHg and 95 mmHg. The median systolic and diastolic

values before watermelon juice consumption were 160.00 mmHg and 100.00 mmHg. The median systolic and diastolic values after being given watermelon juice consumption are 130.50 mmHg and 85.00 mmHg.

**Table 3.** Distribution Normality test of blood pressure before (pre-test) and after (post-test) watermelon juice therapy

Variable	Shapiro-Wilk			Distribution
	statistics	df	sig	
Systolic blood pressure before the intervention	0,753	20	0,000	Not normal
Blood pressure diastole before intervention	0,653	20	0,000	Not normal
Systolic blood pressure after the intervention	0,868	20	0,011	Not normal
Blood pressure diastole after intervention	0,802	20	0,001	Not normal

Based on Table 3, the results of the normality test using Shapiro-Wilk on the subjects showed significant changes in blood pressure before and after (pre-test) watermelon juice consumption, with a significance value of 0.000 (sig <0.05) before and a significance value of 0.001

(sig <0.05) after (post-test) watermelon juice consumption. From the results of the normality test, it can be concluded that the data is not normally distributed, so the data analysis used the Wilcoxon signed-rank test.

**Table 4.** The Effect of Watermelon Juice Consumption on Blood Pressure Reduction in the Elderly

Variable	N	z	p-value
Systolic Pre-intervention	20	-3.929	0,001
Systolic Post-intervention	20		
variable	n	Z	p-value
Diastole Pre-intervention	20	-3.746	0,001
Diastole Post-intervention	20		

Based on Table 4, it is known that the difference in Z values of systolic blood pressure before and after consuming

watermelon juice is -3.929, while the difference in Z values of diastolic blood pressure before and after consuming

watermelon juice is -3.746. The results of the Wilcoxon Signed Rank Test yielded a p-value of 0.001 ( $<0.05$ ), which means that  $H_a$  is accepted and  $H_o$  is rejected, indicating that there is an effect of watermelon juice consumption on the reduction of blood pressure in the elderly at Puskesmas Gedong Air Bandar Lampung in 2025.

### Discussions

Based on the univariate analysis of respondent characteristics, the mean value indicates that elderly patients with hypertension in the Gedong Air Health Center Work Area, Bandar Lampung, have an average age of 65 years, with the highest number of respondents in the study sample being 60 years old, totaling 8 respondents with a percentage of 40%. Then, the majority gender was female, with 17 respondents, accounting for 85%.

Consumption of watermelon juice lowers blood pressure in the elderly. The results of the study on 20 respondents in the Working Area of Gedong Air Health Center before being given watermelon juice therapy showed an average (mean) systolic and diastolic blood pressure of 168.00 mmHg and 99.40 mmHg, respectively. With a 95% confidence level, the average systolic blood pressure before consuming watermelon juice ranged from 160.021 mmHg to 134.92 mmHg. Meanwhile, the 95% confidence level for the average diastolic blood pressure before consuming watermelon juice ranges from 99.44 mmHg to 105.36 mmHg. The average systolic and diastolic blood pressure after consuming watermelon juice was 135.05 mmHg and 85.50 mmHg. With a 95% confidence level, the average systolic blood pressure after consuming watermelon juice is in the range of 132.72 mmHg to 139.38 mmHg. Meanwhile, the 95% confidence level for the average diastolic blood pressure after consuming watermelon juice

ranges from 83.11 mmHg to 87.89 mmHg. The standard deviation of systolic blood pressure before consuming watermelon juice was 16.639 mmHg, and diastolic 12.738 mmHg. The standard deviation of systolic blood pressure after consuming watermelon juice is 7.119 mmHg, and diastolic 5.104 mmHg. The lowest systolic and diastolic blood pressure before consuming watermelon juice were 150 mmHg and 90 mmHg. Meanwhile, the lowest systolic and diastolic blood pressure after consuming watermelon juice was 80 mmHg and 80 mmHg. The highest systolic and diastolic blood pressure before consuming watermelon juice was 200 mmHg and 147 mmHg. Meanwhile, the highest systolic and diastolic blood pressure after consuming watermelon juice was 95 mmHg and 95 mmHg. The median systolic and diastolic values before consuming watermelon juice were 160.00 mmHg and 100.00 mmHg. Meanwhile, the median systolic and diastolic values after consuming watermelon juice were 130.50 mmHg and 85.00 mmHg.

The consumption of watermelon juice can lower blood pressure by 4-15%, as proven by expert research. Even in individuals with normal blood pressure, a decrease of 6-16% can occur after consuming it for 7 days, according to [1]. A study also states that adults who are obese and have prehypertension, when consuming watermelon extract, can lower blood pressure in the ankle and brachial artery areas [1].

