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Application of Red Dragon Fruit Juice in Lowering Blood Pressure in Hypertension Sufferers

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Abstract: Hypertension is a condition where a person experiences an increase in blood pressure above normal, namely systolic blood pressure above 140mmHg and diastolic blood pressure above 90mmHg which results in an increase in morbidity and mortality rates. Red dragon fruit contains potassium, which acts as a vasodilator in blood vessels, thus lowering blood pressure. This study aims to describe nursing care using red dragon fruit juice to lower blood pressure in patients with hypertension. This type of research is descriptive using a case study approach method. Data collection was carried out through observation and interviews conducted before and after the therapeutic intervention was administered. The number of respondents in this study was 2 people with the criteria of subjects willing to be respondents and cooperative, respondents with hypertension aged 36-45 years (late adulthood), respondents who had systolic blood pressure of 140-160mmHg and diastolic 90-100mmHg (grade 1) and respondents who did not consume other pharmacological drugs. Research results shows that blood pressure before the intervention in subject 1 was 150/90mmHg, subject ll 160/100mmHg. Blood pressure after the intervention in subject 1 was 130/80mmHg, subject ll 130/90mmHg. This research proves that the application of red dragon fruit juice is effective in lowering blood pressure in hypertension sufferers. This study can be used as an intervention in lowering blood pressure in hypertension sufferers.

Keywords: Hypertension, Red Dragon Fruit, Blood Pressure

INTRODUCTION

Hypertension, more commonly known as high blood pressure, is a chronic disease caused by excessive and persistently elevated blood pressure in the arteries. The symptoms of hypertension are often difficult to detect because the condition usually has no specific symptoms. However, some common signs that may be observed include headaches, frequent restlessness, facial flushing, ringing in the ears, shortness of breath, easy fatigue, and blurred vision (Sijabat et al., 2021).

A person is diagnosed with hypertension when repeated blood pressure measurements show a systolic blood pressure of ≥140 mmHg and a diastolic blood pressure of ≥90 mmHg (Unger et al., 2022).

According to the World Health Organization (WHO) (2023), approximately 972 million people worldwide have hypertension. It is estimated that 9.4 million people die each year from hypertension and its complications. Of the 972 million people with hypertension, approximately 333 million live in developed countries, while 639 million live in developing countries.

The Ministry of Health of the Republic of Indonesia (2024) also reported that the prevalence of hypertension among the population was 34.11%. The prevalence of high blood pressure was higher among women **(**36.85%**)** than men (31.34%). The prevalence increases with advancing age. Most individuals with hypertension are in the 31–64-year age group. The province with the highest prevalence of hypertension is North Sulawesi, at 13.2%, while the province with the lowest prevalence is Papua, at 4.4%.

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The prevalence of hypertension in Aceh was reported to be 1,299,415 individuals, consisting of 628,278 males and 671,173 females. These data indicate that the prevalence of hypertension in Aceh is higher among females than males. The district/city with the highest prevalence of hypertension was Banda Aceh City, with 220,157 cases, while the district with the lowest prevalence was Simeulue Regency, with 7,376 cases (Aceh Health Profile, 2022).

Hypertension generally has no specific signs or symptoms and is often only diagnosed after it has caused complications such as stroke, myocardial infarction, kidney failure, heart failure, and hypertensive encephalopathy. The condition usually becomes apparent only when complications have developed in target organs, including the eyes, kidneys, brain, and heart. Patients may complain of headaches, particularly in the occipital (back of the head) region, ranging from mild to severe, as well as vertigo, tinnitus (ringing in the ears), neck stiffness, blurred vision, or even loss of consciousness (syncope). Other symptoms may include headache, palpitations, and pallor. Additional signs and symptoms may indicate secondary hypertension, which is hypertension resulting from an identifiable underlying cause, such as kidney disease or endocrine disorders. (Kurnia, 2021).

