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**THE EFFECT OF CUCUMBER JUICE
(*Cucumis Sativus*) TOWARD
HYPERTENSION OF ELDERLY AT
TRESNA WERDHA BUDI SEJAHTERA
SOCIAL INSTITUTION OF BANJARBARU
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Abstract

Introduction: Hypertension is a degenerative disease that becomes a major problem in society, especially elderly. Hypertension-causes complications of cerebral hemorrhage, heart failure, kidney failure, and blindness due to rupture of blood vessels.

Objective: Analyze the effect of cucumber juice on blood pressure in elderly with hypertension at Tresna Werdha Budi Sejahtera Social Institution of Banjarbaru South Borneo 2017.

Method: Quasi experiments with Ones group pre-post test design. Total of samples are 35 people taken using purposive sampling technique. Normality test using Shapiro-wilk and statistical analyze using Paired t-test. 200g of cucumber juice mix on 100 ml water, drink twice a day during morning and afternoon

Result: Systolic blood pressure decreased after cucumber juice therapy with 149,68 mmHg to 136.65 mmHg and p value 0.00 ($p < 0.05$) and diastolic blood pressure decreased after cucumber juice therapy with 95.99 mmHg to 80.09 mmHg and p value $p = 0,000$. Diastolic blood pressure after giving cucumber juice was 89,08 mmHg ($\pm 3,355$ mmHg), lower than diastolic blood pressure before giving cucumber juice which is 95,88 mmHg ($\pm 3,332$ mmHg).

Conclusion: Cucumber juice can lower blood pressure in elderly hypertension patients.

Key Words: Cucumber Juice (*Cucumis Sativus*), Hypertension, Blood Pressure

Background

One of the indicators for a nation progress is the life expectancy of community. Based on the results of population census in 2010, the number of elderly in Indonesia is 16.1 million people (7.6% of the total population). In 2014, the population number of elderly in Indonesia is 18.781 million people and estimated in 2025; the number will increase up to 36 million people (Ministry of Health RI, 2013). Besides having the fourth largest population in the world, Indonesia is the fourth country with the largest number of elderly, after China, America and India, which is about 24 million people. This leads to an epidemiological transition from infectious diseases to degenerative diseases, one of which is the disease of the cardiovascular system (Fatmah, 2010).

Hypertension or high blood pressure is a condition when a person has an elevated blood pressure above normal or a systolic pressure higher than 140 mmHg and a diastolic over 90 mmHg. The risk of hypertension increased at age 50 and above, in elderly population (age ≥ 60 years), prevalence for hypertension is 65,4% (Triyanto, 2014).

High blood pressure/hypertension is one of the most important risk factors that can lead to cerebrovascular disease, congestive heart failure, stroke, coronary heart disease and kidney disease with high morbidity and mortality rates. This disease has become a major problem in public health in Indonesia as well as in some countries in the world.

According to the World Health Organization (WHO), noted in 2012 at least 839 million cases of hypertension, estimated to be 1.15 billion by 2025 or about 29% of the world's population, which is more common in women (30%) than men (29%). Approximately 80% of hypertension cases occur mainly in developing countries (Triyanto, 2014).

Hypertension accounts for 45% of deaths from heart disease and 51% of deaths from stroke. Hypertension is the third leading cause of death after stroke and tuberculosis, with a rate of 6.7% of the population of deaths at all ages in

Indonesia (MOH, 2010). Based on the results of *Riset Kesehatan Dasar* (Riskesdas) in 2013 states that hypertension is the number one disease in Indonesia, the prevalence of the population aged ≥ 18 years is 25.8% (based on measurement). The highest prevalence in Bangka Belitung province is 30.9%, followed by South Borneo 30.8%, East Borneo 29.6%, and West Java 29.4% (Ministry of Health RI, 2013).

The survey result of health services of South Borneo in 2016 showed that the number of hypertension sufferer as many as 51610 people that spread in various regencies and cities which in South Borneo (Health Service of South Borneo, 2016).

Treatment of hypertension outlined by Lewis (2000) in Triyanto (2014) is divided in two types, pharmacology and non pharmacology. Pharmacological therapy using drugs or compounds that in its work can affect the blood pressure of patient. The grouping of pharmacological therapies used to control blood pressure in hypertensive patients is Angiotensin Converting Enzyme (ACE-inhibitor), Angiotensin Receptor Blocker (ARBs), Beta-Blocker, Direct Renin Inhibitor, Diuretic, Vasodilator. Non pharmacology therapy is a therapy without the use of drug agents in the process of therapy. The use of modern anti-hypertensive drugs should consider the efficacy, the risk of side effects, long-term use and economic value, then traditional medicine can be an option, one of which is cucumber (Soeryoko, 2010 in Marbun et al, 2012).

