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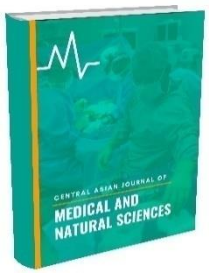

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The Effect of Cucumber Juice on Blood Pressure in Hypertension Patients in the West Pauh Community, Pariaman Health Center Working Area in 2021

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Annotation: According to World Health Organization/WHO (2019) cases of hypertension effect 22% of the world's population. In Indonesia, the number of cases of hy-pertension reached 67%. The prevalence of hypertension in West Sumatra amounted to 25.1% in Pariaman City cases of hypertension as many as 291 peo-ple. The highest case is West Village with a number of hypertension of 78 peo-ple. The purpose of this study is to influence the provision of cucumber juice on blood pressure in people with hypertension in the Western Pauh Com-munity of the Pariaman Health Center Working Area in 2021, the treatment is more effective to lower blood pressure in people with hypertension in Pauh Barat Village. Pariaman Health Center Working Area in 2021. Research using a quasi-experimental design with post-test only control group design, This study has been conducted on August 1-31 in West Village in 2021, Sampling is done with accidental sampling techniques with the number of samples 18 (control) and 18 (treatment). Data collection tools are done using observation sheets filled by researchers, and data processing is done in a computerized system. Based on the results of the research obtained that. There were differences between the treatment group for changes in blood pressure but the treatment group was more effective at lowering blood pressure in people with hypertension in Pauh Barat Village. It is expected that the results of this study provide information to the public about cucumbers for blood pressure management for people with hypertension.

Key words: Blood Pressure, Hypertension, Cucumber Fruit, Pariaman

INTRODUCTION

Rapid development results precisely in the medical field can increase life expectancy. This increase in age is often followed also by various degenerative diseases. Degenerative disease is a problem when there is an increase in old age, such as heart disease and hypertension that have appeared (KEMENKES, 2018). Changes in blood pressure increase slowly with age. The risk for people with hypertension in the population of 55 years of age, among whom men suffer from hypertension more than women. From the age of 55-74 years, slightly more women than men suffer from hypertension, and every year hypertension increases with age (Triyanto, 2014).

The increasing age of hypertension is increasing and has special signs of the emergence of the disease, but instead, it has no complaints and special signs, therefore it is referred to as the silent killer. Facts also prove that one in four people with hypertension do not know if they are hypertensive. Therefore the disease is quite life-threatening which can cause heart failure, heart attack, angina, and stroke. Based on WHO data, hypertension affects 22% of the world's population and reaches 36% of the incidence in Southeast Asia. Hypertension is also the cause of death with a figure of 23.7% of the total 1.7 million deaths in Indonesia in 2016 (Anitasari & Shappe, 2019). Basic Health Research (Riskesdas) conducted by the Ministry of Health in 2018 resulted in an increase in the incidence of hypertension compared to the results in 2013. The prevalence of hypertension incidence based on risked 2018 results is 34.1%. This figure is higher than in 2013 which touched the prevalence rate of 25.8%. The result is an incidence of hypertension based on the results of blood pressure measurements in Indonesian people aged 18 years and over (KEMENKES, 2018).

Based on Riskesdas data in 2018 in Indonesia showed the prevalence of hypertension in the male sex by 31.34% and women by 36.85. Hypertension in Indonesia in the age group of 50 years is still 10%, but over the age of 60 years, the number continues to increase to 20-30%. Prevalence of hypertension in West Sumatra by 25.1% (KEMENKES, 2018). Based on data obtained by researchers from the Pariaman City Health Office as written in the table above, that Pariaman Health Center ranked first in cases of hypertension with several 291 people. Puskesmas Marunggi was ranked second with a total of 201 people and the third rank was occupied by The Padusunan Health Center with a total of 138 people.

Hypertension is a condition of increasing a person's blood pressure above normal that can increase the number of pain (morbidity) and mortality (Sumartini et al, 2019). If a person is declared to have hypertension, it means having an average arterial pressure higher than the normal limit (Sari, 2016). As a result blood volume increases and blood vessels narrow (Kusmiati et al, 2018). High blood pressure or hypertension occurs when systolic blood pressure is ≥ 140 mmHg and diastolic blood pressure ≥ 90 mmHg (Putri & Wijaya, 2014).

