



Implementation of Cucumber Juice to Reduce Blood Pressure for Pregnant Women with Hypertension During Pregnancy

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Abstract

Hypertension occurs in approximately five to ten percent of pregnant women and is a complication that can lead to low birth weight and even death in babies. Cucumbers are known to contain 147 mg of potassium per 100 grams, and are involved in helping lower blood pressure. The study aimed to prove the effectiveness of cucumber juice in reducing blood pressure in pregnant women with hypertension. The study used a Control Group Pretest-Posttest design, with a sample size of 46 pregnant women with hypertension in pregnancy. The results of the statistical analysis showed a significant decrease in systolic blood pressure ($p\text{-value} = 0.000 (<0.05)$) and diastolic blood pressure ($p\text{-value} = 0.003 (<0.05)$). According to the study findings, cucumber juice administration had a significant effect on lowering blood pressure in pregnant women with hypertension. Therefore, health workers are advised to provide education on the benefits of consuming cucumbers as a natural way to help lower blood pressure in pregnant women with hypertension.

Keywords: cucumber juice, hypertension in pregnancy, reduce blood pressure

Introduction

Hypertension is a common problem during pregnancy. This condition accounts for approximately 5–10% of all pregnancy complications and is a major cause of maternal mortality, including hemorrhage and infection. Furthermore, hypertension significantly increases the risk of health problems and death in pregnant women. (Cunningham, 2014)

Hypertension in pregnancy is a condition where blood pressure increases, starting with systolic pressure of ≥ 140 mmHg and diastolic pressure of ≥ 90 mmHg, which usually appears after the 20th week of pregnancy (Gustirini, 2022). Hypertension during pregnancy can negatively impact both the mother and the fetus. In the mother, this condition can lead to complications such as thrombocytopenia and kidney dysfunction. Meanwhile, in the fetus, gestational hypertension carries the risk of low birth weight (LBW) and increases the risk of stillbirth. (Hans & Dwi Ariwibowo, 2020). Hypertension during pregnancy is a major factor in maternal mortality, with a prevalence of 412 (RI, 2023). West Sumatra Province recorded 118 maternal deaths (Sumbar, 2023). Meanwhile, data from Padang City shows an increase in maternal mortality, from 17 cases in 2022 to 23 cases in 2023 (Padang, 2023).

Hypertension can be controlled through medication and dietary adjustments (Laksmi, 2023). Medical treatment typically involves the use of antihypertensive medications and a healthy lifestyle (Nurbaiti & Sari, 2024). According to WHO data, chemical treatments only cure around 30% of hypertension cases, while diet plays a key role in recovery (WHO, 2018). Nutritional therapy includes weight control, dietary adjustments, salt restriction, and increased potassium intake through fruit and vegetable consumption. Cucumbers are among the best natural sources of potassium (Eko Kurniawan & Yuni Yastutik, 2025)

Cucumbers (*Cucumis sativus*) are a type of vegetable with various health benefits. They are quite high in potassium and play a vital role in lowering blood pressure (Gustirini, 2022). Every 100 grams of cucumber contains 147 mg of potassium and 24 mg of phosphorus. Potassium lowers both systolic and diastolic blood pressure by slowing the release of renin, thereby increasing the excretion of sodium and water from the body (Oktavia et al., 2023). Renin itself is an enzyme in the blood that converts angiotensin I into angiotensin II through the ACE enzyme. Furthermore, potassium acts as an electrolyte that supports liver function, maintains stable blood pressure, and helps regulate heart rate and balance the negative effects of sodium. Therefore, the potassium content in cucumbers is one of the most effective natural ways to help control high blood pressure. (Handayani et al., 2025)

A study by (Z. F. Ahmad & Nurdin, 2019) emphasized that administering 200 grams of cucumber juice can lower systolic blood pressure. The average systolic blood pressure during treatment was 146.1 mmHg. After consuming cucumber juice, the average decreased to 127.6 mmHg, representing a decrease of 18.5 mmHg. A study by (S. N. A. Ahmad et al., 2023) administered 250 grams of cucumber juice every afternoon for a week. The study demonstrated a difference between pre- and post-treatment blood pressure, which averaged 145 mmHg to 140 mmHg, resulting in a decrease of 5 mmHg.

