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Case Study

Description of the application of Watermelon of Juice Administration to Reduce Blood Pressure in Patients Suffering from Hypertension

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ABSTRACT

Background: Hypertension is a long-term disease, this disease makes the heart work harder to pump blood through the body's blood arteries which causes heart disease. This can cause damage to blood vessels. Hypertension is characterized by a person's blood pressure being higher than normal and with symptoms such as dizziness, headaches, migraines, irritability, nosebleeds, stiff neck, dizzy eyes, insomnia, and blood pressure results of more than 120/80 mmHg. **Method:** The research design uses a descriptive research design with a case study approach. by measuring blood pressure using a tensiometer and the results obtained through blood pressure examination and after consuming 200 grams of watermelon juice. **Results:**. The application of watermelon juice administration found that there was a change in blood pressure in hypertension patients before and after the application of watermelon juice administration in hypertension patients with a decrease in blood pressure in three participants **Conclusions:** There was a change in blood pressure between before and after administration of processed watermelon juice to reduce blood pressure in hypertension sufferers in the three participants

Keywords: Hypertension, blood pressure, watermelon juice

1. INTRODUCTION

Hypertension is a long-term disease, this disease makes the heart work harder to pump blood through the body's blood arteries which causes heart disease. This can cause damage to blood vessels (Setyawati, 2017). Hypertension is characterized by a person's blood pressure being higher than normal and with symptoms such as dizziness, headaches, migraines, irritability, nosebleeds, stiff neck, dizzy eyes, insomnia, and blood pressure results of more than 120/80 mmHg (Laksana et al., 2022) Until now, hypertension has become a common condition throughout the world. Even today, the prevalence of hypertension is increasing along with the progress of society, especially with the increase in dangerous lifestyle modifications. In the past, hypertension was usually diagnosed in elderly

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patients, but now, many cases of hypertension are found at an early age (Kadir, 2018).

Although it is a non-communicable disease, hypertension is quite common throughout the world. The World Health Organization (WHO) reports that one of the leading causes of heart disease and stroke globally is hypertension, based on its records. According to data, 1.13 billion people worldwide were diagnosed with hypertension in 2015. The number of individuals who suffering from hypertension is predicted to increase every year, reaching around 1.5 billion worldwide by 2025. In addition, the number of deaths caused by hypertension and its complications is estimated to reach 9.4 million per year. According to estimates, more than 80% (Dian et al., 2023)

According to measurement data, the prevalence of hypertension in Indonesia in people over 18 years of age is 34.1%, South Kalimantan has the highest prevalence (44.1%), while Papua has the lowest prevalence (22.2%). According to estimates, there are 63,309,620 cases of hypertension in Indonesia, and 427,218 deaths are caused by this disease. The age groups with the highest rates of hypertension are the 31-44 age group (31.6%), 45-54 years (45.3%), and 55-64 years (55.2%). Based on the prevalence of hypertension of 34.1%, it is estimated that 8.8% of cases are diagnosed, 13.3% of cases do not take medication, and 32.3% of cases do not take medication regularly (Linggariyana et al., 2023). According to data from the East Kalimantan Health Office (Dinkes) in 2022, hypertension is the most common Non-Communicable Disease (PTM) experienced by the people of East Kalimantan. The results of the diagnosis in 2021, the number of hypertension sufferers in East Kalimantan reached 195,817 cases, in 2022 (January-May) the number of sufferers had reached more than 63 thousand cases. This number has increased rapidly compared to previous years, namely 2018 with 49,368 cases, 2019 with 83,397 cases and 2020 with 52,565 cases (Dian et al., 2023).

In the management of hypertension, nurses also play a role in modifying the patient's sick behavior to avoid disease or minimize the risk of suffering from disease. Nurses have a role as caregivers, educators and health promoters. About hypertension information in increasing patient knowledge and can form a positive attitude so that they are able to carry out hypertension care independently to prevent complications (Ayaturahmi et al., 2022).

If hypertension is left untreated or uncontrolled, it dramatically increases the risk of developing other diseases, including diabetes, heart disease, stroke, and kidney disease. High blood pressure can cause internal artery damage and blood clots (Delavera et al., 2021).

Based on the cause, hypertension has two categories according to (Krisma Prihatini & Ainnur Rahmanti, 2021), including: Primary hypertension, Such as poor environment and

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lifestyle such as stress, obesity, age factors, smoking and drinking alcohol, genetics and race are considered as factors causing primary hypertension. Secondary hypertension, is defined as hypertension with a known etiology, such as adrenal gland disease (hyperaldosteronism), thyroid problems, or renal vascular problems. Because essential hypertension affects the majority of hypertensive patients, those with essential hypertension typically receive more treatment.

