The Effect of Red Rosella Tea on Blood Glucose Individuals with Diabetes Mellitus Type II

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ABSTRACT

Red rosella petals had potential as diabetes therapy. Red rosella petals contain citric acid, malic acid, Vitamin C, anthosinins, proteins and flavonoids that act as antioxidants that help lower pancreatic beta-cell damage and improve insulin work. Red rosella petals can be dried without reducing the content in it. Practically, it is used as a beverage ingredient, namely tea. This research aimed to analyze red rosella tea's effect on blood glucose in individuals with diabetes mellitus type II. This research was pre-experimental research with one-group pre-post-test design approach. The population was 17 individuals in Ketawang Village, Gondang District. The sample was 14 respondents with a proportional stratified random sampling technique. The independent variable was rosella tea, and the dependent variable was blood glucose. The instruments were red rosella tea with Standard operating procedures. The data was analyzed SPSS 21 paired t-test with a significance level of 0.05. The results showed that 14 respondents had an average blood glucose level of 317,64 mg/dl before the intervention, while after giving red rosella tea for 7 days had an average of 222 mg/dl. In addition, the results of the paired t-test, p-value = $0.00 \leq \alpha$ (0.05). Thus, there was an Effect of Red Rosella Tea on Blood Glucose in individuals with Diabetes Mellitus Type II. Red Rosella Tea can decrease Blood Glucose. Individuals with diabetes mellitus type II should consume red rosella tea routinely to avoid the complications of diabetes mellitus.

INTRODUCTION

10th edition of the International Diabetes Federation (IDF) Atlas revealed that currently, at least 1 in 10 people or as many as 537 million people live with diabetes mellitus. If there is no intervention, this number is projected to increase, reaching 643 million in 2030 and 784 million in 2045. Diabetes mellitus type II affects more than 90 percent of patients worldwide. This disease has also caused 6.7 million deaths in 2021. It is estimated that 1 person dies every 5 seconds due to diabetes mellitus. In Indonesia, the number of people with diabetes mellitus continues to increase from 10.7 million in 2019 to 19.5 million in 2021. This year, Indonesia is ranked fifth with the highest number of people with diabetes mellitus globally, up from seventh place last year. This increase is very concerning.

The increase in the number of people with diabetes mellitus type II is caused by socioeconomic, demographic, environmental, and genetic factors. Some main drivers are urbanization, an aging population, reduced physical activity, and an increasing number of people who are obese or overweight. The number of people with diabetes with uncontrolled blood sugar increase alarmingly (Bistara et al., 2019).

Diabetes mellitus is a heterogeneous group of disorders characterized by elevated blood glucose levels or hyperglycemia (Padila, 2012). Individuals with diabetes mellitus can experience various long-term

complications if their diabetes is not managed correctly. Complications that have often occurred and are deadly are heart attacks, strokes, impaired kidney function, and nervous disorders (Bistara and Rusdianingseh, 2019). Individuals with diabetes mellitus undergo pharmacological and non-pharmacological treatment to avoid complications. Pharmacological treatment such as administration of anti-diabetic drugs. Meanwhile, non-pharmacological treatment can use herbal plants.

Herbal therapy is better because it is natural, cheap, and easy to get (Ambarwati, 2012). Herbal therapy contains lots of fiber and antioxidants, one of which is that the red rosella plant is easily bred and can grow anywhere (Hastuti and Kusnadi, 2016).

People with diabetes mellitus type II usually need insulin when diet, exercise, and oral antidiabetic medication do not help achieve their target blood sugar (Wijayanti et al., 2019). Individuals with diabetes mellitus type II need to be given appropriate therapy. This situation requires patients diagnosed with diabetes mellitus type II to keep blood glucose levels under control and avoid further complications (Suiraoka, 2012). Patients with diabetes mellitus must regulate their diet and eat fiber-rich foods. Fiber can be obtained from vegetables and fruits (Herdiani and Wikurendra, 2020). Besides vegetables and fruits, it turns out that red rosella has a high fiber and antioxidant content, but the public does not know its many benefits and contents in it (Husna, 2014).

Red rosella petals help maintain the elasticity of blood vessel walls so that blood can flow smoothly and keep blood pressure stable. Rosella is also helpful as a diuretic. This function proves that red rosella petals can be used to lower blood pressure (Gilang, 2020). Red rosella petals have potential as a diabetes therapy. Red rosella petals have citric acid, malic acid, Vitamin C, anthosinins, proteins, and flavonoids that act as antioxidants that help lower pancreatic beta-cell damage and improve insulin work (Herdiani and Wikurendra, 2020). Practically, it is used as a beverage ingredient, namely tea. Compounds in red rosella can be antidiabetic, reducing serum creatinine, cholesterol, and glucose levels. Steeped water of red rosella petals, which people with diabetes routinely consume, can improve pancreatic cells, producing more insulin so that blood sugar can drop (Obat and Indonesia, 2010). This study aims to determine red rosella tea's effect in lowering blood glucose in individuals with diabetes mellitus type II.