To prevent the complications of hypertension described above, nurses can implement both pharmacological and non-pharmacological interventions. Pharmacological management includes the administration of antihypertensive medications such as amlodipine, benazepril, and captopril. Non-pharmacological management includes adherence to a healthy diet, regular physical exercise, reducing salt intake, following a low-fat and low-cholesterol diet, using traditional Chinese herbal remedies and herbal therapies, practicing deep breathing relaxation techniques, obtaining adequate rest, managing stress, and adopting a healthier lifestyle. In addition, several herbal therapies have been reported to help lower blood pressure, including bay leaf (Indonesian bay leaf) decoction, sweet starfruit (carambola), grated turmeric, celery leaf decoction, and red dragon fruit juice therapy. (Mufida, 2021).

Red dragon fruit (Hylocereus undatus) is a fruit from the cactus family that is rich in dietary fiber, potassium, and antioxidants, including vitamin B3 (niacin), vitamin E, and vitamin C. These nutrients help improve the elasticity of blood vessels and stabilize high blood pressure. In addition to strengthening bones, the calcium content of red dragon fruit may also help reduce blood pressure in individuals with hypertension when consumed appropriately. (Nurannisa et al., 2021).

According to Wulan (2023), the potassium content in red dragon fruit functions as a vasodilator by promoting the dilation of blood vessels. Vasodilation reduces peripheral vascular resistance and increases cardiac output, thereby helping to normalize blood pressure. In addition, potassium inhibits the release of renin, thereby modifying the activity of the renin–angiotensin system. Through these mechanisms, potassium contributes to the regulation and maintenance of normal blood pressure.

Red dragon fruit also contains flavonoids. Flavonoids function similarly to potassium by helping regulate the balance of electrolytes, including sodium. As antioxidants, flavonoids inhibit platelet aggregation and stimulate the production of nitric oxide, which promotes vasodilation (relaxation of blood vessels), thereby supporting healthy blood pressure regulation (Nurannisa et al., 2021).

Based on the study by Nisa (2021), participants were given 200 mL of red dragon fruit juice, prepared from 100 g of red dragon fruit flesh, twice daily for three days. The study demonstrated a significant reduction in blood pressure following the intervention. The mean systolic blood pressure decreased from 149.43 mmHg before the intervention to 133.14 mmHg afterward. Similarly, the mean diastolic blood pressure decreased from 88.00 mmHg before the intervention to 76.57 mmHg after consuming the juice. Overall, the findings suggest that consuming 200 mL of red dragon fruit juice daily for five days can reduce blood pressure by approximately 16.29 mmHg.

A subsequent study conducted by Indra Yulianti (2022) involved five participants who consumed 200 mL of red dragon fruit juice twice daily for three consecutive days. The mean pre-test systolic blood pressure was 163 mmHg, which decreased to 153 mmHg after the intervention. Likewise, the mean pre-test diastolic blood pressure was 93 mmHg and decreased to 86 mmHg following the intervention. Overall, the intervention resulted in an average reduction of 10 mmHg in systolic blood pressure and 7 mmHg in diastolic blood pressure.

This study aims to determine the effectiveness of red dragon fruit juice in reducing blood pressure among patients with hypertension in Meunasah Tutong Village, Montasik District, Aceh Besar Regency.

METHOD

This study employed a descriptive research design using a case study approach. A case study is a comprehensive, intensive, and in-depth research design that is primarily intended to examine a problem by addressing the questions of “what,” “how,” or “why.” The research questions focus on a series of events related to a single case of a contemporary phenomenon using a quantitative research approach (Dewi, 2019).

This study involved two respondents from Gampong Meunasah Tutong, Montasik District, Aceh Besar

Regency. The intervention consisted of administering red dragon fruit juice to reduce blood pressure in patients with hypertension. The researcher administered red dragon fruit juice to the participants for three consecutive days, using a preparation of 100 g of red dragon fruit blended with 200 mL of water, which was given twice daily, in the morning and evening, in accordance with the Standard Operating Procedure (SOP). The study was conducted over three consecutive days, from November 6 to November 8, 2025, with two intervention sessions each day.

In this study, the researcher used several research instruments, including an informed consent form, an assessment form, a standard operating procedure (SOP), a stethoscope, a sphygmomanometer, and an observation sheet.