Pathophysiology increased systolic and diastolic blood pressure occurs due to genetic factors and excessive heart activity such as doing physical activity so that the body needs more oxygen (O2). As a result, the rate of blood distribution and the volume of blood needed will increase which causes Vasoconstriction (Rusdiawan & Habibi, 2020). Vasoconstriction or narrowing of blood vessels does not only occur in excessive physical activity and the following things cause vasoconstriction in blood vessels to narrow including: obesity, age, stress.

Watermelon is one of the fruits that contains a lot of water, potassium (plays a role in controlling nerve cells, muscles, and plays a role in maintaining the balance of body fluids), citrulline (a substance that relaxes blood vessels and increases blood flow so that blood flow becomes wider), and carbohydrates (increases energy especially for the brain and muscles) (Farida et al., 2022).

Watermelon contains about 10.82 g of carbohydrates, 91% water, and 182 mg of potassium per 100 g. About 45.02 mg/g of citrulline is found in the mesocarp (outermost and innermost layers) or the white part between the flesh and the skin, while about 43.81 mg/g is found in the flesh so it can lower blood pressure. Compared to red watermelon, yellow watermelon has a higher concentration of citrulline (Farida et al., 2022).

Watermelon is one of the plants that is considered to be able to lower blood pressure. According to research from Florida State University, watermelon also contains L-citrulline/L-arginine, an amino acid that lowers high blood pressure. According to a therapeutic study, consuming 100 grams of watermelon juice daily can lower blood pressure in hypertensive patients by 4.4 and 2.5 mmHg, while in normal people, it can lower blood pressure by 1.8 and 1.0 mmHg (Munir & Muhajaroh, 2019).

Since watermelon contains a higher percentage of air—almost 92%—it can be consumed at any time of the day. Nutrients including fiber, lycopene, vitamin A, and potassium are also abundant in it. The high water content in watermelon helps keep the body hydrated. In addition, watermelon has a high mineral content. The very high concentration of potassium helps regulate blood pressure. Potassium helps maintain blood stability by

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maintaining its viscosity. (Fadliyah, 2022).

Based on previous researchers (Apriza Yanti & Muliati, 2019), 16 were conducted and there were 2 reserve respondents and a total of 18 people were randomly selected who were divided into 2 groups and the title of this study is The Effect of Giving Red and Yellow Watermelon Juice on Blood Pressure in the Elderly Suffering from Hypertension, Quasy Experiment research design with pretest-posttest design, independent variables Red Watermelon Juice and Yellow Watermelon Juice, dependent variable Blood Pressure, results have an effect, p value 0.000 <0.05. The results of this study are presented in two parts, namely Univariate Analysis and Bivariate Analysis. The sample in this study will be given juice in the afternoon 1 hour before eating 1 x a day for a week (7 days).

But in previous research according to (Munir, 2019), which was conducted in Paranganyar Paiton Village, Probolinggo involving 30 respondents divided into 15 control groups and 15 intervention groups, respondents in this study were respondents who suffered from stage 1 hypertension without comorbidities and the title of this study is The Effect of Giving Watermelon Juice on Lowering Blood Pressure, Quasy Experiment research design with pretest-posttest design, independent variable Watermelon Juice, Dependent variable Blood Pressure, the results have an effect, p value 0.010 <0.05. The results of the study according to (Munir, 2019) are that watermelon juice is given once a day in the morning for a week and the watermelon juice is crushed using a blender then 100 grams of watermelon with the addition of 50 cc of mineral water without sugar in it. This blood pressure measurement was carried out after 2 hours of giving watermelon juice.

2. METHOD

The research design uses a descriptive research design with a case study approach. by measuring blood pressure using a tensiometer and the results obtained through blood pressure examination and after consuming 200 grams of watermelon juice.

3. RESULT AND DISCUSSION

The results of the study showed that all participants' blood pressure was above normal or quite high, namely above 120/80 mmHg, but there were some who had a decrease with normal result.

