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## Research Article

# The Effect of Giving Cucumber (*Cucumis sativus*) Juice on Blood Pressure in Stage 1 Hypertension Patients in Cimahi Public Health Center

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### Abstract

**Background:** One of the management of hypertension is with herbal medicine, such as cucumber juice, because cucumber contains a lot of potassium and water, a diuretic that can lower blood pressure.

**Aim:** This study aimed to determine the effect of cucumber juice on blood pressure in patients with stage 1 hypertension.

**Method:** The research design used was (a quasi-experimental design) with the design using the Non-Equivalent Control Group. A total of 28 people whose blood pressure was measured consisted of 14 people in the intervention group giving cucumber juice and 14 in the control group without giving cucumber juice.

**Results:** The study's mean systolic blood pressure in the control and intervention groups ranged above 130 mmHg and 80 mmHg for diastolic. After the intervention procedure, the mean systolic and diastolic blood pressure in the intervention group decreased to 120.71 mmHg (systolic) and 76.43 mmHg (diastolic). In contrast, the control group's systolic and diastolic blood pressure was relatively stable. The Independent t-test result showed a significant p-value ( $< 0.05$ ). Meanwhile, in the control group, a p-value of ( $> 0.05$ ) was obtained, meaning there was no change in blood pressure in the control group.

**Conclusion:** This study showed that cucumber juice affects blood pressure. Based on the study's result, nurses need to maximize hypertension control by giving education to constantly consume anti-hypertensive drugs along with herbal medicine such as cucumber juice.

### Keywords:

**Cucumber Juice, Blood Pressure, Hypertension**

## INTRODUCTION

Blood pressure can be said to be the driving force for blood to circulate throughout the body. One of the problems with blood pressure is increased blood pressure or known as hypertension (1). According to (2), hypertension is often without any complaints or is called "the silent killer," so sufferers usually do not know that they

have hypertension and are only known after complications occur. Target organs such as the brain, heart, kidney, peripheral arteries, and retinopathy can be Diagnosed and untreated as complications from hypertension.

The prevalence of hypertension globally estimates at as much as 22% of the world's total population. The African Region has the

highest prevalence of hypertension (27%), while the Southeast Asia Region has a prevalence of hypertension of 25%). WHO also estimates 1 in 5 women worldwide has hypertension (3). Based on the 2019 Indonesian Basic Health Research results, the prevalence of hypertension based on a doctor's diagnosis in residents aged  $\geq 18$  years is 34.11% of the total population in Indonesia. The incidence of hypertension in the provinces with the highest prevalence was in the Province of West Java at 39.60%, East Java at 36.32%, Central Java at 37.57%, and the lowest prevalence was in the Province of North Kalimantan with a total of 33.02 % (Ministry of Health, 2019). There were 104,868 cases of hypertension sufferers in Cimahi City, and the number of hypertension in Cimahi City exceeds the national standard of 41.80% (4).

Based on the data above, hypertension continues to increase every year. Risk factors for hypertension, according to the Center for Data and Information (Ministry of Health, 2019), are age, gender, genetics, unhealthy habits or lifestyles such as consuming excess salt, smoking habits, and drinking alcoholic beverages. , obesity, lack of physical activity, stress, or increased emotions. There were various symptoms and complications such as headaches, increased emotionality, bleeding in the brain, increased difficulty in the heart's ability to pump blood which returns to the heart quickly, fluid accumulation in the lungs, legs, and other structures, and shortness of breath. Legs swell as a result, otherwise known as edema. These complications can potentially reduce the quality of life and can treat it using medication or therapy immediately (5).

Hypertension treatment divides into two management, pharmacological and non-pharmacological therapy. Pharmacological therapy for people with hypertension is chemical drugs to lower blood pressure (6). One of the non-pharmacological treatments is herbal, complementary therapy such as star fruit, celery, garlic, and cucumber (7).

Herbal therapy for starfruit and bananas is as good as a complementary therapy for cucumbers in lowering blood pressure because they contain lots of potassium. However, starfruit and bananas contain high levels of glucose compared to cucumbers. The content contained in cucumber is potassium, magnesium, and phosphorus. Not only that, cucumber has diuretic properties because it has very high water content. Potassium is the primary intracellular electrolyte; 98% of the body's potassium is inside the cells, and the remaining 2% is outside the cells. One hundred grams of cucumber contains about 147 milligrams of potassium and 12 milligrams of magnesium. The body needs potassium and magnesium to maintain muscle function and prevent muscles from being deficient in potassium and magnesium.