To avoid bad conditions the emergence of complications, treatment therapy is needed. Treatment consists of 2 ways namely pharmacology and non-pharmacology (Wulandari, 2017). Pharmacological treatment is a medical treatment, the use of hypertension drugs often causes unwanted side effects that are things that should be avoided by people with hypertension. One example of common side effects is rising sugar and cholesterol levels, fatigue, and loss of energy. Not a few sufferers have to take other drugs to eliminate side effects from the treatment of hypertension. The only way to avoid these side effects is to discontinue pharmacological treatment therapy. This is what makes patients disobedient to treatment therapy and switch to finding other therapies (Lewis et al, 2004). One of the non-pharmacological therapies that can be given to people with hypertension is nutritional therapy that is done with the management of the hypertension diet. For example, by limiting salt consumption, maintaining potassium, calcium, and magnesium intake, and limiting calorie intake if weight increases. Dietary Approaches to Stop Hypertension (DASH) recommends hypertensive patients consume lots of fruits and vegetables, increase fiber consumption, and drink plenty of water (Lewis et al, 2004).

Dietary therapy is a good therapy of choice for people with hypertension. This therapy can be done by consuming vegetables that can affect blood pressure, such as cucumbers.

Based on research conducted by Kusumastuty et al (2016) on potassium intake to blood pressure, found that potassium intake is associated with systolic blood pressure and diastolic blood pressure with a negative correlation direction, it shows that the higher potassium consumption can lower blood pressure in hypertensive patients. Based on research conducted by Riyadi et al (2016), that excess sodium consumption is at four times the risk for suffering from essential hypertension when compared to those who consume less sodium.

Cucumber is a fruit that is found in many people and has been widely consumed as a complement to dishes. According to a report by the United States Department of Agriculture (USDA) Branded Food Products Database, every 100 grams of cucumber contains 147 mg of potassium and contains no sodium and many other nutrients. The potassium content in cucumbers can lower systolic and diastolic blood pressure by inhibiting the release of renin, increasing sodium and water excretion. Renin circulates in the blood and works by catalyzing the decomposition of angiotensin into angiotensin I. Angiotensin I transforms into its active form of angiotensin II with the help of the Angiotensin-Converting Enzyme (ACE). Sodium and water retention are reduced in the presence of potassium, resulting in a decrease in plasma volume, cardiac output, peripheral pressure, and blood pressure (Arif, 2018). Potassium is also a good electrolyte producer for the liver and helps lower high blood pressure and regulate heart rate rhythm by doing the adverse effects of sodium, potassium content in cucumbers is effective in treating hypertension (Triyanto, 2014).

METHODS

This study uses a quasi-experimental research design with an approach using the design of post-test only control group design which is a design used to measure the effect of treatment on the experimental group by comparing the results of treatment with the control group ended the treatment period. In this study, the population is the number of people with hypertension in Pauh Barat which is 78 people with hypertension in 2021. The size of the sample in this study was determined based on Federer's formula of 16 people.

RESULTS AND DISCUSSIONS

Results

Univariate Analysis

This univariate analysis will be discussed about the decrease in blood levels before and after cucumber juice, the results of the univariate can be seen in the explanation below.

Blood pressure (control group) before giving cucumber juice to people with hypertension in Pauh Barat village in 2021.

Table 1. Systolic and diastolic blood pressure before cucumber juice in control group 2021

TD	N	Mean	Min-Max
Systolic	18	151	140-160
Diastolic	18	92	90-100

Based on Table 1 shows that of the 18 respondents the average systolic and diastolic pressure before being given cucumber juice therapy is 151/90 mmHg. Minimum systolic blood pressure is 140 mmHg and the maximum is 160 mmHg. Minimum diastolic blood pressure is 90 mmHg and the maximum is 100 mmHg.

Tabel 2. Systolic and diastolic blood pressure after being given cucumber juice in the control group in 2021

TD	N	Mean	Min-Max
Systolic	18	146	140-160
Diastolic	18	92	90-100

Based on Table 2 showed that of the 18 respondents the average systolic and diastolic pressure before being given cucumber juice therapy was 146/92 mmHg. Minimum systolic blood pressure is 140 mmHg and the maximum is 160 mmHg. Minimum diastolic blood pressure is 90 mmHg and the maximum is 100 mmHg.

Blood pressure (treatment group) before and after giving cucumbers to people with hypertension in Pauh Barat village in 2021.