Based on the results of the statistical test on the Wilcoxon Signed Rank Test, the Z value for systole was -3.929 and the Z value for diastole was -3.746 with a p-value of 0.001, indicating an effect of watermelon juice consumption on the reduction of blood pressure in the elderly before and after the watermelon juice consumption therapy. This study is in line with [4], which was effectively able to lower blood pressure

in the elderly. In the study by [9] it was shown that the administration of watermelon juice consumption therapy had an effect on blood pressure in the elderly at Puskesmas Gedong Air Bandar Lampung using a quasi-experimental approach with a one group pretest post-test design, with a sample size of 20 respondents using random sampling and the Wilcoxon test. The results showed a p-value of  $0.001 < 0.05$ . Based on the research by [9] it shows the effect of watermelon juice consumption on lowering blood pressure. In elderly individuals with high blood pressure, it shows that there is an effect of watermelon juice consumption on blood pressure in the elderly after 7 days of watermelon juice intervention, which indicates a decrease in blood pressure. The Wilcoxon test showed a significance level of  $p \text{ value} = 0.001$  with  $\alpha = < 0.05$ .

### Limitations

This study is limited by its small sample size, short intervention period, and lack of a control group, which may reduce the reliability and generalizability of the findings. External factors such as diet, medication use, and lifestyle were not controlled, potentially influencing outcomes. Further research with larger, controlled populations is recommended to validate these results.

### Conclusion

Based on the research conducted at the Gedong Air Health Center, Tanjung Karang Barat District, Bandar Lampung, it was concluded that there is an effect of watermelon juice consumption on lowering blood pressure in the elderly at the Gedong Air Health Center, Tanjung Karang Barat District, Bandar Lampung in 2025 with a value ( $P\text{-value}=0.001$ ). Which means  $H_a$  is accepted, so it can be said that there is an effect of watermelon juice consumption therapy on blood pressure in the elderly at

Puskesmas Gedong Air Bandar Lampung in 2025. The results of this study can be used as additional information or preliminary data for the development of further research by involving other factors that also influence the occurrence of hypertension.

### Acknowledgment

The authors express their gratitude to the management and staff of the Gedong Air Health Center, Bandar Lampung, for their support and facilitation during the research. Special thanks to all elderly participants for their cooperation and commitment.

### Funding Information

No external funding was received for this study.

### Conflict of Interest Statement

The authors declare no conflict of interest related to this study.

### Data Availability

The datasets generated and analyzed during this study are available from the corresponding author upon reasonable request.

### Author Contributions

Amos Armando M.L.G: Conceptualization, Methodology, Data Collection, Writing Original Draft, Diah Sulastri: Supervision, Literature Review, Data Analysis, Writing Review & Editing, and Sri Maryuni: Statistical Analysis, Data Validation, Writing Review & Editing, Administrative Support.

### References

1. Annisa Hapsari. (2021). Manfaat Semangka untuk Penderita Tekanan Darah Tinggi.
2. Anita, F., Hermawan, D., & Andoko. (2019). Hubungan Kadar Kolesterol

- Dengan Kejadian Hipertensi Di Puskesmas Gedung Air Kota Bandar Lampung. *Jurnal Kesehatan Holistik*, 9(3), 126–131.
3. Furngili, B., & Kustriyani, M. (2023). Penerapan Jus Semangka Pada Pasien Hipertensi. *Jurnal Ners Widya Husada*, 10(1), 1–14.
  4. Nurjannah. (2020). Pemberian Jus Semangka terhadap Penurunan Tekanan Darah Penderita Hipertensi Usia Dewasa Muda. *Jurnal Ilmiah Kesehatan (JIKA)*, 2(3), 135–146.
  5. Putra, R. S. (2022). Penyuluhan Dan Demonstrasi Terapi Non Farmakologi Membuat Rebusan Air Daun Seledri Untuk Lansia Dengan Hipertensi. *Community Development Journal: Jurnal Pengabdian Masyarakat*, 3(2), 831–834.
  6. Putri Dafriani. (2020). Pendekatan Herbal Dalam Menangani Hipertensi. *Berkah Prima*, 1–98.
  7. RISKESDES. (2018). Laporan Provinsi Lampung RIKESDAS 2018. Badan Penelitian Daerah, 1–674.
  8. Sari, D. R., Qosim, A., & Nudesti, N. P. (2023). Pengaruh Pemberian Terapi Jus Semangka terhadap Penurunan Hipertensi pada Lansia. *Jurnal Ilmiah Permas: Jurnal Ilmiah Stikes Kendal*, 11 No 1(Januari), 1–8.
  9. Umrah, Y., Rosjidi, C. H., Idris, K., S1, P., Stikesikaryaikesehatan, K., Bina, P., Kendari, H., Kunci, K., Jus, :, & Semangka, H. (2022). Pengaruh Jus Semangka Dalam Menurunkan Tekanan Darah Pasien Hipertensi. *Jurnal Ilmiah Karya Kesehatan*, 03, 16–22.
  10. Yesi, N., Fadhilan, R. N., Ade, D. U., Rinto, H., Abdurrohman, I., & Selvi, A. (2021). Penyuluhan Hipertensi Pada Pasien Puskesmas Kebon Jahe Kota Bandar Lampung. [*Jurnal Kreativitas Pengabdian Kepada Masyarakat (Pkm)*, P-Issn: 2615-0921 E-Issn: 2622-6030 Volume 4 Nomor 3 Tahun 2021] Hal 555-563, 4(3), 555–561.
  11. World Health Organization. (2023). Hypertension WHO. In *Hypertension*.