TOMATO JUICE EFFECTS ON REDUCING HIGH BLOOD PRESSURE IN ELDERLY HYPERTENSIVE PATIENTS

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ABSTRAK JUS TOMAT BERPENGARUH TERHADAP PENURUNAN TEKANAN DARAH TINGGI PADA LANSIA PENDERITA HIPERTENSI

Latar Belakang : Riskesdas 2018 menyatakan prevalensi hipertensi berdasarkan hasil pengukuran pada penduduk usia ≥18 tahun sebesar 34,1%, tertinggi di Kalimantan Selatan (44.1%), sedangkan terendah di Papua sebesar (22,2%). Estimasi jumlah kasus hipertensi dii Indonesia sebesar **63.309.620 orang**, sedangkan angka kematian di Indonesia akibat hipertensi sebesar 427.218 kematian. Data kunjungan lansia dengan tekanan darah tinggi dii Puskesmas Kaliasin pada bulan Februari sebanyak 132 pasien lansia.

Tujuan penelitian ini diketahui pengaruh pemberian jus tomat dengan penurunan tekanan darah tinggi pada lansia penderita hipertensi di Puskesmas Kaliasin Kab. Lampung Selatan Tahun 2021.

Metode : Jenis penelitian menggunakan kuantitatif, rancangan penelitian praeksperimental dengan pendekatan one group pretespost test design, populasi dan sampel adalah responden dengan tekanan darah tinggi berjumlah 22 orang. Teknik sampling menggunakan purposive sampling, penelitian dilakukan selama 7 hari dengan jumlah 150ml setiap pagi selama 7 hari berturut-turut. Analisa data univariat dan bivariat menggunakan Ttest.

Hasil : Rata-rata sistole diastole sebelun diberi jus tomat adalah sebesar 164,09/100,91 mmHg. Rata-rata sistole diastole sesudah diberi jus tomat adalah sebesar 132,73/85,45 mmHg. Hasil uji statistic menggunakan tes-dependen didapat nilai p-value 0.000 (α<0.05) yang artinya terdapat pengaruh pemberian jus tomat dengan penurunan tekanan darah tinggi pada lansia penderita hipertensi di Puskesmas Kaliasin Kab. Lampung Selatan Tahun 2021.

Kesimpulan : terdapat pengaruh pemberian jus tomat dengan penurunan tekanan darah tinggi pada lansia penderita hipertensi di Puskesmas Kaliasin Kab. Lampung Selatan Tahun 2021.

Saran .: Diaplikasikan sebagai pertimbangan secara rasional untuk pendekatan pada lansia untuk melakukan terapi herbal untuk menurunkan tekanan darah, selain itu jus tomat dipilih karena di Puskesmas Kaliasin Kab. Lampung selatan banyak yang menderita hipertensi

Kata Kunci : Jus Tomat, Tekanan Darah Tinggi, Lansia

ABSTRACT

Background :Riskesdas 2018 stated that the prevalence of hypertension based on measurement results in the population aged 18 years was 34.1%, the highest was in South Kalimantan (44.1%), while the lowest was in Papua (22.2%). The estimated number of hypertension cases in Indonesia is 63,309,620 people, while the death rate in Indonesia due to hypertension is 427,218 deaths. The data of elderly visits with high blood pressure at the Kaliasin Health Center in February were 132 elderly patients. South Lampung in 2021.

Objective: To determine the effect of giving tomato juice to reduce high blood pressure in elderly patients with hypertension at the Kaliasin Health Center, Kab. South Lampung in 2021.

Method : This type of research uses quantitative, pre-experimental research design with a one group pretest post test design approach, the population and sample are respondents with high blood pressure. The sampling technique used purposive sampling, the study was conducted for 7 days. Univariate and bivariate data analysis using t-test.

Result : The average systolic diastole before being given tomato juice was 164.09/100.91 mmHg. The average systolic diastole after being given tomato juice was 132.73/85.45 mmHg. The results of statistical tests using dependent tests obtained a p-value 0.000 (α<0.05) which means that there is an effect of giving tomato juice with a decrease in high blood pressure in the elderly with hypertension at the Kaliasin Health Center, Kab. South Lampung in 2021.