RESULT AND DISCUSSION

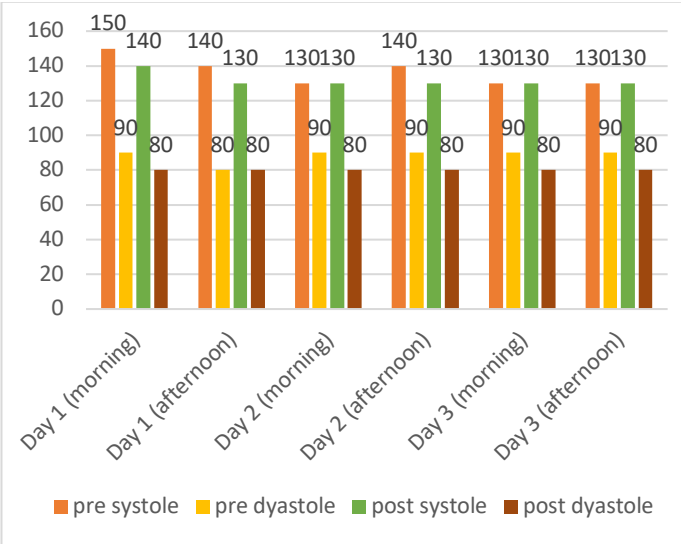
RESULT

Based on the findings of this study, both Subject I and Subject II experienced a reduction in blood pressure following the administration of red dragon fruit juice compared with their baseline measurements. The reductions in blood pressure are presented as follows:

Subject I

Figure I.

Blood Pressure values Before and After the Administration of Red Dragon Fruit Juice in Subject I

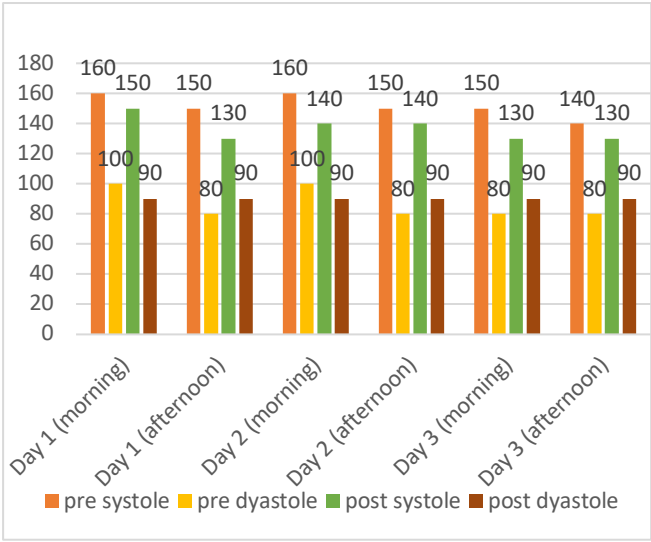


Based on the figure above, Subject I experienced a gradual reduction in blood pressure from the first day to the final day of the intervention, with a final blood pressure reading of 130/80 mmHg. However, on the afternoon of the second day, the subject's blood pressure temporarily increased to 140/90 mmHg. The participant reported experiencing stress due to concerns about the family's financial situation. Based on the researcher's observations, the mean pre-test blood pressure of Subject I during the three-day intervention period was 150/90 mmHg. After the administration of red dragon fruit juice, the mean post-test blood pressure decreased to 130/80 mmHg.

Subject II

Figure II.

Blood Pressure values Before and After the Administration of Red Dragon Fruit Juice in Subject II



Based on the figure above, Subject II experienced a gradual reduction in blood pressure from the first day to the final day of the intervention. However, on the morning of the second day, the subject's blood pressure temporarily increased to 160/100 mmHg. The participant reported experiencing dizziness the previous night after consuming goat meat soup. Based on the researcher's observations, the mean pre-test blood pressure of Subject II during the three-day intervention period was 160/100 mmHg. Following the administration of red dragon fruit juice, the mean post-test blood pressure decreased to 130/90 mmHg.

DISCUSSION

The findings of this study indicate that the administration of red dragon fruit juice resulted in changes in blood pressure among patients with hypertension. For Subject I, the baseline blood pressure before the intervention was 150/90 mmHg, which decreased to 130/80 mmHg after the intervention. Similarly, for Subject II, the baseline blood pressure before the administration of red dragon fruit juice was 160/100 mmHg, which decreased to 130/90 mmHg after the intervention. The intervention was carried out for three consecutive days.

