

Differences In The Effectiveness Of Giving Tomato Juice And Cucumber Juice In Lowering Blood Pressure In Hypertension In The Review Of Pregnancy

Iyos Rosnawati^{1*}, Mahyar Suara²

^{1,2} Abdi Nusantara College of Health Sciences, Indonesia

*Corresponding Author:

Email: iyosrosnawati1@gmail.com

Abstract.

Background the content of tomato and cucumber juice both contain potassium which functions as a catalyst so that potassium can play a role in lowering a person's blood pressure. The purpose of writing: to determine the difference in the effectiveness of giving tomato juice and cucumber juice in reducing blood pressure in those who experience hypertension in terms of gestational age. Research Methods: Pre-experimental research with the type of one group pre test – post test design by means of a causal relationship by involving one group of subjects. the subject group was observed before the intervention was carried out and then observed after the intervention was carried out. The sampling technique is non-probability sampling with a purposive method. The study was divided into 2 variables, namely the independent variables, namely the consumption of tomato juice and cucumber juice. Research Results: The results of statistical tests are known Asymp. Sig (2 – Tailed) has a value of 0.263, because $0.263 > 0.05$, it can be concluded that the hypothesis is rejected. This means that there is no difference in giving tomato juice and cucumber juice in reducing blood pressure in those with hypertension. This means that tomato juice and cucumber juice both have the same efficacy in reducing blood pressure in pregnant women. However, from the Mann – Whitney mean rank between giving tomato juice and cucumber juice, it was found that cucumber juice was more effective than tomato juice in reducing blood pressure. Conclusions and Suggestions: The results of this study are expected to provide information that giving date palm juice and beetroot juice is a type of natural food that can increase Hb levels.

Keywords: *Tomato Juice, Cucumber Juice and Decreased Blood Pressure.*

I. INTRODUCTION

Hypertension is the condition of a person who has an increase in systolic blood pressure of more than 140 mmHg while diastolic of more than 90 mmHg by measuring twice according to standard provisions in the implementation of blood pressure measurements in order to get the right results in measuring blood pressure. (RI Ministry of Health, 2018). The prevalence of hypertension in Indonesia based on the results of measurements according to age > 18 obtained through a questionnaire diagnosed by health workers is 9.5% while taking medication, respondents who have normal blood pressure but are currently taking hypertension medication are 0.7%, so the prevalence of hypertension in Indonesia by 26.5% (Ministry of Health, 2017). In Indonesia in 2019, the second highest number of maternal deaths was caused by gestational hypertension, which amounted to 1,066 cases after causes due to bleeding and the third cause was due to infection with as many as 207 cases. It is estimated that in 2024 the maternal mortality rate in Indonesia will drop to 183/100,000 live births and in 2030 it will drop to 131 per 100,000 live births (Ministry of Health RI, 2020). According to Syafira, (2021) mentions that hypertension during pregnancy needs special treatment because it can reduce blood flow to the placenta, which will affect the supply of oxygen and nutrients to the baby. This will slow the growth of the baby and increase the risk during delivery. Pregnancy at age (35 years) is a high-risk pregnancy that can cause complications in pregnancy. Age is a risk factor for hypertension in pregnancy. Pregnant women aged 35 years have a 15,731 risk of experiencing preeclampsia compared to pregnant women aged 20-35 years.

Mother's age is too young. Meanwhile, at the age of the mother > 35 years, a degenerative process occurs which results in structural and functional changes that occur in the peripheral blood vessels which are

responsible for changes in blood pressure. High blood pressure increases with age, this is caused by structural changes in the large blood vessels, so that the lumen becomes narrow and the blood vessel walls become more rigid, as a result, systolic blood pressure increases. Age 20-35 years is a safe period for giving birth with the lowest risk of maternal morbidity and mortality. In this study non-pharmacological action using juice therapy, namely tomato juice and cucumber juice. Based on the research of Septimar, et al (2019) which said that tomato juice is a way of non-pharmacological therapy that can reduce blood pressure, this is caused by tomatoes. Because tomato juice contains 94% potassium which can increase sodium and water excretion, resulting in decreased plasma volume, cardiac output, peripheral pressure and blood pressure. Therefore, someone in their body can excrete excess sodium or potassium in urine to stabilize blood pressure to normal. Apart from tomato juice, there are also types of food that can lower blood pressure or hypertension, namely cucumbers, because cucumbers also contain several ingredients such as protein, fat, carbohydrates, potassium, iron, magnesium, phosphorus, vitamin A, vitamin B1, vitamin B2, vitamin C, so this plant deserves to be called an herbal plant. According to research by Hermawan & Novariana (2018), it states that there is an effect on reducing blood pressure in hypertensive patients after being given cucumber juice.

