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THE EFFECTIVENESS OF THE *PAPAYA MENGKAL* AND GREEN GRASS JELLY AGAINST THE DECREASE IN THE BLOOD PRESSURE OF THE CLIENT'S MILD HYPERTENSION

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ABSTRACT

Hypertension is condition medical moment pressure blood in arteries increase exceed normal limit. Various study has conducted for see effectiveness plant in lower pressure blood high, such as papaya mengkal and green grass jelly. In one study said that there was a decrease in blood pressure in hypertensive clients after giving papaya juice. While green grass jelly is rich in flavonoid and alkaloid active substances. The content of flavonoid active substances can act as anti-hepatotoxic, anti-HIV1, anti-tumor, anti-inflammatory and can provide a vasodilating effect on blood vessels that helps protect heart function. Flavonoids can reduce arterial stiffness and can be an alternative treatment to reduce the risk of heart disease.

KEYWORDS Grass Jelly, Papaya Curd, Systolic, Diastolic

INTRODUCTION

Hypertension is a medical condition when the blood pressure in the arteries increases beyond normal limits (Guyton et al., 1972). Hypertension is one of the most influential risk factors for the incidence of heart and blood vessel disease. The results of the 2007 Basic Health Research (Riskesdas) show that most cases of hypertension in the community have not been diagnosed. This can be seen from the results of measuring blood pressure at the age of 18 years and over, it was found that the prevalence of

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hypertension in Indonesia was 31.7%, where only 7.2% of the population already knew they had hypertension and only 0.4% of cases took hypertension medication.

The results of Riskesdas 2013 showed that the national prevalence of hypertension reached 25.8% in the population in Indonesia over the age of 18. The prevalence of primary/essential hypertension in Central Java in 2012 was 1.67%. In the target area of the Srondol Health Center, Banyumanik, Semarang city, more than 400 clients suffer from hypertension. From the prevalence of hypertension above, as many as 7% of people with hypertension eventually suffer a stroke, the rest develop heart disease (1.5%), heart failure (0.13%), and kidney failure (0.2%). Hypertension is also the third leading cause of death after stroke and tuberculosis, reaching 6.7% of the death population at all ages in Indonesia.

A person diagnosed with hypertension must take medication every day. This often causes clients to become bored taking medication. Therefore, there needs to be food based therapy which can be an alternative to relieve symptoms, even cure diseases. Various studies have been conducted to see the effectiveness of plants in lowering blood pressure. Elsa's research, et al (2014) said that there was a significant difference between the mean blood pressure before and after administration of papaya juice to decrease blood pressure. In this study, Elsa did not mention how many doses of papaya mengkal and how to make it.

RESEARCH METHOD

The research method used was the Randomized Controlled Trial (RCT), which is a controlled experimental comparative research method, where the researcher provides two interventions by determining the sample group randomly.

Research design pre and post test control group design. Research respondents were randomly divided into three groups, namely the papaya skin group, the green grass jelly treatment group, and the control group. Before treatment, all groups were measured (pre test). Furthermore, the treatment group was given papaya or green grass jelly every day in a row for 14 days. When:

a. Systolic blood pressure 110 mm Hg and/or diastolic 70 mm Hg for 3 (three) consecutive days
b. or the patient complains: dizzy eyes, especially when changing positions, dizziness, weakness, feels like fainting and turns out after measurement of blood pressure results in systolic blood pressure 110 mm Hg and/or diastolic 70 mm Hg then the treatment is stopped.

During 14 days of treatment, researchers monitored the respondent's blood pressure every day (Ritonga, Setiani, Umaroh, & Amri, 2017). Blood pressure measurements on the second day onwards were carried out before giving green grass jelly or green grass jelly, with the reason for this measurement to see the results of giving green grass jelly or green grass jelly the previous day. In the control group, no treatment was given, but monitoring was still carried out every day. After treatment, blood pressure measurements (post test) were performed in each group. The target population in this study are clients with mild hypertension who live in Indonesia. Affordable population of mild hypertension clients who live in Jabungan Village, Banyumanik District, Semarang. Sample inclusion criteria:

a. Systolic blood pressure of 130-150 mm Hg and/or diastolic blood pressure of 90-100 mm Hg when two consecutive blood pressure measurements are taken with an interval of 5 minutes in a fairly calm/resting state.

b. Age 40-65 years and no plans to become pregnant. This is because the continuous administration of papaya will cause infertility
c. No heart, kidney, lung disease, DM, stroke
d. Not taking antihypertensive drugs
e. Not obese II or BMI < 30

RESULT AND DISCUSSION

The results of the study provide an overview that the median or mean value of the pre-test systolic blood pressure measurement in the control group was 140 mm Hg, a minimum of 130 mm Hg, and a maximum of 150 mm Hg. In the control group, the median systolic blood pressure on days 3, 7, 11, and 14 was the same, namely 130 mm Hg.