According to the researcher's interpretation,

one of the bioactive compounds found in red dragon fruit is flavonoids, which help relax and dilate blood vessels, thereby improving blood circulation and reducing high blood pressure. In addition to its pleasant taste, red dragon fruit contains valuable nutrients that may contribute to lowering blood pressure. These nutrients include vitamin B, vitamin C, carbohydrates, dietary fiber, calories, unsaturated fats, calcium, protein, phosphorus, and a high water content, all of which contribute to its potential health benefits for individuals with hypertension. Several nutrients and bioactive compounds found in red dragon fruit help promote the dilation of capillary blood vessels, thereby improving blood flow to and from tissues. Through this mechanism, red dragon fruit is believed to contribute to lowering high blood pressure.

According to Faizaturrahmi and Trisnawati (2021), red dragon fruit contains high levels of calcium and flavonoids, which may help reduce blood pressure. It is also an excellent source of dietary fiber and vitamin C. In addition, the potassium present in the flesh of red dragon fruit plays an important role in regulating the body's fluid balance together with sodium, inhibiting the release of renin, promoting arteriolar vasodilation, and reducing endogenous vasoconstrictor responses. These mechanisms contribute to a reduction in blood pressure.

A supporting factor for the successful implementation of red dragon fruit juice therapy in this case study was adherence to the intervention. Based on the study findings, both participants consumed the red dragon fruit juice in accordance with the Standard Operating Procedure (SOP) provided by the researcher. The intervention was carried out consistently for three consecutive days, with the juice administered twice daily, in the morning and afternoon. According to the researcher's interpretation, adherence to all procedures outlined in the Standard Operating Procedure (SOP) and compliance with the instructions provided by healthcare professionals are essential for achieving optimal outcomes. The more consistently and faithfully participants adhere to the prescribed therapy and follow the researcher's recommendations, the greater the likelihood of obtaining maximum therapeutic benefits.

This finding is supported by Smantumkul (2021), who stated that treatment adherence refers to a patient's compliance with medication use, prescribed guidelines, and recommendations provided by healthcare professionals. Such adherence is closely associated with the prevention of complications. Similarly, Anugrah, Saibi, Britha, and Anwar (2021) emphasized that treatment adherence is a crucial factor in achieving the expected therapeutic outcomes. Patients who consistently comply with their prescribed treatment regimen are more likely to experience better health outcomes.

Family support also played an important role in the implementation of this study. During the intervention, the participants were consistently accompanied by their family members, and the researcher was warmly received by the participants' families. In addition, family members regularly reminded the participants to consume the red dragon fruit juice every morning and afternoon according to the intervention schedule. According to the researcher's interpretation, family support plays a crucial role in the successful implementation of red dragon fruit juice therapy. Such support can enhance participants' motivation and encourage greater adherence to the prescribed intervention. Consequently, improved compliance with the therapy may contribute to achieving optimal treatment outcomes.

This finding is supported by the theory proposed by Friedman (2021), which states that a family's ability to provide care influences the overall health status of its members. It is also supported by the findings of Nita (2022) regarding the relationship between family support and dietary adherence among patients with hypertension, which demonstrated a positive and significant association between family support and healthy eating behaviors in individuals with hypertension.

The participants' level of knowledge also played an important role in maximizing the effectiveness of the intervention, as it could influence their understanding of blood pressure management. This is reflected in the educational backgrounds of both Subject I and Subject II, both of whom had completed senior high school , which was categorized as a relatively high level of education.

According to the researcher's interpretation, education plays an important role in improving health status because it reflects an individual's level of knowledge. A better understanding of a disease enables individuals to implement more effective preventive measures, maintain their health, and adhere to appropriate treatment, thereby reducing the risk of disease progression. This interpretation is supported by the study conducted by Wulandari and Puspita (2023), which found that respondents with a higher level of knowledge about hypertension had a better understanding of their condition and were more aware of the appropriate management and treatment of hypertension.