Table 3. Systolic and Diastolic Blood Pressure Before Being Given Cucumber Juice In The Treatment Group in 2021

TD	N	Mean	Min-Max
Systolic	18	153	140-160
Diastolic	18	93	90-100

Based on Table 3 showed that of the 18 respondents the average systolic and diastolic pressure before being given cucumber juice therapy was 152/93 mmHg. Minimum systolic blood pressure is 140 mmHg and maximum is 160 mmHg. Minimum diastolic blood pressure is 90 mmHg and maximum is 100 mmHg.

Table 4. Systolic and Diastolic Blood Pressure After Being Given Cucumber Juice In The Treatment Group in 2021

TD	N	Mean	Min-Max
Systolic	18	136	130-160
Diastolic	18	82	80-90

Based on Table 4 shows that of the 18 respondents re average systolic and diastolic pressure before being given cucumber juice therapy is 136/82 mmHg. Minimum systolic blood pressure is 130 mmHg and maximum is 160 mmHg. Minimum diastolic blood pressure is 80 mmHg and maximum is 90 mmHg.

Bivariate Analysis

Effect of just cucumber (control group) on blood pressure in Pauh Barat village in 2021

Table 5. Analysis of systolic and diastolic blood pressure changes before and after cucumber juice therapy in a control group in Pauh Barat village in 2021

TD	Decrease	Increase	same	total	v-value
Systolic	10	0 (0%)	8	18	0.005
Diastolic	0	0 (0%)	18	18	1.000

Wilcoxon statistical test for systolic blood pressure before and after being given cucumber juice of respondents who experienced a decrease in blood pressure as much as 10 people out of 18 respondents. With a value of p-Value = 0.005 < α = 0.05, this means that H1 is accepted meaning that

there is a significant difference between systolic blood pressure before and after the administration of cucumber juice therapy. The above statistical test concludes that there is an effect of cucumber juice therapy on changes in systolic blood pressure in people with hypertension.

Wilcoxon's statistical test for diastolic blood pressure before and after being given cucumber juice did not experience a decrease in pressure and blood pressure remained the same as many as 18 people out of 18 respondents. With a value of p-Value = 1,000 < α = 0.05 this means that H1 is rejected meaning there is no significant difference between diastolic blood pressure before and after the administration of cucumber juice therapy. The above statistical test concluded that there was no effect of cucumber juice therapy on diastolic blood pressure changes in the control group.

The effect of just cucumber (Treatment Group) on blood pressure in Pauh Barat village in 2021

Table 6. Analysis of systolic and diastolic blood pressure changes before and after being given cucumber juice therapy in the treatment group in Pauh Barat village in 2021

TD	Decrease	Increase	same	total	v-value
Systolic	15	0 (0%)	3	18	0.000
Diastolic	14	0 (0%)	4	18	0.000

Wilcoxon statistical test for systolic blood pressure before and after being given cucumber juice of respondents who experienced a decrease in blood pressure as much as 15 people out of 18 respondents. With a value of p-Value = 0.000 < α = 0.05 this means that H1 is accepted meaning that there is a significant difference between systolic blood pressure before and after the administration of cucumber juice therapy. The above statistical test concludes that there is an effect of cucumber juice therapy on changes in systolic blood pressure in people with hypertension.

Wilcoxon's statistical test for diastolic blood pressure before and after being given cucumber juice of respondents who had decreased blood pressure by 14 people, and who had the same blood pressure as many as 4 people out of 18 respondents. With a value of p-Value = 0.000 < α = 0.05 this means that H1 is accepted meaning there is a significant difference between diastolic blood pressure before and after the administration of cucumber juice therapy. The above statistical test concludes that there is an effect of cucumber juice therapy on changes in diastolic blood pressure in the treatment group.

DISCUSSION

Univariate Analysis

Blood *pressure (control group) before and after cucumber juice therapy*

The results of the study of 18 respondents in the cucumber juice therapy group before the cucumber juice therapy were obtained an average blood pressure of 151.11/93 mmHg when transformed into the classification of high blood pressure in stage 1 hypertension, and after being given cucumber juice therapy the average blood pressure decreased to 146.78/93, mmHg. These changes show that cucumber juice therapy affects blood pressure in people with hypertension. The effect of cucumber juice therapy on changes in systolic blood pressure in people with hypertension has been conducted Wilcoxon statistical test before and after being given cucumber juice therapy respondents who experienced a decrease in systolic blood pressure as many as 10 people out of 18 respondents. At the level of meaning α (0.05) with a value (p) obtained of 0.05. For the effect of cucumber juice therapy on changes in diastolic blood pressure in people with hypertension has been conducted statistical test Wilcoxon before and after being given cucumber juice therapy respondents no decrease in blood pressure 18 have the same blood pressure people from 18 respondents. At the level of meaning α (0.05) with a value (p) obtained of 1,000 because the value (p) is less than the value (α), then H1 is

rejected, there is no significant change between cucumber juice therapy to changes in blood pressure in people with hypertension.