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Conclusion: there is an effect of giving tomato juice with a decrease in high blood pressure in the elderly with hypertension at the Kaliasin Health Center, Kab. South Lampung in 2021.

Suggestion.: Applied as a rational consideration for the approach of the elderly to do herbal therapy to lower blood pressure, besides that tomato juice was chosen because at the Kaliasin Health Center, Kab. South Lampung many suffer from hypertension

Keywords : , Elderly, High Blood Pressure, Tomato Juice

INTRODUCTION

Indonesia is a tropical area with sun exposure throughout the year, but the Indonesian population is still at risk of experiencing vitamin D deficiency. This is because one of them is women. Wearing closed clothes, there are still many activities carried out in closed spaces that do not get direct sunlight. Other things that affect vitamin D deficiency are women who wear closed clothes and are rarely exposed to the sun, and women who always use sunscreen also play a role in preventing the entry of ultraviolet rays from sunlight into the skin, resulting in reduced synthesis of vitamin D in the skin and lack of vitamin D consumption. As a result, there is a risk of degenerative diseases such as hypertension (Masulili, 2017; Evayanti, 2021).

Riskesdas 2018 stated that the prevalence of hypertension based on measurement results in the population aged 18 years was 34.1 % , the highest was in South Kalimantan (44.1%), while the lowest was in Papua (22.2%). Estimate

the number of cases of hypertension in Indonesia is 63,309,620 people, while the death rate in Indonesia due to hypertension is 427,218 deaths.

Hypertension occurs in the age group 31-44 years (31.6 %) , age 45-54 years (45.3%), age 55-64 years (55.2%). From the prevalence of hypertension of 34.1 % , it was known that 8.8% were diagnosed with hypertension and 13.3% of people diagnosed with hypertension did not take medication and 32.3% did not take medication regularly. This shows that most people with hypertension do not know that they are hypertension so they do not get treatment (Riskesdas RI, 2018).

Hypertension that does not get proper treatment causes complications such as stroke, coronary heart disease, diabetes, kidney failure and blindness. Stroke (51%) and Coronary Heart Disease (45%) are the highest causes of death. Target organ damage due to complications of hypertension will depend on the magnitude of the increase in blood pressure and the duration of the undiagnosed and untreated blood pressure condition. The organs of the body that are targeted include the brain, eyes, heart, kidneys, and can also affect the peripheral arteries themselves. In addition, hypertension is more common at the age of 35-44 years (6.3 %) , age 45-54 years (11.9%), and age 55-64 years (17.2%). Meanwhile, according to economic status, the highest proportion of hypertension is at the lower middle (27.2%) and middle (25.9%) levels (Kemenkes RI, 2019)

According to the 2014 Indonesian Sample Registration System (SRS) data, hypertension with complications (5.3 %) is the number 5 (five) cause of death at all ages. The 2015 National Health Insurance (JKN) financing showed that 1.3 million people or 0.8% of JKN participants received services for Strophic Kata, which cost 13.6 trillion rupiah or 23.9% consisting of; Heart Disease (11.59 %), Chronic Kidney Failure (4.71 %), Cancer (4.03 %), Stroke (1.95%), Thalassemia (0.73%), Hepatitis Cirosis (0.42%), Leukemia (0.3%) , Haemophilia (0.16%) (Ministry of Health, 2019)

Hypertension can be controlled by pharmacological and non-pharmacological methods , pharmacologically with blood pressure-lowering drugs. These drugs include diuretics, adrenergic inhibitors, ACE-inhibitors, ARBs, calcium antagonists, and so on (Junaidi , 2010 ; Suwanti, 2018).

The Herbalists (herbal experts) are very confident in the ability of herbs to treat various diseases, without causing side effects. Even its ability can be equated with chemical drugs. Types of herbs that can be used for the treatment of hypertension as follows, garlic (Allium Sativum), Shallots (Alium Cepa). Tomato (Lyocopercisonlycopersicum), Celery (Apiumgraveolens), Cat's whiskers (Orthosiphon Stamineus) (Dr Widharto, 2007; Suwanti, 2018).