The content of cucumbers that contain potassium, this potassium substance is an electrolyte that helps regulate the amount of sodium (salt content) retained by the kidneys so that potassium can regulate and control a person's blood pressure. Consumption of high amounts of potassium can protect individuals from hypertension. The function of potassium is that, together with sodium, potassium plays a role in maintaining fluid and electrolyte balance and acid-base balance. Together with calcium, potassium plays a role in nerve transmission and muscle relaxation. Potassium levels in the muscles are related to muscle mass and glycogen stores, therefore when the muscles are in formation they need potassium in sufficient quantities. Pressure inside cells, potassium functions as a catalyst in many biological reactions, especially in energy metabolism and glycogen and protein synthesis. Potassium plays a role in cell growth. Normal blood pressure requires an appropriate ratio between sodium and potassium in the body. Estimated need for potassium in the body, because it is an essential part of all living cells, potassium is widely found in food, one of which is cucumber. The minimum requirement for potassium is 2000 mg a day. Fulfillment of potassium is less than the minimum, the heartbeat will be pounding and reduce the ability to pump blood. Increased potassium intake will lower systolic and diastolic blood pressure. Based on the explanation described above, which in the content of tomato and cucumber juice both contain potassium which functions as a catalyst so that potassium plays a role in lowering one's blood pressure. Therefore, the researchers wanted to prove the efficacy of tomato and cucumber juice by comparing the effectiveness of the most dominant between tomato juice and cucumber juice so that the title of this study was "The Difference in the Effectiveness of Giving Tomato Juice and Cucumber Juice in Reducing Blood Pressure in Hypertension in Review From Gestational Age.

II. METHODS

This research is experimental with a quasi experimental design with a quantitative approach. Researchers want to know the difference in the effectiveness of giving tomato juice and cucumber juice in reducing blood pressure for those who experience hypertension in terms of the age of pregnant women. The sampling technique used with cluster sampling is done by selecting samples based on certain groups. In determining the type of cluster, the characteristics of each group must be carefully considered. In this study, in the working area of the Medangasem Health Center, samples were taken from three villages, namely Medangasem Village, Ciptamarga Village and Kampong Sawah Village. In this study, pregnant women who experienced hypertension were taken based on cases with the number found incidentally from each village, each number of 20 people, namely Medangasem village, 20 people, Ciptamarga village and Kampong Sawah village 20 people. Tomato and cucumber juice on reducing hypertension / as for measuring hypertension using a sphygmomanometer and stethoscope, as well as observation sheets in monitoring the administration of the tomato juice group and the cucumber juice group. Tomato juice and cucumber juice were given 2 times a day consecutively for 14 days

III. RESULT AND DISCUSSION

A. Univariate Analysis

1. Observed frequency distribution of gestational age in pregnant women in the Tomato Juice Giving Group in the Working Area of the Madangasem Health Center

Blood pressure in the review of the gestational age of giving tomato juice	Frequency	%
Gestational Hypertension	14	46,7
Chronic Hypertension	16	53,3
Total	30	100

Based on Table 1 above, it can be seen that of the 30 pregnant women respondents whose blood pressure was reviewed for gestational age in the group of pregnant women who were given tomato juice, the majority found 16 people (53.3%) chronic hypertension and 14 gestational hypertension (46.7%).)

2. The frequency distribution of gestational age in pregnant women in the cucumber juice administration group in the working area of the Madangasem Health Center

Blood Pressure in the Age of Pregnancy Given Cucumber Juice	Frequency	%
Gestational Hypertension	13	43,3
Chronic Hypertension	17	56,7
Total	30	100

In Table 2 above, it can be seen that of the 30 pregnant women respondents whose blood pressure was reviewed for gestational age in the group of pregnant women who were given cucumber juice, the majority found 17 people (56.7%) chronic hypertension and 13 gestational hypertension (43.3%).)

