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EFFECTIVENESS OF AMBON BANANA JUICE FOR REDUCING BLOOD PRESSURE AMONG HYPERTENSION PATIENTS IN INDONESIA

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ABSTRACT
Hypertension has dangerous impacts on health, such as stroke, blurred vision, kidney problems, and a tendency to become irritable. Non-pharmacological therapy for hypertension is lifestyle modification by adjusting eating patterns or diet, such as bananas. This study aims to examine the effectiveness of Ambon banana juice in reducing blood pressure in people with hypertension. Method: This research used a quasi-experimental method with a one-group pre-posttest in Indonesia. This study included 18 participants, sufferers of mild and moderate hypertension, not taking antihypertensive drugs, and not being sick. The instruments used are blood pressure measuring instruments and digital and mercury stethoscopes. The results showed a significant difference between systolic blood pressure before and after administering Ambon banana juice to hypertension sufferers, the Asymp Sig value. (2-tailed) = 0.001, then the p-value = 0.0005 (< 0.05). Apart from that, for diastolic blood pressure, the p-value = 0.000 (< 0.05) means there is a difference between diastolic blood pressure before and after therapy with Ambon banana juice. However, Ambon banana juice reduces diastolic blood pressure in hypertension sufferers. This study highlights that Ambon banana juice effectively reduces blood pressure in hypertensive patients include pre-hypertension and mild hypertension.

Keywords: ambon banana; diet; hypertension; Indonesia; non-pharmacological

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INTRODUCTION

Hypertension is still a health problem and one of the leading causes of death in the world (He & MacGregor, 2007; Mills et al., 2020; Zhou et al., 2021). Hypertension is called the silent killer because it often occurs without complaints, so it is usually only discovered after complications arise (Putri et al., 2021; Sawicka et al., 2011). Hypertension is when a person experiences an increase in blood pressure above average, which increases morbidity and mortality (Aspiani, 2015; Ogah, 2012; Zhou et al., 2021).

The incidence of hypertension continues to increase every year. An estimated 1.28 billion adults (30–79 years) worldwide have hypertension, and 46% of adults with hypertension are unaware that they have the condition (WHO, 2023a). It is estimated that 1.5 billion people will suffer from hypertension in 2025, and it is estimated that every year, 10.44 million people die from hypertension and its complications (Kemenkes RI, 2019). Data from Riskesdas in 2018 showed that more than 63 million Indonesians suffered from hypertension. The prevalence of hypertension in people aged ≥ 18 years was 34.1%, with the highest result 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, with a death rate of 427,218. From the

prevalence of hypertension of 34.1%, it is known that 13.3% were diagnosed as not taking medication, and 32.3% did not regularly take medication (Kemenkes RI, 2018).

Hypertension has dangerous impacts on health, such as stroke, blurred vision, kidney problems, and a tendency to become irritable (Chrisanto, 2017; Hamrahian & Falkner, 2016; Maiër & Kubis, 2019). Some efforts in managing hypertension include overcoming obesity, reducing salt intake, avoiding stress, improving unhealthy lifestyles, regulating blood pressure, regulating diet, controlling body weight, and increasing physical activity (Chrisanto, 2017). In the current management of hypertension, apart from pharmacological therapy, hypertension also uses non-pharmacological therapy by modifying lifestyles, such as adjusting eating patterns or diet (Aloo, 2018; Kimani et al., 2019; Ojangba et al., 2023). One of the fruits to lower blood pressure is bananas (Rafi et al., 2023).

Bananas are often found in tropical areas such as Indonesia (Drenth et al., 2020; Hastuti et al., 2019). Bananas contain vitamin C and are high in potassium and fiber (Ashokkumar et al., 2018). One type of banana in Indonesia that has many benefits is the Ambon banana, which contains vitamin B6, vitamin C, potassium, fiber and manganese (Ashokkumar et al., 2018; Ningrum, 2020). Studies reveal that potassium helps control blood pressure, influence heart rhythm, treat high blood pressure, and trigger the work of muscles and nerve nodes (Chiamvimonvat et al., 2017; Filippini et al., 2020). Apart from that, potassium also causes vasodilation of peripheral blood vessels, resulting in a decrease in peripheral resistance, and blood pressure also decreases (Palmer & Williams, 2007).