Furthermore, potassium has the added effect of dilating blood vessel walls, which can help reduce blood pressure. Cucumbers can be eaten directly and can also be juiced. It was juicing natural products more effective in the metabolic process than eating them directly. A previous study stated eats cucumber directly needs to be chewed, and then the amylase enzyme in saliva will make the stomach full quickly. Besides that, the reabsorption process takes longer because it has to be chewed and digested first in the stomach, unlike juice, which is soluble, so the absorption process in the small intestine will be faster (8).

Based on previous studies by providing treatment or intervention every day for 7-14 days, the juice was given 250cc in the morning and 250cc in the afternoon, with the average result being a decrease in systolic blood pressure of 11-23 mmHg and diastolic 6-10 mmHg.

Based on the data, cucumber is quite effective in lowering blood pressure, with one of its ingredients being potassium which can dilate blood vessels. Therefore researchers are interested in conducting a study entitled "The Effect of Administering

Cucumber Juice on Changes in Blood Pressure in Patients with Stage 1 Hypertension”.

## METHODS

### Study Design

This type of research used a quasi-experimental design (quasi-experimental design) with a Non-Equivalent Control Group design. The pre-measurement as a baseline of experimental and control groups conduct before the intervention. After the intervention procedure was complete, the researcher took the post-test for both groups.

### Sample

This study's population was individuals with hypertension in the North Cimahi Public Health Center area. The total population in this study was 126 people, and using purposive sampling to get 28 samples. The respondents in both the intervention and control groups were 14 people. The intervention group took the intervention of cucumber juice, and the control group did not take any intervention. At the end of this study, the researcher gave health education about cucumber

consumption to reduce blood pressure. In this study, no respondents dropped out.

### Procedure

The intervention group takes cucumber juice daily in the morning and the evening for ten days, as much as 250cc.

### Instrument

This study's blood pressure measurement technique used an aneroid sphygmomanometer, a food scale, and a measuring cup for cucumber juice.

### Data Analysis

The data normality test consists of three general tests that researchers often use the Shapiro-Wilk test. The normality test results indicate that the data are not normally distributed with the p-value <0.005, so the data analysis in this study uses the Mann-Whitney test.

This research has passed a research ethics test issued by the Institute for Health Research Ethics Commission at the Faculty of Health, University of Jenderal Achmad Yani, with number: 024/KEPK/FITKES-UNJANI/ V/2022.

## RESULTS

This study aims to determine the effect of giving cucumber juice (*Cucumis Sativus*) on changes in blood pressure in patients with stage 1 hypertension in the Working Area of the North Cimahi Health Center. This research was conducted on 30<sup>th</sup> May 2022. The results of the study are as follows:

**Table.1**  
**Blood Pressure Average In Patients With Stage 1 Hypertension Before and After Consuming Cucumber Juice (n=28)**

|                           | Pre-test Mean (SD) | Range | Post-test Mean (SD) | Range |
|---------------------------|--------------------|-------|---------------------|-------|
| <b>Intervention Group</b> |                    |       |                     |       |
| Systolic                  | 134.29 (5.136)     | 10    | 120.71 (4.746)      | 20    |
| Diastolic                 | 85.00 (5.189)      | 10    | 76.43 (4.972)       | 10    |
| <b>Control Group</b>      |                    |       |                     |       |
| Systolic                  | 135.00 (5.189)     | 10    | 135.00 (6.504)      | 20    |
| Distolic                  | 82.86 (4.688)      | 10    | 85.71(6.462)        | 20    |

Based on the table. 1, the mean systolic blood pressure in the intervention group before being given cucumber juice was 134.29 mmHg, with a standard deviation of 5.136. The mean diastolic blood pressure in the intervention group before being given cucumber juice was 85.00 mmHg, with a standard deviation of 5.189. The mean systolic blood pressure in the control group before being given cucumber juice was 135.00 mmHg, with a standard deviation of 5.189. The mean diastolic blood pressure in the control group before being given cucumber juice was 82.86 mmHg, with a standard deviation of 4.688. The mean systolic blood pressure in the intervention group after consuming cucumber juice was 120.71 mmHg, with a standard deviation of 4.746. The mean diastolic blood pressure in the intervention group after consuming cucumber juice was 76.43 mmHg, with a standard deviation of 4.972. The mean systolic blood pressure in the control group was 135.00 mmHg, with a standard deviation of 6.504. The mean diastolic blood pressure in the control group was 85.71 mmHg, with a standard deviation of 6.462.