3. Average Decrease in Blood Pressure in Pregnant Women Before and After Administration of Tomato Juice in the Work Area of the Madangasem Health Center

Variable	n	Blood Pressure Drop		
		M	SD	Min-Max
Pre-test	30	148,00	13,746	130-180
Post-test		131,67	14,404	110-170

Based on table 3 it is known that, of the 30 pregnant women the average result before giving tomato juice was given an average value of 148.00, the standard deviation was 13.746, the systolic blood pressure rating was a minimum of 130 mmHg and a maximum of 180 mmHg. Then after giving tomato juice, the average value was 131.67, the standard deviation was 14.404, the minimum systolic blood pressure was 110 mmHg and the maximum was 170 mmHg

4. Average Decrease in Blood Pressure in Pregnant Women Before and After Administering Cucumber Juice in the Working Area of the Madangasem Health Center

Variable	n	Blood Pressure Drop		
		M	SD	Min-Max
Pre-test	30	147,33	14,126	130-180
Post-test		127,00	13,684	100-160

Based on table 4 it is known that, of the 30 pregnant women, the average result before giving cucumber juice was an average value of 147.33, the standard deviation was 14.126, the systolic blood pressure assessment was a minimum of 130 mmHg and a maximum of 180 mmHg. Then after administration of cucumber juice, the average value was 127.00, the standard deviation was 13.684, systolic blood pressure was assessed at least 100 mmHg and a maximum of 160 mmHg.

B. Bivariate Analysis

1. Differences in Administration of Tomato Juice and Cucumber Juice to Lowering Blood Pressure in Pregnant Women in the Work Area of the Madangasem Health Center

Group	N	Mean Ranks	Sum Of Ranks	Asymp. Sig (2 – Talled)
Giving Tomato juice	30	32,93	988,00	0,263
Giving cucumber juice	30	28,07	842,00	
Total	60			

Based on the table above, the Mann-Whitney test results obtained the Mean Rank in the group given cucumber juice which had the lowest decrease in blood pressure with a value of 28.07 compared to giving

tomato juice with a value of 32.93. This means that the comparison between tomato juice and cucumber juice reduces blood pressure, the smallest blood pressure measurement is found in cucumber juice compared to tomato juice.

2. Differences in the Effectiveness of Giving Tomato Juice and Cucumber Juice in Lowering Blood Pressure in Hypertension

The statistical test results are known to Asymp. Sig (2 – Tailed) has a value of 0.263, because $0.263 > 0.05$, it can be concluded that the hypothesis is rejected. This means that there is no difference in giving tomato juice and cucumber juice in reducing blood pressure in those with hypertension. This means that tomato juice and cucumber juice both have the same efficacy in reducing blood pressure in pregnant women. However, from the Mann – Whitney mean rank between giving tomato juice and cucumber juice, it was found that cucumber juice was more Effective Than Tomato Juice In Reducing Blood Pressure.

Discussion

A. Frequency distribution in the review of gestational age in pregnant women in the group given the tomato juice and cucumber juice

The results showed that pregnant women experienced hypertension in terms of gestational age. While administration of cucumber juice found the majority of chronic hypertension totaling 17 people (56.7%) and gestational hypertension totaling 13 people (43.3%). According to Alifiah Rahmawati, (2019) explained that hypertension in pregnancy is a non-communicable disease that causes maternal death. Hypertension in pregnancy can be grouped into preeclampsia, eclampsia, chronic hypertension in pregnancy, chronic hypertension with pre-eclampsia, and gestational hypertension. In this study, pregnant women were found to have chronic hypertension and gestational hypertension. According to Sarwono (2019) explains that chronic hypertension is hypertension that arises before 20 weeks of gestation, hypertension is first diagnosed after 20 weeks of gestation and hypertension persists until 12 weeks postpartum. Meanwhile, gestational hypertension (also called transient hypertension) is hypertension that occurs without proteinuria and hypertension disappears after 3 months postpartum or pregnancy with signs of preeclampsia but without proteinuria.