This finding is further supported by the theory proposed by Wang et al. (2023) regarding the relationship between educational level and

hypertension. They reported that lower levels of education among rural populations may contribute to unhealthy lifestyle practices and limited knowledge regarding the prevention of hypertension compared with urban populations. Educational attainment is positively associated with health-promoting behaviors, as individuals with higher levels of education tend to be more aware of their health-related behaviors. They are also more likely to seek information about their health conditions and are better able to understand health information and adopt healthy lifestyle practices.

One of the factors influencing blood pressure is an unhealthy dietary pattern. Based on the study findings, Subject II experienced an increase in blood pressure on the morning of the second day, with a reading of 160/100 mmHg. This increase was attributed to the participant's consumption of a high-fat meal, specifically goat meat soup. In contrast, Subject I maintained a healthy dietary pattern throughout the three-day intervention period and, therefore, did not experience any increase in blood pressure during the study.

According to the researcher's interpretation, dietary habits can influence blood pressure, as many people in Indonesia commonly consume foods with a high salt content. Excessive sodium intake is one of the major contributing factors to hypertension. This is consistent with the findings of Purwono, Sari, Ratnasari, and Budianto (2021), who explained that salt contains sodium, which is absorbed into the bloodstream. High sodium intake promotes water retention, leading to an increase in blood volume. Furthermore, excessive sodium consumption stimulates the overproduction of natriuretic hormones, which indirectly contributes to elevated blood pressure.

According to the researcher's interpretation, consuming foods that are high in fat may contribute to an increase in blood pressure. A high-fat diet can elevate blood pressure by adversely affecting the cardiovascular system. This interpretation is supported by Farhat (2021), who stated that excessive consumption of high-fat foods can lead to atherosclerosis, or the narrowing of blood vessels. As a result, the blood vessels become stiffer and lose their elasticity, increasing vascular resistance to blood flow. Reduced arterial elasticity contributes to elevated systolic blood pressure, while the narrowing of blood vessels leads to increased diastolic blood pressure. Together, these changes result in hypertension. Furthermore, elevated levels of free fatty acids can also cause vasoconstriction, thereby contributing to increased blood pressure.

Based on the findings of this study, stress may also influence blood pressure. The results showed that Subject II did not experience stress, whereas Subject I reported experiencing stress due to concerns about declining health, meeting daily living needs, and work-related fatigue. According to the researcher's interpretation, stress can contribute to elevated blood pressure because it may disrupt normal sleep patterns, which in turn can lead to an increase in blood pressure.

This finding is supported by Ramdani (2023), who reported a significant relationship between stress levels and the incidence of hypertension among individuals with hypertension. Stress is characterized by feelings of fear and anxiety. When the body perceives a threatening situation, the pituitary gland stimulates the endocrine system to release hormones into the bloodstream. These hormones activate the secretion of adrenaline and hydrocortisone, enabling the body to adapt to stressful conditions. The release of adrenaline causes the heart to beat more forcefully and rapidly, increasing blood flow to various organs. When stress persists over a prolonged period, it may lead to cardiovascular hypertrophy. In addition, these stress-related hormonal responses contribute to elevated blood pressure, thereby increasing the risk of hypertension.

This finding is further supported by Delavera, Siregar, Jazid, and Eryando (2021), who stated that when an individual experiences stress, the primary stress hormones—adrenaline, thyroxine, and cortisol—increase and significantly affect the body's homeostatic system. Adrenaline acts synergistically with the sympathetic nervous system to induce vasoconstriction, resulting in greater blood being pumped throughout the body. Consequently, this physiological response increases both heart rate and blood pressure, thereby contributing to the development or worsening of hypertension.

Sleep patterns also influence blood pressure. Based on the findings of this study, Subject I experienced difficulty sleeping during the daytime. According to the researcher's interpretation, irregular sleep patterns may contribute to an increase in blood pressure because poor sleep quality can disrupt both physiological and psychological balance, thereby increasing the risk of developing hypertension.

This finding is consistent with the theory proposed by Gangwisch (2022), who stated that insufficient sleep may reflect poor sleep quality. Inadequate sleep can contribute to the development of hypertension by increasing sympathetic nervous system activity, elevating physical and psychological stress, and promoting salt retention, all of which may lead to increased blood pressure.