METHOD

This study was pre-experimental research with the One-Group Pre-Posttest design approach. This study in Ketawang Village, Gondang District, for one week. The Population was 17 individuals in Ketawang Village, Gondang District. The Sample was 14 respondents with a proportional stratified random sampling technique. The sampling technique used is proportional stratified random sampling with inclusion criteria determined by the researcher to get the number of samples from each hamlet, and then

carried out simple random sampling of each hamlet. The inclusion criteria in this study were individuals with diabetes mellitus type II who did not experience complications.

The independent variable was rosella tea, and the dependent variable was blood glucose. Each respondent gets a rosella tea twice daily in the morning at 08.00 AM and the afternoon at 04.00 PM for 7 days. Give red rosella tea 3 dried rosella petals with 200 cc of hot water. The instruments were red rosella tea with standard operating procedures. The measurement of the blood glucose was the glucometer merk Easy Touch was given before and after the individuals were given red rosella tea. The glucometer (merk Easy) in the research was carried out by restarting the code using the chip from the device to maintain the accuracy of the measurement results. The glucometer merk Easy Touch has a registration number from the Indonesian Ministry of Health, has a chip that can only be used on one device, is easy to use, easy to carry, and has an affordable price. The data was analyzed SPSS 21 paired t-test with a significance level of 0.05. An ethical clearance in this paper has been carried at the Ethics Test Commission at IIK STADA Indonesia, Kediri.

RESULT

Table 1. Distribution of Frequency in Characteristics respondents (n=14)

Variable	N	%	p-value Pre	p-value Post
Age				
30-40 Years	1	7	0,333	0,333
41-50 Years	3	21		
51-60 Years	4	29		
>60Years	6	43		
Gender				
Man	5	36	0,460	0,301
Woman	9	64		
Education				
No school	1	7	0,227	0,387
Elementary School	10	72		
Middle School	2	14		
High School	1	7		
Job				
Housewife	3	21	0,350	0,350
Farmer	3	21		
Entrepreneur	7	50		
Pensioners	1	8		
Long Suffered				
1-5 Years	8	57	0,719	0,260
6-10 Years	5	36		
>10 Years	1	7		
Food Diet				
Yes	2	14	0,514	0,260
No	5	36		
Sometimes	7	50		
Sport				
Often	2	14	0,473	0,260
Seldom	10	72		
Never	2	14		

Drugs Consumed				
No	9	64	0,301	0,301
oral	5	36		

Table 1. shows that most respondents are >60Years old (43%), most are female (64%), and most graduated from elementary school (72%). Most respondents are an entrepreneur (50%), long suffered 1-5 years (57%). In addition, they sometimes food diet (50%), seldom do sport (72%) and have no drug consumption (64%).

Table 2. Blood Glucose Before and After Red Rosella Tea (n=14)

Blood Glucose	n	Mean	Std. Dev
Before intervention	14	317.64	95.76
After intervention		222.00	108.90
Paired t-test	P value = 0,000		

Table 2 shows that the average blood glucose level was 317,64 mg/dl before giving red rosella tea and the average blood glucose level was 222 mg/dl after giving red rosella tea. The paired t-test obtains p-value = $0.000 \leq \alpha$ (0.005). Thus, there was a difference in blood glucose before and after giving red rosella tea.

DISCUSSION

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The paired t-test results obtained a p-value = $0.000 \leq \alpha$ (0.050 and showed a difference in blood glucose before and after giving red rosella tea. Red rosella petals help reduce blood viscosity (lower blood sugar levels) and improve blood circulation. This can be seen from the pharmacological content in red rosella petals, namely citric acid, malic acid, vitamin C, anthocyanins, proteins and flavonoids (Andareto, 2015). The flavonoids consisting of gossy peptin, anthocyanins, and glucoside hibiscin act as antioxidants that help lower pancreatic beta-cell damage and improve insulin work (Husna, 2014). Compounds in rosella can be antidiabetic, reducing serum creatinine, cholesterol, and glucose levels. Steeped water of red rosella petals, which people with diabetes routinely consume, can improve pancreatic cells, producing more insulin so that blood sugar can fall (Herdiani and Wikurendra, 2020). People with diabetes mellitus must manage their diet well. People with diabetes mellitus must consume high fibers (Ambarwati, 2012). From this research, it is proven that the red rosella petals contain essential substances that are needed by the body, including vitamin A, vitamin C, calcium, essential proteins, and 12 kinds of amino acids, legin and arginine, which function to rejuvenate body cells (Herdiani and Wikurendra, 2020).

Monitoring blood glucose in individuals with diabetes mellitus type II is necessary to avoid complications (Bistara *et al.*, 2020). Consumption of red rosella tea helps lower blood sugar in people with diabetes mellitus. In this study, red rosella was used in dry form so that it was durable and maintained its content. It is expected that people with diabetes mellitus can consume red rosella tea every day but still take

medication. Dried red rosella is easy to obtain; the price is affordable, and red rosella plants are easy to grow around the house, so individuals with diabetes mellitus type II can consume red rosella tea easily.

CONCLUSION

Red rosella tea can decrease blood glucose. Individuals with diabetes mellitus type II should consume red rosella tea routinely twice a day to avoid the complication of diabetes mellitus. The limitations of this study are that there is only one intervention group, the sample is small, the intervention time is only 7 days, and the authors have difficulty controlling confounding factors such as respondents taking drugs. Future research could use the control group to compare and control confounding factors.

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