According to Basith (2013), a non-pharmacological treatment that can be used to treat hypertension is tomato juice. Tomato juice has the benefit of lowering blood pressure because tomatoes contain lycopene. There are 4.28 mg of lycopene in 100 grams of fresh tomatoes (Kailaku, 2007; Lita, 2010). Apart from cooking, tomatoes are also consumed raw in the form of juice. Research conducted by Lestary (2012) states that the consumption of tomato juice derived from 150 grams of tomatoes can reduce systolic blood pressure by

11.76% (approximately 7.276 mmHg) and diastolic by 8.82% (by 3.321 mmHg).

Tomato (Lyocopercis only copersicum) is one type of herbal therapy to treat hypertension. Tomatoes are rich in potassium. The action of potassium is to affect the renin-angiotensin system by inhibiting its production. Renin is in charge of converting angiotensinogen to angiotensin I, but because of a block in this system, the blood vessels experience vasodilation so that blood pressure will drop. Potassium also reduces the potential of membranes on the walls of blood vessels so that there is relaxation in the walls of blood vessels and ultimately lowers blood pressure (Monika, 2013; Suwanti, 2018).

RESEARCH METHODOLOGY

This type of research uses quantitative, pre - experimental research design with a one group pretest post test design approach, population and samples are 22 people who suffer from high blood pressure. The sampling technique used purposive sampling, before giving tomato juice, a pre test was carried out first by checking blood pressure and then giving tomato juice for 7 consecutive days every morning, with 150 grams of pure tomatoes added with 50 ml of water and added sugar by 2 grams. So that it produces 150 ml of tomato juice

RESEARCH RESULT

Characteristics of Hypertension

From table 1 below, it is known that the characteristics of respondents based on age are mostly > 55 years as many as 19 respondents (86.4%) with an average blood pressure value before the intervention of 163.158/101.05 mmHg and after the intervention 132.63/84.74mmHg, the value is 132.63/84.74mmHg. p-value 0.000 aged <55 years as many as 3 respondents (13.6%) the average value of blood pressure before intervention was 170.00/100.00 mmHg, after intervention 133.33/90 mmHg, p-value 0.001. Male sex as many as 14 respondents (63.6%) the average value of blood pressure before the intervention was 165.71/102.14 mmHg after the intervention was 134.29/85.71 mmHg, the p-value was 0.000 and the female was 8 respondents (36.4%) the average value of blood pressure before the intervention was 161.25/98.75 mmHg after being given the intervention 130.00/85.00 mmHg, the p-value was 0.000.

Table 1
Mean Systolic Diastolic Hypertension Based on Age , Gender in the Elderly in Kaliasin Public Health Center, Kab. South Lampung Year 2021

Characteristics	F	%	Pretest Blood Pressure		Posttest Blood Pressure		p-value
			Systole	Diastole	Systole	Diastole	
Age							
< 55 Years	3	13.6	170,000	100.00	133.33	90.00	0.001
55 Years	19	86.4	163,158	101.05	132.63	84.74	0.000
Gender							
Man	14	63.6	165.71	102.14	134.29	85.71	0.000
Woman	8	36.4	161.25	98.75	130.00	85.00	0.000
Total	22	100	-	-	-	-	-

Based on the most age > 55 years as many as 19 respondents (86.4%) with a p-value of 0.000 this can prove if the age approaching the elderly is more at risk of developing hypertension. This is due to increasing age, changes occur in the arteries in the body to become wider and stiffer which results in reduced capacity and recoil of blood accommodated through blood vessels. This reduction causes the systolic pressure to increase. Aging also causes disruption of neurohormonal mechanisms such as the renin-angiotensin-aldosterone system and also causes an increase in peripheral plasma concentrations and also Glomerulos klerosis due to aging and intestinal fibrosis resulting in increased vasoconstriction and anvascular resistance, resulting in increased blood pressure (hypertension).