Cucumber fruit is very good in consumption for people with hypertension because of its mineral content of potassium, magnesium, and phosphorus that treat hypertension effectively, potassium is useful for clearing carbon dioxide in the blood, triggers the work of muscles and nerves and regulates osmotic pressure with sodium. Magnesium mineral plays a role of blood flow and the nerves. In addition, cucumber is also useful as a detoxification because the water content is very high up to 90% make cucumber has diuretic effect. Mineral rich in cucumber is

able to bind salt and is excreted through urine (Kholish, 2011).

The results of preliminary study conducted on April 4, 2017 at Tresna Werdha Budi Sejahtera Social Institution of Banjarbaru South Borneo, the number of hypertensive patients as many as 55 people. The results of interviews on five elderly people with hypertension stated they have been aware that cucumbers can lower the blood pressure, but they have not proven directly where just by consuming cucumber without pharmacological drugs can lower blood pressure. They also did not know how many cucumbers or cups of cucumber juice to be consumed and what content of cucumber so that it can lower blood pressure. The therapies that widely used are by consuming pharmacological drugs and low-calorie diets.

Based on the phenomenon described in the introduction and supported by the related data, the researcher interested to examine more about "The effect of cucumber juice on blood pressure drop in elderly hypertension patients at Tresna Werdha Budi Sejahtera Social Institution of Banjarbaru South Borneo 2017".

Method

The research used quasi experiment with one group pre-post test design. The research was conducted with one group treated with certain treatment, then observed before and after treatment (Supardi, 2013). Dose of *cucumis sativus*: 200g of cucumber and 100 ml of water. The study was conducted at Tresna Werdha Budi Sejahtera Social Institution of Banjarbaru South Borneo July 2017, giving juice every day for three days and in the morning at 09.00 WITA.

Populations in this research are the 55 patient of hypertension in Social Institution Tresna Werdha Budi Sejahtera of Banjarbaru, South Borneo. The sampling technique used is non-probability sampling with Purposive Sampling that is sampling based on the consideration of the researcher himself (Saryono, 2013). The sample size was calculated using Slovin formula with error level of 10% or 0.1 (Noor, 2011) as

follows: Based on the result, the sample size used in this study is 35 people. The samples in this study were hypertensive patients who met the inclusion and exclusion criteria. The criteria of the sample in this research are:

- a. Inclusion criteria
 - 1) Blood pressure 140/90 - 160/110 mmHg.
 - 2) The health conditions in general were good and respondents who agreed not to take antihypertensive drugs.
 - 3) No physical activity such as sports, smoking, and eating, at least 30 minutes before the measurement and also sit to rest at least 5-15 minutes before the measurement.
 - 4) Willing to be a respondent by signing an approval sheet.
- b. Exclusion criteria
 - 1) Blood pressure <140/90 and > 160/110 mmHg.
 - 2) Respondents who do not agree to not take antihypertensive drugs.
 - 3) Not willing to be a respondent.

The data were analyzed by computer process respectively. Data analyzed also used to answer and prove that the hypotheses enforced or rejected (Suyanto, 2011).

1. Univariate Analyzed
In this study univariate analysis was used to identify blood pressure before being given cucumber juice and blood pressure after being given cucumber juice.
2. Bivariate Analyzed
This analysis was conducted to determine the effect of cucumber juice on blood pressure in elderly people with hypertension in Tresna Werdha Budi Sejahtera Social Institution of Banjarbaru South Borneo using statistic test paired sample t-test with significant level 95% ($\alpha \leq 0,05$).

Results

1. Characteristics of Respondents

Table 1. Characteristics Of Respondents Based On Ages, Sex and Education

Characteristics	Total	
	n	%
Age		
60-64	5	14,3
65-70	14	40,0
>70	16	45,7
Total	35	100
Sex		
Male	15	42,9
Female	20	57,1
Total	35	100
Education		
Primary School	27	77,1
Junior High School	5	14,3
Senior High School	3	8,6
Total	35	100

Based on the results of this research in table 1, most respondents in this study aged over 70 years as many as 16 people (45.7%), female sex that is as many as 20 people (57.1%), and has the level of elementary education that is as many as people (77.1%).

2. Univariate Analysis

Table 2. Blood Pressure Systolic and Diastolic Before and After Treatment

Variabel		Min-Max	Mean (mmHg)
BP Systolic	Before	140-160	149,68
	After	120-149	136,65
BP Diastolic	Before	90-105	95,88
	After	80-95	89,08

Based on table 2, known that mean (pre-test) blood pressure of systolic before treatment (pre-test) is 149,68 mmHg, with lowest systolic blood pressure is 140 mmHg and highest systole blood pressure is 160 mmHg.

The mean value of diastolic blood pressure before treatment (pre-test) was 95.88 mmHg, with the lowest diastolic blood pressure was 90 mmHg and the highest diastole blood pressure was 105 mmHg.