B. The average decrease in blood pressure in pregnant women in the Tomato Juice and Cucumber Juice Group

The results of this study showed that the average decrease in blood pressure between the groups given tomato and cucumber juice had the same decrease in blood pressure. This was marked by an assessment of blood pressure in the systolic tomato juice administration group of at least 130 mmHg and a maximum of 180 mmHg. Then after giving tomato juice, the average value was 131.67, the standard deviation was 14.404, the minimum systolic blood pressure was 110 mmHg and the maximum was 170 mmHg. While the pressure assessment in the cucumber juice group. According to Sitiyaroh (2019) mentioned in his research that the same content in tomato and cucumber juices can help lower blood pressure, including Potassium, which contains potassium in tomato and cucumber juices. Potassium is a mineral that plays an important role in maintaining fluid balance in the body and regulating blood pressure. Adequate potassium consumption can help balance the effects of sodium in the body thereby helping to lower blood pressure. Apart from the potassium content in tomato and cucumber juices, there is fiber according to Sitiyaroh (2019). Fiber can help reduce LDL cholesterol (bad cholesterol) in the blood which can reduce the risk of heart disease and help maintain healthy blood pressure. Tomato and cucumber juices both contain antioxidants, tomato juice contains lycopene while cucumber contains flavonoid compounds such as quercetin. Both types of antioxidants can help maintain healthy blood vessels and lower blood pressure by protecting blood vessels from oxidative damage and improving endothelial function.

The similarity in content between tomatoes and cucumbers has a high water content so it helps maintain good hydration so that with adequate hydration, blood pressure will be maintained properly. According to the researchers' assumptions about the explanation conveyed by Sitiyaroh's previous research, (2019) that tomato juice and cucumber juice both have high water content. It is associated with a decrease in blood pressure because a well-hydrated body condition can help maintain electrolyte balance, including sodium which plays a role in regulating blood pressure. This is supported by the opinion of

Taviyanda, D., & Palupi, K. D. (2017) who explains that when the body is well hydrated, blood volume tends to be optimal, allowing blood to flow smoothly through blood vessels and maintaining blood pressure within the normal range. In addition, adequate water can help improve endothelial function, the inner lining of blood vessels that plays a role in regulating blood pressure and overall cardiovascular function. Therefore the high water content of tomato and cucumber juices can provide benefits in maintaining body hydration and supporting circulatory health which contributes to controlling blood pressure.

C. Differences in the Effectiveness of Giving Tomato Juice and Cucumber Juice in Lowering Blood Pressure in Hypertension

The results of this study indicate that the statistical test is known Asymp. Sig (2 – Tailed) has a value of 0.263, because $0.263 > 0.05$, it can be concluded that the hypothesis is rejected. This means that there is no difference in giving tomato juice and cucumber juice in reducing blood pressure in those with hypertension. However, from the Mann-Whitney mean rank between giving tomato juice and cucumber juice, it was found that cucumber juice was more effective than tomato juice in reducing blood pressure. It was seen from the Mann-Whitney test results that the Mean Rank for the group given cucumber juice had the lowest reduction in blood pressure. with a value of 28.07 compared to giving tomato juice with a value of 32.93. The results of this study are in line with previous research by Sitiyaroh (2019) which found that giving cucumber juice was more effective than tomato juice. As for previous research on cucumber juice based on the facts above which stated that cucumber has ingredients that help lower blood pressure. The nutrients contained in cucumber oil are: Protein, calcium, fat, phosphorus, iron, sulfur, vitamins A, B1 and C. The mineral content of potassium, magnesium and fiber in it is very useful for lowering blood pressure.

So for individuals who have a history of high blood pressure it is highly recommended to consume cucumbers. Where in the cucumber there is the mineral magnesium which functions to improve blood flow and neutralize nerves, besides that cucumber has diuretic properties due to its water content which functions to reduce blood pressure. Hypertension can be treated using non-pharmacological therapies such as the use of natural resources around us, for example Cucumis sativus or cucumbers which can be used to lower blood pressure in hypertension sufferers. The potassium content in cucumber can treat high blood pressure. In every 100 grams of cucumber contains 147 mg of potassium and 24 mg of phosphorus. Potassium is also a good electrolyte producer for the liver, helps reduce high blood pressure and regulates the rhythm of the heartbeat against the bad effects of sodium, so that the potassium content in cucumber is very effective for treating hypertension (Triyanto, 2014). Based on theory and previous research, the results of this study have no theoretical gap with previous studies which state that tomato juice and cucumber juice have properties that can lower blood pressure. The similarity of these properties was found in cucumber juice which has faster effectiveness in reducing blood pressure, so the results of this study can be used as a guideline for using non-pharmacological treatments, namely cucumber and tomato juice.