A study by (Cholifah et al., 2021) administered 100 grams of cucumber juice twice daily for 7 days. The results showed that the average systolic blood pressure before treatment was 147.67 mmHg, and after administration of cucumber juice, it dropped to 126.33 mmHg, with an average variation of 21.34 mmHg. The results of the hypothesis test showed a significant difference in blood pressure before and after the intervention. Therefore, this study concluded that consuming cucumber juice twice daily for one week was proven effective in lowering blood pressure in pregnant women at the Sukatani Community Health Center.

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Based on this phenomenon, the researcher wishes to apply a study, the implementation of cucumber juice to reduce blood pressure in pregnant women with hypertension during pregnancy at the Alai Community Health Center in 2025.

Literature Review

Previous research has shown varying results regarding the effects of cucumber juice consumption on blood pressure. A study conducted by (Tiara Carolin et al., 2023) reported that the results of a bivariate analysis using a paired sample t-test showed a significance value of $p = 0.000$ for the treatment with chayote and cucumber, and the results of an independent t-test on the post-test data obtained a p value of 0.011. Meanwhile, research by (Marlina et al., n.d.) showed that cucumber juice consumption had a significant effect on reducing blood pressure in pregnant women with hypertension in the work area of the Air Naningan Community Health Center, Tanggamus Regency. Research by (Aini, 2025) showed the results of a bivariate analysis with a p value of 0.000 for systolic and diastolic blood pressure, which is below the significance threshold of 0.05. These findings indicate that administration of cucumber juice has a statistically significant effect on reducing blood pressure in pregnant women at the clinic in 2025.

Cucumbers have antihypertensive effects due to their high potassium and magnesium content. Potassium in cucumbers acts as a vasoactive agent that contributes to the vasodilation mechanism through the hyperpolarization of vascular smooth muscle cells, which occurs due to stimulation of the sodium (Na^+)–potassium (K^+) pump and activation of the K_{ir} ion channel. (Sasmianti et al., 2025) Potassium ions released by endothelial cells in response to neurohumoral mediators and physical stress also support the endothelial relaxation process (Soripet et al., 2022). In addition, potassium functions to prevent sodium retention, which has implications for lowering blood pressure. Another mechanism involves potassium's ability to inhibit the formation of angiotensin II, a powerful vasoconstrictor that plays a role in increasing blood pressure (Makmun et al., 2025). Potassium also contributes to reducing aldosterone secretion from the zona glomerulosa of the adrenal glands, thereby reducing sodium and water retention that can lead to increased blood pressure (Takahashi et al., 2011).

Magnesium acts as a calcium channel blocker, reducing the release of calcium ions, thereby decreasing vascular resistance (Astuti & Claudia, 2024). Furthermore, magnesium plays a role in activating the sodium–potassium–ATPase pump, which regulates mineral balance and contributes to the maintenance of intracellular electrolyte homeostasis. Intracellular magnesium concentration is influenced by extracellular magnesium levels and its entry through membrane voltage-dependent calcium channels (Rohmaniah et al., 2023). Extracellular magnesium has the ability to competitively inhibit calcium channels, which results in decreased insulin secretion. Conversely, if magnesium is not available in the extracellular space, calcium channel inhibition does not occur, so insulin secretion tends to increase (Setiawan & Sunarno, 2022).

Research Method

This study used a quasi-experimental design with a Control Group Pretest-Posttest Design, where a pretest was conducted before the intervention, followed by treatment, and a posttest after the intervention (Dwi Anjani et al., 2021). The study aimed to assess the effectiveness of cucumber juice in reducing hypertension during pregnancy. The population comprised all 46 pregnant women with hypertension registered at the Alai Community Health Center between June and August 2025, using a total sampling technique.

The instruments used in this study were a sphygmomanometer and a table scale to weigh the cucumbers. The study was conducted over a two-week period. Blood pressure was measured at baseline and after administration of cucumber juice, with the juice consumed in the morning.

Interpretation using the Paired t-test to determine the implementation of systolic and diastolic blood pressure at the beginning and after treatment.

Results and Discussion

Table 1 Distribution of blood pressure frequency before of cucumber juice

Td	N	Mean	Median	S.D
Sistol	46	181,11	181	8,512
Diastol	46	89,61	89	6,741

The results of the study showed that before being given cucumber (pre-test), pregnant women with hypertension in pregnancy had a systolic mean of 181.11 and a standard deviation of 8.512 and a diastolic mean of 89.61 and a standard deviation of 6.741.