Male sex as many as 14 respondents (63.6 %) and female as many as 8 respondents (36.4%). In this study, showing that the male gender is more at risk of developing hypertension, this is inversely proportional to the opinion expressed by Wahyuni and Eksanoto (2013) that women will experience an increased risk of hypertension after menopause, namely those aged over 45 years. Menopause women have low estrogen levels. While this estrogen functions to increase levels of High Density Lipoprotein (HDL), which plays a very important role in maintaining healthy blood vessels.

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Research conducted by Prasetyaningrum (2014) stated that men are more at risk of developing hypertension than women at the age of <45 years. But at the age of >65 years, women are more at risk of experiencing hypertension than men after women enter menopause, the prevalence in women will increase due to hormonal factors. In addition, this study used a mixed sample of male and female gender, and the number of samples that were comparable between the sexes was not determined, which had an impact on the results of data processing.

Univariate Analysis
Blood Pressure Before Intervention

Table 2
Mean blood pressure in the elderly with hypertension before being given tomato juice at the Kaliasin Health Center, Kab. South Lampung Year 2021

Blood Pressure	N	Mean	SD	SE	Min-Max
Systole	22	164.09	10.075	2.618	150-180
Diastole	22	100.91	6,109	1,301	90-110

From table 2 above, it can be seen that the average blood pressure in elderly patients with hypertension before being given tomato juice at the Kaliasin Health Center, Kab. South Lampung in 2021 to 22 respondents, with a mean systolic 164.09 mmHg and mean diastolic 100.91 mmHg.

Blood Pressure After Intervention

Table 3
Mean blood pressure in the elderly with hypertension after being given tomato juice at the Kaliasin Health Center, Kab. South Lampung Year 2021

Blood Pressure	N	Mean	SD	SE	Min-Max
Systole	22	132,73	8,872	1,882	120-150
Diastole	22	85,45	5,096	1,087	80-90

From table 3 below, it can be seen that the average blood pressure in elderly patients with hypertension before being given tomato juice at the Kaliasin Health Center, Kab. South Lampung in 2021 to 22 respondents, with a mean systole of 132.73 mmHg and a mean diastole of 85.45 mmHg.

Bivariate Analysis

Table 4
The Effect of Giving Tomato Juice With Reduction of High Blood Pressure in Elderly Patients with Hypertension at the Kaliasin Public Health Center, Kab. South Lampung Year 2021

Blood Pressure	N	Mean	SD	t	P value
Systole Pretest	22	164,09	10,075	16,551	0,000
Diastole Pretest	22	100,91	6,109		
Systole Posttest	22	132,73	8,872	9,056	
Diastole Posttest	22	85,45	5,096		

Based on table 4 above, it is known that the average systolic diastole before being given tomato juice was 164.09/100.91 mmHg and after being given an intervention for 7 days using tomato juice, the average blood pressure was 132.73/85.45 mmHg.

The results of statistical tests using the independent test obtained a p-value of 0.000 (α<0.05), which means that there is an effect of giving tomato juice with a decrease in high blood pressure in the elderly with hypertension at the Kaliasin Health Center, Kab. South Lampung in 2021.

DISCUSSION

Univariate Analysis

Mean blood pressure in the elderly with hypertension before being given tomato juice at the Kaliasin Health Center, Kab. South Lampung Year 2021

The average blood pressure in the elderly with hypertension before being given tomato juice at the Kaliasin Health Center, Kab. South Lampung in 2021 for 22 respondents, with a mean systole of 164.09 mmHg and a mean diastole of 100.91 mmHg.

In line with the theory put forward by Riskesdas (2018) Hypertension is no stranger to society. Hypertension is persistent blood pressure where the systolic pressure is above 140 mmHg and the diastolic pressure is > 90 mmHg. Hypertension is not a deadly disease, but this disease can trigger the occurrence of other diseases that are classified as deadly diseases such as stroke. In most cases, hypertension is detected during a physical examination due to certain disease reasons, so it is often referred to as the “silent killer”. Without realizing it, patients experience complications in vital organs such as the heart, brain (stroke), kidneys, eyes (retinopathy), and peripheral arteries. Damage to these organs depends on high blood pressure and how long the high blood pressure is not controlled or treated (Muhadi, 2016).