The mean value of blood pressure of systolic after treatment (post-test) was 136,65 mmHg, with lowest systolic blood pressure 120 mmHg and highest systolic blood pressure was 149 mmHg.

The mean value of diastolic blood pressure after treatment (post-test) was 89.08 mmHg, with the lowest diastolic blood pressure was 80 mmHg and the highest diastolic blood pressure was 95 mmHg.

3. Bivariate Analysis

Before the bivariate analysis, the normality test is the absolute requirement of the paired sample t-test. If the data obtained is distributed normally then the requirement to do paired sample t-test is fulfilled.

Table 3. Test of Normality of Blood Pressure of Systolic and Diastolic Before and After Treatment

	Value	Df	Sig.
BP Systolic (Pre-test)	0,944	35	0,076
BP Systolic (Post-test)	0,942	35	0,064
BP Diastolic (Pret-test)	0,945	35	0,081
BP Diastolic (Post-test)	0,952	35	0.126

From table 3, it known that the distributions of systolic and diastolic blood pressure data before and after treatment were both normal distributed, the analysis used paired sample t-test.

Table 4. Results of Paired Sample T-Test Analysis Effect of Cucumber Juice on Blood Pressure Reduction

	n	Delta Mean	Std. Dev	p= 0,05
BP Systolic	35	13,028	6,780	0,000
BP Diastolic	35	6,800	3,270	0,000

Table 4 shows the mean value of systolic blood pressure before after consumption of cucumber juice is 13.028 mmHg (\pm 6.780 mmHg) and mean diastolic blood pressure value before after cucumber juice is 6,800 mmHg (\pm 3,270 mmHg).

The result of paired sample t-test analysis shows that $p = 0,000 < \alpha 0,05$, there was an effect of cucumber juice on decreasing systolic and diastolic blood pressure in elderly people with hypertension in Tresna Werdha Budi Sejahtera Social Institution of Banjarbaru South Borneo.

Discussion

1. Univariate Analysis

The result describes that the systolic blood pressure before the highest treatment reached 160 mmHg and the lowest reached 140 mmHg. Systolic blood pressure after the highest treatment reached 149 mmHg and the lowest reached 120 mmHg. This study was in line with Muniroh et al, (2005) who concluded that the increasing age of a person can lead to increased blood pressure, especially blood pressure of systolic.

Theoretically, elderly people tend to increase blood pressure as they age. Increased blood pressure in the elderly generally occurs due to decrease organ function in the cardiovascular system.

The heart valve thickens and becomes stiff, and there is a decrease in elasticity of the aorta and other large arteries (Ismayadi, 2004). In addition, there is an increase in peripheral blood vessel resistance when the left ventricle pumps, resulting in increased systolic and afterload pressure (Gunawan, 2009).

Describes the result that diastolic blood pressure before the highest treatment reaches 105 mmHg and the lowest reaches 90 mmHg. Diastolic blood pressure after the highest treatment reached 95 mmHg and the lowest reached 80 mmHg. This study is in line with Ryan Ardian (2006) who concluded that there was a difference between diastolic blood pressure before and after giving treatment to the elderly.

Diastolic blood pressure increases with age. Diastolic blood pressure increases until age 50-60 years, and then tends to persist or slightly decreases. This results in stiffness of blood vessels and decreased arterial flexibility resulting in an increase in pulse pressure according to age (Rigaud, 2001).

2. Bivariate Analysis

There was an effect of *Cucumis sativus* on blood pressure decrease in elderly people with hypertension in Tresna Werdha Budi Sejahtera Social Institution of Banjarbaru South Borneo.

The results of this study were in line with the research conducted by Prakoso, Fery, Sonhaji (2011) that there was a significant effect of cucumber juice on blood pressure of systolic and diastolic in elderly with hypertension in

This was also supported by Hariada (2011) percentage decrease in blood pressure in adult women equal to adult males ($p < 0.05$). Giving cucumber juice can lower blood pressure in adult and adult women, with a percentage drop in comparable blood pressure.

Decrease in blood pressure occurs because cucumber has potassium content that can decrease the secretion of renin which leads to inhibition of Renin-Angiotensin System also leads to decreased aldosterone secretion, resulting in

decreased reabsorption of sodium and water in the renal tubules. As a result of this mechanism, there is an increase in diuresis which causes a decrease in blood volume, so the blood pressure goes down. In addition, potassium also causes vasodilation of peripheral blood vessels, resulting in a decrease in peripheral resistance, and blood pressure also drops.

This happened because the content in the cucumber of potassium, magnesium, and phosphorus that efficacious lowering high blood pressure. Cucumbers were also useful as detoxification because very high water content of up to 90% makes cucumber has diuretic effect. Mineral rich in cucumber was able to bind salt and is excreted through urine (Kholish, 2011).

Conclusion

Cucumber juice can lower blood pressure in elderly hypertension patients.

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