The median diastolic blood pressure on the 3rd, 7th, 11th, and 14th day was 80 mm Hg. While in the papaya group, the median pre-test systolic blood pressure was 150 mm Hg, on days 3, 7, 11, and 14 were 135 mm Hg, 130 mm Hg, 130 mm Hg, and 120 mm Hg. The median pre-test diastolic blood pressure was 90 mm Hg, days 3, 7, 11, and 14 were the same, namely 80 mm Hg. For the green grass jelly group, the median pre-test systolic blood pressure was 140 mm Hg, days 3, 7, 11, and 14 were 135 mm Hg, 130 mm Hg, 130 mm Hg, and 130 mm Hg. The median pre-test diastolic blood pressure was 90 mm Hg, 3,7,11, and 14 days, namely 85 mm Hg, 80 mm Hg, 80 mm Hg, and 85 mm Hg. All respondents fall into the category of mild hypertension.

Among the three groups above, it can be seen that the systolic blood pressure in the papaya group had the largest median difference among the other groups (Kana-Sop et al., 2015). This difference was seen in the pre-test median of 150 mm Hg and the median of day 14 = 120 mm Hg, meaning the difference was 30 mm Hg. Thus, the papaya group experienced a definite decrease in systolic pressure from the pre-test until the 14th day of the study, while the control group and grass jelly respondents did not experience a significant decrease in systolic pressure. The results of the diastolic pressure measurement of the three groups from the pre test to day 14 tend to be stable.

The above conditions are in line with the theoretical basis that in normal conditions the heart is still adapting, the diastolic pressure will not increase because this pressure is a resting ventricular phase. The absence of a decrease in diastolic blood pressure is possible because several things are caused by several confounding variables that are not controlled, including the respondent's genetic factors where the researcher does not know the respondent's family health history.

According to Junaidi (2010) genetic factors have a close relationship with the occurrence of hypertension in people who have a family history of hypertension sufferers. The second factor (OHTSUKA, KOMIYA, AIZAWA, & YAMADA, 1995), the respondent's stress level also cannot be controlled. Stress can affect blood pressure because the hypothalamus stimulates the release of the hormone epinephrine or adrenaline. Adrenaline hormone will increase blood pressure periodically. Prolonged stress will cause a permanent increase in blood pressure. The third factor, the respondent's diet and the type of food consumed contains high salt which is water-retaining so that blood pressure increases (Lategan, 2011).

Under physiological conditions, blood pressure is always under the Renin Angiotensin Aldosterone / RAA system (Ames, Atkins, & Pitt, 2019). Renin is an enzyme

with a small protein released by the kidneys that is stored in the juxtaglomerular cells when arterial pressure drops very low. This causes the activation of angiotensinogen to become angiotensin I which has weak vasoconstrictive properties to blood vessels (MacKenzie, 2011). For 30 minutes - 1 hour, renin will work for the formation of angiotensin I. When blood passes through the pulmonary veins, angiotensin I meets with ACE (angiotensin Converting Enzyme) released by the endothelium cells of the pulmonary blood vessels, converting angiotensin I into angiotensin II.

Angiotensin II has very strong vasoconstrictor properties so that it affects arteries and is slightly weak in veins, causing an increase in arterial pressure due to increased peripheral resistance, on the other hand angiotensin II affects the renal cortex to secrete the hormone aldosterone thereby increasing sodium and water reabsorption in order to increase plasma volume. thereby increasing blood pressure. Angiotensin II itself within 2 minutes will be inactivated by blood and tissue enzymes, namely angiotensinase (Guyton & Hall, 2000).

The results of the analysis in the same group showed significant differences in both the papaya group and the green grass jelly group (Nissa et al., 2020). In the control group, both systolic and diastolic blood pressure tended to persist from the pre-test to day 14. In line with the results of the analysis between groups, there were significant differences between the control group, papaya and grass jelly on the 7th, 11th and 14th days of measurement. Supported by multivariate analysis, it showed that the papaya group had the most significant difference compared to the control group and the grass jelly group starting on days 7, 11 and 14 of measuring respondents' systolic and diastolic pressure with p value: 0.000 (< 0.05).

The results of this study are in line with the results of Elsa's research, et al (2014) which states that there is a significant difference between the mean blood pressure before and after administration of papaya juice to decrease blood pressure. In this study, Elsa did not mention how many doses of papaya mengkal and how to make it.

Various studies have stated that papaya mengkal contains a diuretic, which is high in potassium of 354 mg/100 grams which has an antihypertensive effect by increasing the release of water and sodium salts. Potassium will also maintain the stability of the body's electrolytes through the potassium sodium pump which reduces the amount of water and salt in the body (Nriagu, Darroudi, & Shomar, 2016). Young papaya besides containing high calcium, potassium also contains flavonoids. Flavonoids can reduce arterial stiffness so that they can lower blood pressure. Flavonoids are useful for inhibiting ACE (Kwon et al, 2010), so that from angiotensin I cannot be converted into angiotensin II which functions to increase the activity of the sympathetic nervous system, vasoconstriction of vascular smooth muscle and increase water and sodium retention (Sylvia, 2005).