This research is in line with research conducted by Sabilu, Nuziyati, Fachlevi (2017) with the title "Tomato Juice (Lycopersicum Commune) Reducing Blood Pressure in Elderly With

Hypertension in Kali Susu, Buton Utara in Indonesia". Compared with the control group, the treatment group showed a higher reduction in systolic blood pressure (8.59 mmHg, $p < 0.05$) and diastolic blood pressure (6.19 mmHg, $p < 0.05$) after the 7-day intervention with juice. tomato. Conclusion: The findings show that tomato juice treatment effectively reduces systolic and diastolic blood pressure levels in Indonesian elderly with hypertension.

According to researchers, high blood pressure is a state of systolic and diastolic above normal, which is 140/90 mmHg. This can be caused by many things, one of which is age . The older a person gets , the harder the heart pump works, which affects the results of systolic and diastolic blood pressure.

Lifestyle habits such as smoking, drinking alcoholic beverages, and lack of exercise can affect the increase in blood pressure. Drinking more than one alcoholic beverage per day tends to increase blood pressure. Meanwhile, lack of exercise can encourage obesity and hypertension (Suiraoka , 2012 ; Maternity, 2020). The condition of the social environment is related to economic conditions in an area and determines the pattern of food and nutrition consumption carried out by the community (Rahmadya, 2019; Maternity, 2020) .

Mean blood pressure in the elderly with hypertension after being given tomato juice at the Kaliasin Health Center, Kab. South Lampung Year 2021

The average blood pressure in the elderly with hypertension before being given tomato juice at the Kaliasin Health Center, Kab. South Lampung in 2021 for 22 respondents, with a mean systole of 132.73 mmHg and a mean diastole of 85.45 mmHg.

In line with the theory put forward by Foex & Sear (2004; Jitowiyono, 2018) Hypertension is a chronic increase in blood pressure which in the long term causes organ damage and results in increased morbidity and mortality. Blood pressure is the product of cardiac output and systemic vascular resistance. Thus, patients with arterial hypertension may have increased cardiac output, increased systemic vascular resistance, or both. In the younger age group , cardiac output is often increased, while in older patients hypertension increases systemic vascular resistance and increases vascular stiffness.

According to Saferi (2013), hypertension treatment is broadly divided into 2, namely pharmacological and non-pharmacological (herbal) treatment. Non-medical treatment is treatment without antihypertensive drugs. Treatment is based on salt intake with a low salt diet, exercise, weight loss, and lifestyle improvements such as avoiding alcohol.

This research is in line with research conducted by Sabilu, Nuziyati, Fachlevi (2017) with the title "Tomato Juice (Lycopersicum Commune) Reducing Blood Pressure in Elderly With Hypertension in Kali Susu, Buton Utara in Indonesia". Compared with the control group, the treatment group showed a higher reduction in systolic blood pressure (8.59 mmHg, $p < 0.05$) and diastolic blood pressure (6.19 mmHg, $p < 0.05$) after the 7-day intervention with juice. tomato. Tomato juice treatment effectively reduces systolic and diastolic blood pressure levels in Indonesian elderly with hypertension.

According to researchers, traditional medicine is a treatment for hypertension that uses natural ingredients that are around us. This kind of treatment has no side effects but the treatment can't take patience, patience, and the benefits will only be seen in the long term, one of which is tomatoes.

Tomatoes are also a source of potassium which can help lower blood pressure. The mechanism of action of potassium in preventing atherosclerosis or narrowing of blood vessels is by keeping the walls of large blood vessels elastic and optimizing their function so that they are not easily damaged due to high blood pressure. Potassium also maintains water balance in the body and is a mechanical mechanism used to balance blood pressure (Astawan, 2008; Maisyaroh, 2016).