The results showed an insignificant reduction in blood pressure in the control group. This is due to several factors that affect this. Factors included smoking and less reduced salt consumption. Of the whole smoking and the average still consume salt. But basically with the dose of cucumber can lower blood pressure.

Based on the analysis of researchers it is known that cucumbers can help lower blood pressure because the content of cucumbers including potassium, magnesium, and phosphorus effectively treat hypertension. Potassium is the main intracellular electrolyte, 98% of the body's potassium is inside the cells, the remaining 2% is outside the cell for neuromuscular function, potassium affects the activity of both the skeletal and heart muscles (Brunner & Suddarth, 2013). Cucumber also has diuretic properties consisting of 90% water, so it can remove salt content in the body. Minerals rich in cucumbers can bind to salt and excrete through urine (Ponggohong et al, 2015).

Smoking can cause hypertension due to chemicals contained in tobacco that can damage the lining of artery walls. So that the arteries are more susceptible to plaque buildup (arteriosclerosis). This is caused by nicotine which can stimulate the sympathetic nerve so that it spurs the work of the heart harder and causes narrowing of blood vessels. When the blood pressure vessels narrow then to circulate blood throughout the body will be disturbed. This can make blood pressure rise.

The results of this study in the study of Kusnul, Zauhani 2017 in Monggot village of Geyer District of Grobogan Regency sample used were 20 people with stage 1 hypertension who were given interventions in administering cucumber juice 100 grams for 7 days, obtained the results of systole 147.10 mmHg and diastole 87.20 mmHg. The average blood pressure after the intervention of cucumber juice systolic blood pressure to 140.50 mmHg and diastole blood pressure 87.20 mmHg, the results of the analysis showed $p = 0.011$ ($p<0.05$) it showed an effect of reducing the blood pressure of people with stage 1 hypertension after being given tomato juice therapy. Based on the above results researchers can conclude that cucumber juice therapy weighing 150 grams has an insignificant effect on changes in blood pressure in people with hypertension.

Blood pressure (treatment group) before and after cucumber juice therapy

The results of the study of 18 respondents in the treatment group before cucumber juice therapy obtained an average blood pressure of 153.22/93.78 mmHg when transformed in the classification of high blood pressure was in stage 1 hypertension and after being given cucumber juice therapy with a weight of 250 ml the average blood pressure decreased to 136.67/ 82.22. This change in blood pressure numbers shows that cucumber juice therapy weighing 250 grams affects blood pressure in people with hypertension.

The effect of cucumber juice therapy weighing 250 ml on changes in diastolic blood pressure in people with hypertension has been conducted statistical tests Wilcoxon before and after being given cucumber juice weighing 250 ml, respondents who experienced a decrease in blood pressure as much as 15 people, and who had the same blood pressure as much as 3 people out of 18 respondents. At the level of meaning α (0.05) with a p-Value value obtained of 0.000, because the p-Value value is less than the value (α), H1 is accepted which means there is a significant change between cucumber juice therapy and changes in blood pressure in the treatment group. This statistic concludes that there is an effect of cucumber juice therapy on changes in blood pressure in people with the hypertension treatment group.

The results of this study are supported by research from Kusnul research, Zauhani 2017 in Monggot village Geyer district grobogan sample used is 20 people with hypertension stage 1 who were given interventions in administering cucumber juice for 7 days, obtained the results of systole 147.10 mmHg and diastole 87.20 mmHg. The average blood pressure after the intervention of cucumber juice systolic

blood pressure to 140.50 mmHg and diastole blood pressure 87.20 mmHg, the results of the analysis showed p = 0.011 (p<0.05) it showed there was an effect of reducing the blood pressure of people with stage 1 hypertension after being given cucumber juice therapy. Based on the analysis of researchers it is known that cucumbers can help lower blood pressure because the content of cucumbers including potassium, magnesium, and phosphorus effectively treat hypertension. Potassium is the main intracellular electrolyte, 98% of the body's potassium is inside the cells, the remaining 2% is outside the cell for neuromuscular function, potassium affects the activity of both the skeletal and heart muscles (Brunner & Suddarth, 2013). Cucumber also has diuretic properties consisting of 90% water, so it can remove salt content in the body. Minerals rich in cucumbers can bind to salt and excrete through urine (Kholish, 2001).