Previous studies revealed that 100 grams of Ambon bananas contain 435 mg of potassium and 18 mg of sodium, potentially lowering blood pressure (Adzari, 2016). According to other studies, potassium in Ambon bananas works as an antihypertensive drug in the human body (Susanti et al., 2019; Wahdah, 2011). Potassium can inhibit renin and angiotensin and reduce aldosterone secretion, decreasing sodium and water reabsorption in the kidney tubules (Poulsen & Fenton, 2019). Previous studies show that hypertension sufferers who consumed banana juice experienced a significant reduction in blood pressure (Astutia et al., 2021). The same research was also shown by Manek et al. (2023) that hypertension sufferers over 60 years who consumed Ambon banana juice for five days experienced a decrease in blood pressure. Seeing the high incidence of hypertension and the significant potential of Ambon bananas for reducing hypertension in Indonesia, researchers are interested in obtaining new evidence that supports the effectiveness of consuming Ambon bananas in reducing blood pressure in hypertension sufferers. This study aims to test the effectiveness of giving Ambon banana juice to reduce blood pressure in hypertension sufferers in Indonesia.

METHOD

This research uses a Quasi-Experimental method with a One-Group Pre-Posttest. In the testing group, treatment/intervention was given, and the group was also assessed before and after the intervention. The population in this study was 156 people with hypertension, and the sample included 18 participants. The inclusion criteria for this study were sufferers of mild and moderate hypertension, not taking antihypertensive drugs (pharmacological or non-pharmacological), and not being sick. The exclusion criteria set include hypertension degrees 3 and 4 (systolic: 180 - ≥ 210 mmHg and diastolic: 120 - ≥130 mmHg) and currently taking antihypertensive drugs. The instruments used in this research were blood pressure measuring instruments, both digital and mercury, stethoscopes, pens, and observation sheets. Meanwhile, the tools used during the intervention were the SOP on how to make Ambon banana juice. The materials and tools used included 100g Ambon banana ± ml water, blender, knife,

glass/cup, and measuring cup.

The research procedure includes the preparation, intervention, and evaluation. In the preparation stage, the researcher explains the aims and objectives to the respondent and the respondent's informed consent. Then, participants were asked to fill in demographic data, including name, age, occupation and gender. Pre-intervention, blood pressure measurements were carried out one day before giving banana juice. Measurements were taken in the morning because the body was still fresh, and the participant was sitting with both feet touching the floor. The measurement results are then written on an observation sheet. In the experimental stage, 1 participant needed 100 mg of Ambon banana juice plus ± 100ml of water to make Ambon banana juice. The process of blending the juice for ± 1 minute without using sugar. Ambon banana juice is given once a day for five days in the morning after eating. The post-experimental follow-up stage and blood pressure measurements were carried out again on the fifth day after the intervention was given. The time and measurement method was the same as measurements during the pre-experiment, carried out in the morning with the participant sitting with both feet touching the floor.

The data is tabulated and grouped according to the variables studied. Data processing uses the Statistical Package for the Social Sciences (SPSS). Univariate analysis is used to analyze existing variables descriptively by calculating frequency distributions and proportions to determine the characteristics of the research subjects. In addition, bivariate analysis was carried out to see the effect of the independent variable on the dependent by displaying cross-labels. The analysis technique used to determine the difference in effectiveness between groups given Ambon banana juice to reduce blood pressure used the independent statistical t-test. The degree of significance is ≤ 0.05, meaning that if the statistical test shows $p \leq 0.05$, there is a significant influence between the independent and dependent variables.Researchers used informed consent to obtain participant consent. Researchers also explain the aims and benefits of the research, possible risks and inconveniences, and guarantee confidentiality of identity. This study's ethical clearance was obtained from the Research Ethics Committee of RSUD Pasar Rebo with Number 386/FM.09.45.

RESULTS

Effectiveness of Providing Ambon Banana Juice in Reducing Blood Pressure in Hypertension Sufferers in Indonesia

Based on the results of blood pressure measurements before and after being given Ambon banana juice to people with hypertension, data was obtained on post-experimental blood pressure measurements, with the results of 3 respondents (16.7%) in the pre-hypertension category and 15 respondents (83.3%) in the mild hypertension category. The study showed a decrease in blood pressure in post-experimental blood pressure measurements or after being given Ambon banana juice (Table 1).

Table 1.
Blood pressure of hypertension sufferers before and after being given Ambon banana juice (n=18)

Blood pressure Pre experiment	f	%	Blood pressure Post experiment	f	%
Mild hypertension (140-159/90-99)	16	88.9	Pre-hypertension (130-139/85-89)	3	16.7
Moderate Hypertension (160-179/100-109)	2	11.1	Mild hypertension (140-159/90-99)	15	83.3

Table 2.
Systolic blood pressure before and after being given Ambon banana juice to hypertension sufferers (n=18).