Another factor that may influence blood pressure is physical activity or exercise. Based on the

findings of this study, both Subject I and Subject II reported that they rarely engaged in regular exercise because of work commitments and stated that they did not have sufficient time to exercise consistently.

According to the researcher's interpretation, individuals who do not engage in regular physical exercise are more susceptible to developing hypertension because they tend to have lower cardiovascular fitness. As a result, the heart must work harder to pump blood throughout the body, which may contribute to increased blood pressure.

This finding is consistent with the theory proposed by Kuswandono (2022), who stated that physical exercise has a significant influence on the occurrence of hypertension. Individuals with low levels of physical activity tend to have a higher resting heart rate, causing the heart muscle to work harder during each contraction. As the heart pumps with greater force, the pressure exerted on the arterial walls increases, thereby contributing to elevated blood pressure. Physical exercise involves body movements that require energy expenditure and plays an important role in maintaining both physical and mental health, as well as preserving overall quality of life by keeping the body healthy and fit throughout daily activities.

This finding is further supported by Mellisa (2024), who stated that physical activity or exercise plays an important role in the development of hypertension and elevated blood pressure. Individuals with low levels of physical activity tend to have a higher heart rate, causing the heart muscle to work harder during each contraction. As the heart contracts more forcefully and more frequently, greater pressure is exerted on the arterial walls, thereby increasing blood pressure.

Genetic factors may also influence blood pressure. Based on the findings of this study, Subject I developed hypertension due to a family history of the condition inherited from both the grandmother and the mother. Similarly, Subject II had a family history of hypertension inherited from the mother, suggesting that genetic predisposition may have contributed to the development of hypertension in both participants.

According to researcher's interpretation, genetic predisposition may be a major contributing factor to the development of hypertension. Individuals with a family history of hypertension are at a higher risk of developing the condition, with an estimated 1.25-fold greater risk compared with those who do not have a hereditary history of hypertension.

This finding is supported by Setiandari (2022), who stated that essential hypertension is commonly associated with genetic factors, with multiple genes contributing to the development of hypertension. Genetic factors are estimated to account for approximately 30% of the variation in blood pressure among different populations. Therefore, heredity or a genetic predisposition to hypertension is considered one of the most important risk factors, particularly in individuals with a family history of the condition.

This finding is further supported by Kozier, as cited in Mufarokhah (2024), who noted that several studies have reported a higher incidence of hypertension among monozygotic (identical) twins than among dizygotic (fraternal) twins. These findings provide evidence that genetic factors play a significant role in the development of hypertension.

RESEARCH LIMITATIONS

The researcher encountered several obstacles during this case study, which became limitations in conducting the research. The limitations of this study were that Subject I experienced stress due to concerns about the family's financial condition, while Subject II was unable to maintain a healthy dietary pattern, which could trigger an increase in blood pressure.

CONCLUSION

Based on the findings and discussion of this case study involving patients with hypertension, it can be concluded that the administration of red dragon fruit juice was effective in reducing blood pressure. Subject I experienced a reduction in blood pressure from 150/90 mmHg to 130/80 mmHg, while Subject II showed a decrease from 160/100 mmHg to 130/90 mmHg following the intervention. These findings suggest that red dragon fruit juice may be beneficial as a complementary intervention for lowering blood pressure in patients with hypertension. Several factors were identified as influencing blood pressure, including unhealthy dietary habits, sleep patterns, stress, lack of regular physical activity or exercise, and genetic predisposition. Factors that contributed to the successful implementation of the red dragon fruit juice intervention included adherence to the therapy, family support, educational level and knowledge, healthy sleep patterns, and, most importantly, adherence to dietary restrictions by avoiding foods that should be limited by individuals with hypertension.

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AUTHOR CONTRIBUTIONS

Fathia Zakirah is responsible for the conceptualization of the study, data collection, implementation of the intervention, data analysis and interpretation, manuscript preparation, and approval of the final version of the manuscript for publication.

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CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest regarding the conduct of this research, the preparation of the manuscript, or the publication of this article.

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