IV. CONCLUSION

Based on the results and discussion of the research results, it can be concluded that:

1. 30 respondents to pregnant women whose blood pressure was reviewed for gestational age in the group of pregnant women who were given tomato juice found that the majority had chronic hypertension totaling 16 people (53.3%) and gestational hypertension totaling 14 people (46.7%).
2. 30 respondents to pregnant women whose blood pressure was reviewed for gestational age in the group of pregnant women who were given cucumber juice found that the majority had chronic hypertension totaling 17 people (56.7%) and gestational hypertension totaling 13 people (43.3%)
3. The average result before giving tomato juice was an average value of 148.00, the standard deviation was 13.746, a minimum systolic blood pressure assessment of 130 mmHg and a maximum of 180 mmHg. Then after giving tomato juice, the average value was 131.67, the standard deviation was 14.404, the minimum systolic blood pressure was 110 mmHg and the maximum was 170 mmHg.
4. The average result before administering cucumber juice was an average value of 147.33, the standard deviation was 14.126, a minimum systolic blood pressure assessment of 130 mmHg and a maximum of 180 mmHg. Then after administration of cucumber juice, the average value was 127.00, the

standard deviation was 13.684, systolic blood pressure was assessed at least 100 mmHg and a maximum of 160 mmHg.

5. Asymp knows the statistical test results. Sig (2 – Talled) has a value of 0.263, so it can be concluded that the hypothesis is rejected. This means that there is no difference in giving tomato juice and cucumber juice in reducing blood pressure in those with hypertension.

REFERENCES

- [1] Aminah, D. K. M. H. (2018). Cucumber Juice To Descending Blood Pressure. *Nursing*, VI(1), 28–32.
- [2] Astuti, E. (2017). Administration of Tomato Juice Affects Blood Pressure Reduction in Hypertension Patients in Tambak Asri RT 17 RW 06 Surabaya. *Journal of Nursing*, 6, 1–8.
- [3] Hermawan, N. S. A., & Novariana, N. (2018). Cucumber Extract Herbal Therapy for Lowering Blood Pressure in Hypertension Sufferers. *Aisyah's Journal: Journal of Health Sciences*, 3(1), 1–8.
- [4] Ivana, T., Martini, M., & Christine, M. (2021). The Effect of Giving Cucumber Juice on Blood Pressure in Elderly Hypertension at Pstw Sinta Rangkang in 2020. *Journal of Insan Asylum Nursing (Jksi)*, 6(1), 53–58.
- [5] Kisnawati, B., Irianto, & Siswandi, H. (2019). 2 3 123. *Journal of Borneo Scholars*, 3(2), 40–46.
- [6] Priyono, D. B. D. (2022). The Effectiveness of Giving Cucumber Juice to Lower Blood Pressure in Hypertension Patients. *Nursing*, 1(1), 1–6.
- [7] Sitiyarah, N. (2019). Differences in the Effectiveness of Giving Tomato Juice and Cucumber Juice in Lowering the Blood Pressure of Pregnant Women Experiencing Hypertension at Neglasari Tangerang Health Center in 2019. 119(4), 361–416.
- [8] Sriminanda, L., Dewi, A. P., & Indriati, G. (2014). The effectiveness of giving tomato juice to blood pressure in patients with hypotension. *Online Journal of Nursing Study Program Students*, University of Riau, 1–8.
- [9] Tjiptaningrum, A., & Erhadestria, S. (2016). Benefits of Cucumber Juice (*Cucumis sativus* L.) as a Therapy for Hypertension. *Majority*, volume 5, 113.
- [10] Warini, W. (2022). Factors related to the incidence of hypertension in pregnancy at RSUD X in 2021. *Open Access Jakarta Journal of Health Sciences*, 1(12), 473–477. <https://doi.org/10.53801/oajjhs.v1i12.176>
- [11] Zul, F. (2019). Effect of Cucumber Juice (*cucumis sativus* linn) on blood pressure in adult hypertensive patients. 9–25.
- [12] Taviyanda, D., & Palupi, K. D. (2017). Amount of Consumption of Drinking Water in Elderly Blood Pressure Events at the Islamic Boarding School 1 Health Center, Kediri. *STIKES Journal*, 10(2), 71–77. <https://jurnal.stikesbaptis.ac.id/index.php/STIKES/article/view/302>
- [13] Ilma, A. D., & Wirawanni, Y. (2015). The Effect of Cucumber and Tomato Juice on Overweight and Obese Women's Blood Pressure. *Journal of Nutrition College*, 4(3), 281–287. <https://doi.org/10.14710/jnc.v4i3.10094>