Table 2 Distribution of blood pressure frequency after of cucumber juice.

Td	N	Mean	Median	S.D
Sistol	46	149,74	148,50	13,097
Diastol	46	78,33	80	5,203

The results of the study showed that after being given cucumber (post-test), pregnant women with hypertension in pregnancy had a systolic mean of 148.50 and a standard deviation of 13.097 and a diastolic mean of 78.33 and a standard deviation of 5.203.

Table 3 Implementation of Cucumber Juice on Reducing Blood Pressure in Pregnant Women Hypertension in pregnancy

Variabel	Mean	N	P value
Sistolik pre-post test	569,466	46	0,000
Diastolik pre-post test	592,359	46	0,003

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The results of the study showed that before being given cucumber (post-test), pregnant women with hypertension in pregnancy had a mean systolic blood pressure of 148.50 and a standard deviation of 13.097 and a mean diastolic blood pressure of 78.33 and a standard deviation of 5.203. The results of the study after being given cucumber (post-test), pregnant women with hypertension in pregnancy had a mean systolic blood pressure of 148.50 and a standard deviation of 13.097 and a mean diastolic blood pressure of 78.33 and a standard deviation of 5.203.

The statistical test results showed a significant difference in systolic blood pressure before and after the intervention, with a p-value of 0.000 (<0.05) for the systolic test. Meanwhile, the diastolic test results showed a significant difference with a p-value of 0.003 (<0.05). Thus, there is evidence that administering cucumber lowers blood pressure in pregnant women with hypertension.

This study aligns with (Christine et al., 2021) who showed that administering cucumber juice effectively reduced both systolic and diastolic blood pressure in respondents at baseline and after receiving cucumber juice, with a p-value 0.002.

According to (Lisnawati, n.d.) one of the adaptations that occurs during pregnancy is metabolic changes, which cause blood pressure to rise. In response to the growth of the fetus and placenta and the increased needs of both, pregnant women experience numerous and intense metabolic changes. These changes lead to an increase in blood volume and extravascular extracellular fluid.

Endothelium-related vasodilation is strongly influenced by sodium and potassium homeostasis. Hypertension causes increased renin secretion and activation of the RAS. By increasing sympathetic nervous system sensitivity, potassium inhibits renin release. Furthermore, adequate potassium intake can help reduce sodium and fluid retention. (Putri et al., 2023)

Cucumbers, rich in potassium, have been shown to lower high blood pressure, especially in individuals who are sensitive to sodium. The effectiveness of cucumber juice consumption is maximized when combined with a healthy and balanced lifestyle, such as a diet low in fat and cholesterol but high in fiber, found in fresh fruits and vegetables. (Mahbubah et al., 2022)

Cucumbers have the potential to lower blood pressure in individuals with hypertension, stimulating the excretion of body fluids through urine. Their high water content gives cucumbers a natural diuretic effect. Hypertension sufferers are encouraged to consume cucumbers because they contain essential minerals like potassium, magnesium, and fiber, which help lower blood pressure (Oktavia et al., 2023). Furthermore, the magnesium contained in cucumbers helps smooth blood flow and reduce pressure on nerves. Cucumber juice also contains potassium, which helps remove carbon dioxide from the blood, supports muscle and nervous system function, and maintains osmotic pressure balance with sodium. (Sasmianti et al., 2025)

Conclusion

Based on the results of data analysis and hypothesis testing, it can be concluded that the administration of cucumber juice has a significant effect on reducing systolic and diastolic blood pressure in pregnant women with hypertension in pregnancy, namely: Administration of cucumber juice is more effective in reducing blood pressure in pregnant women with hypertension in pregnancy. Post-test results, the average systolic blood pressure is 148.50 with a standard deviation of 13.097 and the average diastolic blood pressure is 78.33 with a standard deviation of 5.203. Post-test results, the average systolic blood pressure is 148.50 with a standard deviation of 13.097 and the average diastolic blood pressure is 78.33 with a standard deviation of 5.203. There are changes in blood pressure before and after administration of cucumber juice, p value 0.000 (<0.05) proves a significant implementation for systolic. This study also proves diastolic blood pressure with a p value of 0.003 for diastolic.

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