**Table.2**  
**Blood Pressure Differences In Patients With Stage 1 Hypertension Before And After Consuming Cucumber Juice (n=28)**

|                           | N  | Mean   | Std. Deviation | P-Value |
|---------------------------|----|--------|----------------|---------|
| <b>Intervention Group</b> |    |        |                |         |
| Systolic                  | 14 | 127.50 | 8.444          | 0.000   |
| Diastolic                 | 14 | 80.71  | 6.627          | 0.001   |
| <b>Control Group</b>      |    |        |                |         |
| Systolic                  | 14 | 135.00 | 5.774          | 0.854   |
| Distolic                  | 14 | 84.07  | 5.724          | 0.217   |

The Mann-Whitney test on the intervention group showed a significant difference in the systolic and diastolic blood pressure before and after the intervention (p-value: <0.005). On the contrary, the control group's systolic and diastolic blood pressure showed an insignificant difference before and after the intervention (p-value:> 0.05).

## DISCUSSION

Herbal medicine use increased significantly because of people's favorable attitudes toward these treatments (9). The escalation use of natural products is also in line with the previous study stated that health attitudes, such as holistic and magical health beliefs, were found to be favorably correlated with the general population's usage of herbal medication in Indonesia during the pandemic era. (10). According to a separate piece of prior study, there is a

common belief that natural health products are safer and of better quality than pharmaceuticals (11,12). Non-pharmacological management with herbal therapy also can be carried out in patients with stage 1 hypertension. Herbal treatment of hypertension needs fruits, vegetables, leaves, and other natural products containing potassium, calcium, and other essential substances.

Patients with hypertension generally lack potassium and calcium. Therefore, consuming potassium fruits and vegetables is one right ways to reduce high blood pressure, such as starfruit, bananas, cucumbers, and others. Cucumber contains potassium, calcium, and other vitamins that can lower blood pressure (13).

According to (14), the content of cucumber (*Cucumis sativus*) includes Potassium (Potassium), magnesium, phosphorus, and

other vitamins, which are effective for reducing high blood pressure. Potassium has various health benefits for the overall well-being of the body. One of them is keeping the body from various diseases. Consuming a variety of vegetables and fruits increases potassium intake. The body electrolyte supplier was the other benefit of potassium. Sodium and potassium electrolytes are essential in regulating body fluids as an acid-base balance.

This study follows the results of the research conducted by (15,16) by conducting a comparative study of giving cucumber juice for one and two weeks twice a day (250 gr/portion). The results obtained for one week of giving cucumber juice were a decrease in blood pressure for systole by 11.07 mmHg and 6.0 mmHg diastolic and for the results of 2 weeks of administration of cucumber juice obtained with 23.77 systolic results and 10.72 mmHg diastolic. From the results of research conducted by (17), there was a significant decrease in blood pressure between systolic and diastolic pressure before and after being given cucumber juice 25 respondents for seven days, one day two times drinking one glass or 250 g mg. The results of the study before and after the intervention showed a significant decrease in blood pressure, namely 13.07 mmHg

The difference between this study and previous research conducted by), namely conducting research by providing treatment or giving interventions every day for 7-14 days, the juice is given 250cc in the morning and 250cc in the afternoon days with an average result of a decrease in systolic blood pressure of 11-23 mmHg and 6-10 mmHg in diastolic (Sudiana & Rudianingseh, 2018; Sinaga & Ariyanti, 2021).

The results of this study can describe the effectiveness of cucumber juice which contains 57 mg of potassium per 100 grams of cucumber. This potassium can inhibit the renin-angiotensin system and reduce aldosterone secretion, resulting in

decreased sodium and water reabsorption in the kidney tubules. So, as a result of this mechanism, the process of diuresis increases and causes a reduction in blood volume and causes a decrease in blood pressure. Another effect of potassium is that it can vasodilate peripheral blood vessels. The benefits of the cucumber's content conclude that cucumber juice could be an alternative medicine for hypertension treatment.

## CONCLUSION

Cucumber juice affects changes in blood pressure, which answers the research question that cucumber juice affects lowering blood pressure. Researchers suggest it maximizes hypertension control by constantly consuming anti-hypertensive drugs and other alternatives such as cucumber juice. Nurses can be more active in counseling about the benefits of cucumber against changes in blood pressure, blood pressure in hypertensive patients.

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