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Table 3.1 Blood Pressure Measurement of Participants Before & After Provision of Watermelon Juice

Participant	Day	Before	After	Info	Fn (p)	%
P1		161/110 mmHg	155/112 mmHg	Tall	3	100
P2	I	140/95 mmHg	138/93 mmHg	Tall		
P3		151/89 mmHg	142/92 mmHg	Tall		
P1		161/110 mmHg	159/115 mmHg	Tall	2	66,6
P2	II	132/91 mmHg	129/92 mmHg	Normal	1	33,3
P3		139/97 mmHg	133/100 mmHg	Tall		
P1		153/109 mmHg	140/106 mmHg	Tall	2	66,6
P2	III	130/89 mmHg	123/86 mmHg	Normal	1	33,3
P3		141/84 mmHg	135/90 mmHg	Tall		
P1		158/109 mmHg	143/105 mmHg	Tall	2	66,6
P2	IV	145/99 mmHg	142/94 mmHg	Tall	1	33,3
P3		138/92 mmHg	121/90 mmHg	Normal		
P1		140/101 mmHg	132/95 mmHg	Tall	2	66,6
P2	V	129/90 mmHg	124/90 mmHg	Normal	1	33,3
P3		143/96 mmHg	140/92 mmHg	Tall		
P1		158/117 mmHg	151/105 mmHg	Tall	2	66,6
P2	VI	128/87 mmHg	120/89 mmHg	Normal	1	33,3
P3		133/89 mmHg	130/87 mmHg	Tall		
P1		164/111 mmHg	155/110 mmHg	Tall	2	66,6
P2	VII	134/93 mmHg	127/87 mmHg	Normal	1	33,3
P3		144/95 mmHg	132/97 mmHg	Tall		

The results of the study showed that all participants' blood pressure was above normal or quite high, namely above 120/80 mmHg, but some had a decrease with normal results.

In participants (P1), (P2), and (P3) on the first day, the results were still relatively high, namely the frequency of the three participants with an average of (100%), on the second day, the participants had high and normal information from the frequency results, 2 high information in participants (P1) and (P3) with an average of (66.6%) and 1 normal information in participant (P2) with an average of (33.3%), on the third day, there was high and normal information from the frequency results, 2 high information in participants (P1) and (P3) with an average of (66.6%) and 1 normal information in participant (P2) with an average of (33.3%), on the fourth day of the study, the results of the study obtained had high and normal information from the frequency results, 2 high information in participants (P1) and (P2) with an average of (66.6%) and 1 normal information in participant (P3) with an average of (33.3%), on the fifth day, there was also high and normal information from the frequency results, 2 high statements in participants (P1) and (P3) with an average of (66.6%) and 1 normal statement in participants (P2) with an average of (33.3%), on the

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sixth day there were high and normal statements from the frequency results, 2 high statements in participants (P1) and (P3) with an average of (66.6%) and 1 normal statement in participants (P2) with an average of (33.3%), and finally on the seventh day there was a statement high and normal from the frequency results, 2 high statements in participants (P1) and (P3) with an average of (66.6%) and 1 normal statement in participants (P2) with an average of (33.3%),

With the result that blood pressure decreased after being given processed watermelon juice. This can be caused by the content of watermelon which has a content such as lots of water, potassium, and potassium (plays a role in controlling nerve cells, muscles, and plays a role in maintaining body fluid balance), citrulline (a substance that relaxes blood vessels and increases blood flow so that blood flow becomes wider), and carbohydrates (increases energy especially for the brain and muscles) (Farida et al., 2022).

Citrulline is a non-essential alpha amino acid compound that is converted into Arginine in the body. Arginine is a precursor of NO (Nitric Oxide) which plays a role in regulating arterial blood pressure. NO or in Indonesian is called nitrogen monoxide is a compound that plays a role in vasodilation function, which means it functions to relax the muscles in the blood vessels, causing them to widen and improve circulation. The commonly recommended dose of L-citrulline is 3-6 grams per day, or about 8 grams of citrulline malate. However, the specific dose may vary depending on certain conditions, the type of supplement (L-citrulline or citrulline malate), and the purpose of consumption (eg, circulatory health, sports performance) (Trisnayanti 2020). And watermelon also contains about 10.82 g of carbohydrates, 91% water, and 182 mg of potassium per 100 g. About 45.02 mg/g of citrulline is found in the mesocarp (the outermost and innermost layers) or the white part between the flesh and the skin, while about 43.81 mg/g is found in the flesh so it can lower blood pressure (Farida et al., 2022).

The results of these participants are supported by research conducted by (Munir, 2019), (Falah, 2017) and (Satiyem 2021). This can happen because there are several mechanisms to lower blood pressure, such as participants consuming processed watermelon juice and maintaining a diet such as avoiding foods that are high in salt.

4. CONCLUSION

Based on the research conducted, it can be concluded that there was a change in blood pressure between before and after administration of processed watermelon juice to reduce blood pressure in hypertension sufferers in the three participants.

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