With the presence of potassium and flavonoids, blood pressure will decrease Potassium, calcium and magnesium have been known to lower blood pressure (Gilani, Jabeen, Khan, & Shah, 2008). These minerals inhibit the occurrence of constriction of blood vessels which causes a decrease in peripheral resistance resulting in a decrease in blood pressure. Potassium acts as a diuretic so that fluid sodium expenditure increases, it can help lower blood pressure. Potassium is also useful for inhibiting renin (Emma et al, 1982), so that in the renin-angiotensin system, angiotensinogen cannot be converted into angiotensin I.

Likewise with green grass jelly, green grass jelly leaves contain tetradine alkaloids which have the effect of lowering blood pressure (Shine, Anuja, Suja, Raj, & Latha, 2020). According to Katrin et al. (2012), grass jelly plants are rich in flavonoid and alkaloid active substances. Research by Lokesh and Amitsankar (2012) states that the active substance of flavonoids can act as anti-hepatotoxic, anti-HIV 1, anti-tumor, anti-inflammatory and can provide a vasodilating effect on blood vessels that helps protect heart function. Research by Curtis et al. (2013) showed that flavonoids can reduce arterial stiffness and can be an alternative treatment to reduce the risk of heart disease in postmenopausal diabetes mellitus patients. Green grass jelly contains potassium about 100 mg / 100 grams of leaves.

According to Astawan (2011), grass jelly leaves also contain chlorophyll which can function as an antioxidant, anti-inflammatory, and anticancer. The alkaloid components contained in green grass jelly are more than those found in black grass jelly. Green grass jelly leaves also contain components of polyphenols, saponins, and flavonoids that play a role in lowering blood pressure (Rockmana, Suwondo, & Sulistiyani, n.d.).

Fitriana Sundari, et al (2015) research said that there was a significant difference in blood pressure before and after giving green grass jelly, because green grass jelly contains flavonoids. The content of flavonoid active substances can act as anti-hepatotoxic, anti-HIV-1, anti-tumor, anti-inflammatory and can provide a vasodilating effect on blood vessels that helps protect heart function (Zulfa & Fitriyanti, n.d.). Researchers have not mentioned how many doses of green grass jelly, how to make it, and how long to give it (Aiyalu, Govindarjan, & Ramasamy, 2016). Research by Curtis et al. (2013) showed that flavonoids can reduce arterial stiffness and can be an alternative treatment to reduce the risk of heart disease.

The results of this study showed that the papaya group had the most significant difference compared to the control group and the grass jelly group starting on days 7, 11 and 14 of measuring respondents' systolic and diastolic pressure with p value: 0.000 (<0.05). In line with the results of Sundari's (2014) study, the decrease in blood pressure in research respondents who consume grass jelly will decrease starting on the 14th day. Why the papaya group tends to be more dominant in its impact on lowering blood pressure, this is possible because the content of potassium and flavonoids in papaya is higher than in grass jelly. Papaya contains high potassium of 354 mg/100 grams while green grass jelly contains potassium about 100 mg/100 grams of leaves. Potassium is a good diuretic so that it will reduce plasma volume gradually thereby lowering the respondent's blood pressure.

In this study, the respondent's age factor contributed to the measurement results because after a person is 45 years old and over, the arterial walls will experience thickening due to the buildup of collagen substances in the muscle layer, so that the blood vessels will gradually narrow and become stiff. Systolic blood pressure increases due to decreased flexibility of large blood vessels (Sherwood, 2001).

The results of this study are expected to provide hope that someone diagnosed with hypertension will not get bored of taking medication because there is a food based therapy technique that can be an alternative to relieve symptoms, even cure disease. However, there is one obstacle in the use of natural ingredients that have not been able to determine how large the dose is consumed (Ojovan, Lee, & Kalmykov, 2019) .

CONCLUSION

The papaya group had the most significant difference compared to the control group and the grass jelly group starting on days 7, 11 and 14 of the respondents' systolic and diastolic pressure measurements with p value: 0.000 (<0.05). There needs to be a breakthrough in the provision of food-based treatment technology (Food Based Therapy) and it is necessary to consider determining the exact dose in each consumption so that unexpected negative effects are minimized. New breakthroughs are needed to explore food-based therapy other than papaya and green grass jelly as consumption plants to lower blood pressure such as advocate leaves, celery, cucumber, and others. Further research is needed that provides treatment with graded doses of papaya juice and control of disturbing factors in this study including economic status, type of work and type of hypertension of the respondents.

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