The results showed a decrease in blood pressure in the treatment group after being given interventions influenced by several factors, such as smoking. Of the 18 respondents known to smoke, 16 people smoked. This can affect the benefits of cucumber juice itself. In diastolic blood pressure there is something that does not change, maybe because the respondents themselves after drinking cucumber juice therapy continued with smoking. But basically with a dose of cucumber 250 ml can lower blood pressure.

Smoking can cause hypertension due to chemicals contained in tobacco that can damage the lining of artery walls. So that the arteries are more susceptible to plaque buildup (arteriosclerosis). This is caused by nicotine which can stimulate the sympathetic nerve so that it spurs the work of the heart harder and causes narrowing of blood vessels. When the blood pressure vessels narrow then to circulate blood throughout the body will be disturbed. This can make blood pressure rise. Based on the above results researchers can conclude that cucumber juice therapy weighing 250 ml has a significant influence on changes in blood pressure in people with hypertension.

Bivariate Analysis

Effect of cucumber therapy on blood pressure changes in Pauh Barat village in 2021

Based on a table of 5.10 systolic blood pressure differences after being given cucumber juice therapy in the treatment and control group using the Man Whitney test obtained a p-Value value (Asymp). Sig 2-tailed) of 0.000 (< 0.05) so that it can be concluded H1 is accepted which means there is a difference in the effectiveness of cucumber juice therapy in the treatment and control group for systolic blood pressure changes in people with hypertension in Pauh Barat Village in 2021. Based on the researchers' analysis it is known that the difference in effectiveness in cucumber juice therapy in the treatment group and the control group occurred because the treatment group had a larger amount of cucumber dose of 250 ml. This led to the effect of cucumber juice given to the larger treatment group because the more cucumber doses given to respondents, the decreased effect that occurred on blood pressure would be large.

Cucumber juice contains potassium substances beneficial to clean carbon dioxide substances in the blood, trigger the work of muscles and nerve nodes and regulate osmotic pressure along with sodium. The minerals potassium, magnesium, and fiber in cucumbers are beneficial for lowering blood pressure. The mineral magnesium plays a role in blood flow. In addition, cucumbers are diuretic because of their high water content so that which helps lower blood pressure. The elements of phosphorus, folic acid, and vitamin C in cucumbers are useful to relieve tension or stress (Putri & Wijaya, 2014).

This study is in line with research conducted by Khusnul Zauhani, the results showed that empirically proven there is an effect of cucumber juice on blood pressure reduction, and the most meaningful decrease occurred on the 4th and 5th days, at 2 hours after treatment. Some studies show a link between calcium intake and blood pressure, where low calcium intake can increase the prevalence of

hypertension. In epidemiological studies, it is known that groups with low levels of calcium consumption (300 - 600mg/day) tend to raise blood pressure. Low calcium levels in the blood will stimulate parathyroid hormones and result in intracellular calcium ion levels increasing. This causes smooth muscle cells of blood vessels to be hyperactive to suppressive substances so that peripheral resistance of blood vessels can increase which will also increase blood pressure. Based on the above results it can be known that there is a difference in effectiveness between cucumber juice in the treatment group and control of changes in blood pressure in people with hypertension in Pauh Barat Village of Central Pariaman Sub-district.

CONCLUSIONS

Based on the results of research that has been done and outlined in the discussion exposed in the previous chapter, the researcher can give the following conclusions: 1) There is the signification of blood pressure changes before and after being given 250 ml cucumber juice therapy in people with hypertension treatment group in Pauh Barat Village of Pariaman Central sub-districts, Pariaman City; 2) There is no signification of blood pressure changes before and after being given cucumber juice therapy in hypertensive patients of the control group in Pauh Barat Village of Pariaman Central sub-districts, Pariaman City; and 3) There are differences between the treatment group and the control group on changes in blood pressure but the treatment group is more effective for lowering blood pressure in people with hypertension in Pauh Barat Village of Pariaman Central sub-districts. It is expected that the results of this study provide information to the public about cucumbers for blood pressure management for people with hypertension.

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