Variable	Decrease	Increase	Equal	N	P Value
Systolic blood pressure	12 (67%)	0 (%)	6 (33%)	18	0.001
Diastolic blood pressure	13 (72%)	0 (%)	5 (28%)	18	0.000

The results showed a significant difference between systolic blood pressure before and after administering Ambon banana juice to hypertension sufferers, the Asymp Sig value. (2-tailed) = 0.001, then the p-value = 0.0005 (< 0.05). Apart from that, for diastolic blood pressure, the p-value = 0.000 (< 0.05) means there is a difference between diastolic blood pressure before and after therapy with Ambon banana juice. Based on the results of statistical tests, it can be concluded that Ambon banana juice reduces diastolic blood pressure to reduce blood pressure in hypertension sufferers (Table 2).

DISCUSSION

Principal finding

Hypertension is a serious medical condition, an increased blood pressure above 140/90 mmHg that can increase the risk of health problems such as heart, and brain and kidney disease (Astutia et al., 2021). Hypertension is a degenerative disease often found in the elderly (Yanti & Nofia, 2013). Hypertension can also be prevented and minimized with non-pharmacological therapy to avoid the side effects (Kolompoy et al., 2023). However, Ambon bananas have the potential to control blood pressure (Astutia et al., 2021; Yanti & Nofia, 2013).

Based on the results study, blood pressure measurements before and after being given Ambon banana juice therapy, there was a decrease in blood pressure towards a more normal direction, as seen in the reduction of blood pressure frequency in the pre-hypertension, mild hypertension and moderate hypertension categories. After being given Ambon banana juice, it was shown that three respondents (16.7%) were in the pre-hypertension category and 15 respondents (83.3%) were in the mild hypertension category. These results are supported by another study, which shows that after being given Ambon bananas, elderly hypertension decreased, which means that there is a difference between the results of blood pressure measurements before and after the administration of Ambon bananas in elderly hypertensive patients (Susanti et al., 2019). Meanwhile, there was an effect of autogenic relaxation therapy and consumption of Ambon bananas on systolic and diastolic blood pressure in the elderly (Balqis et al., 2023).

Our findings show that Ambon bananas have the benefit of lowering blood pressure among the elderly with hypertension. According to research by Ningrum (2020), show that bananas contain potassium, which helps control blood pressure, influences heart rhythm, treats high blood pressure, cleans carbon dioxide in the blood, plays a role in the density of nerves and muscles, and triggers the work of muscles and nerve nodes. WHO (2023b) recommends consuming potassium to reduce blood pressure and the risk of cardiovascular disease, stroke and coronary heart disease in adults. The recommended daily requirement for potassium intake is at least 90 mmol per day or 3510 mg per day, and one food that contains high potassium is bananas.

This study highlights the ease and benefits of Ambon banana juice in reducing hypertension. Researchers applied this by preparing 100 grams of washed Ambon bananas, cutting them into small pieces, putting them in a blender or juicer, adding 100 ml of water, blending until

smooth for ± 1 minute, and then drinking Ambon banana juice every morning after breakfast. According to Kowalksi in Ningrum (2020), Ambon bananas contain high levels of potassium, there is the secretion of renin and Angiotensin II, and reduced vasoconstriction of blood vessels can ease the work of the heart so that blood pressure is reduced. Bananas contain natural angiotensin-converting enzymes or natural ACE inhibitors to stop blood vessels from narrowing. In this way, ACE inhibitors can widen blood vessels, thereby reducing blood pressure (Poulsen & Fenton, 2019).

The findings from this study show the effectiveness of giving Ambon banana juice in reducing blood pressure in people with hypertension. This is in line with research by Tangkilisan et al. (2013), which showed a decrease in blood pressure after participants were given diet therapy with three Ambon bananas daily for one week. Another study shows how consuming Ambon bananas reduces blood pressure in the elderly (Manek et al., 2023). This study still has limitations, including the fact that participants' daily activities were not controlled, so there are possible causes that could influence the rise and fall of respondents' blood pressure during measurement. Only a few participants were included, which could lead to bias in the results. However, the advantages of this study need to be acknowledged, namely that it provides additional information to similar research in the context of the problem of hypertension and the benefits of bananas. Apart from that, this study discusses a specific topic, namely the use of Ambon banana juice, and this type of banana only exists in Indonesia. The findings of this research can provide information and input to health services in Indonesia to develop interventions to reduce hypertension using non-pharmacology, such as using Ambon bananas.

CONCLUSION

Based on the research results, this study found that Ambon banana juice effectively reduced blood pressure in hypertensive patients in Indonesia. The categories for reducing hypertension obtained include pre-hypertension and mild hypertension. These results highlight that Ambon bananas have great potential in health services and efforts to prevent and control hypertension problems, especially in Indonesia.

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