Bivariate Analysis

The Effect of Giving Tomato Juice With Reduction of High Blood Pressure in Elderly Patients with Hypertension at the Kaliasin Public Health Center, Kab. South Lampung Year 2021

The mean systolic diastole before being given tomato juice was 164.09 /100.91 mmHg and after being given an intervention for 7 days using tomato juice, the average blood pressure was obtained. blood of 132.73/85.45 mmHg.

The results of statistical tests using the independent test obtained a p-value of 0.000 ($\alpha<0.05$), which means that there is an effect of giving tomato juice with a decrease in high blood pressure in the elderly with hypertension at the Kaliasin Health Center, Kab. South Lampung in 2021.

In line with the theory put forward by the Ministry of Health (2009) Men aged 35-50 years and postmenopausal women are at high risk for developing hypertension. Gender factors affect the occurrence of hypertension, where men are more than women. Men are thought to have a lifestyle that

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tends to increase blood pressure compared to women. However, after entering menopause, the prevalence of hypertension in women increases. This is due to the influence of the hormone estrogen which can protect women from cardiovascular disease. Levels of this hormone will decrease after menopause.

Old age is part of the process of growth and development. Humans do not suddenly grow old, but develop from babies, children, adults and eventually become old. This is normal, with predictable physical and behavioral changes occurring in all persons at the time of recording reaching a certain age of chronological developmental stage. Elderly is a natural process that is determined by God Almighty. Everyone will experience the process of getting old and old age is the last period of human life. At this time a person will experience physical, mental and social decline gradually (Azizah, 2011).

This research is in line with research conducted by Virgona (2010) The Effect of Tomato Juice Therapy on Blood Pressure in Elderly With Hypertension at Citeureup Public Health Center, Cimahi City. Based on the research results obtained in table 2, it shows that the average systolic pressure after consuming tomato juice is 142.90

mmHg and the average diastolic pressure after consuming tomato juice was 82.80 mmHg. From the Wilcoxon test in table 3 shows a p-value of 0.001 (<α=0.05), it can be concluded that there is an effect of consumption of tomato juice on blood pressure in the elderly with hypertension.

According to Basith (2013), a non-pharmacological treatment that can be used to treat hypertension is tomato juice. Tomato juice has the benefit of lowering blood pressure because tomatoes contain lycopene. There are 4.28 mg of lycopene in 100 grams of fresh tomatoes. In addition to cooking tomatoes are also consumed raw in the form of juice.

According to researchers, tomatoes are a food fruit that is currently consumed in all corners of the world. It is believed, consuming tomatoes is good for liver health. Lycopene, one of the most powerful natural antioxidants, is found in tomatoes with levels of 30-100 ppm. Lycopene has the ability to prevent cancer. Currently, tomato fruit extract has also been developed which is used as a treatment.

Food sources of potassium have excellent potential to reduce systolic and diastolic blood pressure (Hull, 1996; Raharjo, 2010). Tomatoes are rich in potassium (235 mg/100gr tomatoes), little sodium and fat. The action of potassium in lowering blood pressure is that it can cause vasodilation, resulting in decreased peripheral retention and increased cardiac output; potassium functions as a diuretic, so sodium and fluid expenditure will increase; potassium inhibits the release of renin, thereby altering the activity of the renin-angiotensin system; potassium can regulate peripheral and central nerves that affect blood pressure (Budiman, 1999; Raharjo, 2010). Potassium supplements in tomatoes and lycopene, can be useful in the treatment of hypertension. Tomatoes contain strong anti-oxidants that inhibit the absorption of reactive oxygen to the endothelium which interferes with the dilates of blood vessels, thus causing hypertension, this is one of the pathophysiologies of why tomatoes can lower blood pressure.

CONCLUSION

There is an effect of giving tomato juice with a decrease in high blood pressure in elderly patients with hypertension at the Kaliasin Health Center, Kab. South Lampung in 2021.

SUGGESTION

It can be applied as a rational consideration for the approach of the elderly to take herbal therapy to lower blood pressure, besides that tomato juice was chosen because at the Kaliasin Health Center, Kab. South Lampung many suffer from hypertension.

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