

Tomato Juice and Dragon Fruit Juice to Reduce Blood Sugar Level

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Abstract—Diabetes Mellitus non communicable disease that is included in the top ten disease that cause death. The highest prevalence of people with diabetes melitus type 2 that occurs as a result of unhealthy daily lifestyle. Diabetes Mellitus can improve the Quality of Life by managing Diabetes Mellitus which consist of education, diet, physical activity, medication and monitoring of blood sugar levels. Diet using tomato juice and dragon fruit juice to reduce blood sugar levels. The method with used one group pretest and posttest with control group. the sample of this research is 48 samples, consist of 16 samples with control group, 16 samples with juice tomato, 16 samples with dragon fruit juice. the instrument in this study used the observation checklist giving juice. juice is given once a day for two weeks. The method using statistical test independent t test. Analysis of the difference test between the control group and given tomato juice had no effect on the difference in decrease in blood sugar levels with P value of 0.363, and the analysis of test difference between the control group. Dragon fruit juice had no effect on the difference in decreasing blood sugar levels with a P value of 0.061. The summary tomato juice and dragon fruit juice does not have a significant effect in reducing sugar levels.

Keywords—Tomato Juice, Dragon Fruit Juice, Blood Sugar

I. INTRODUCTION

Non communicable disease have become a public health problem. One non communicable disease that has a lot of attention is Diabetes Mellitus. Diabetes Mellitus is a group disorders characterized by an increase in blood glucose levels or hyperglycemia. Glucose is formed in the liver from food consumed. Insulin is a hormone produced by the pancreas, and the function is control glucose levels in the blood by regulating the product and storage [1].

In Indonesia, Diabetes Mellitus is a serious threat to health development, because it can cause blindness, kidney failure, diabetic foot (gangrene) and it must be amputated, heart disease and stroke. Diabetes mellitus is ranked 6th as a cause of death. About 1.3 million people die and 4 % die before the age of 70th because diabetes mellitus. In 2030 diabetes is estimated to rank 7th cause of world death. In Indonesia it is estimated that in 2030 there will be 21.3 million people with Diabetes Mellitus. Data in The International Diabetes Federation (IDF) that more than 371 million people in the world aged 20-79 years have a diabetes. While Indonesia is the 7th country with the highest

prevalence of diabetes, after China, India, USA, Brazil, Russia and Mexico [2]. Riskesdas in 2018 showed an increase in the incidence of Diabetes Mellitus from 6.9 % in 2013 to 8.5% in 2018, while the prevalence of Diabetes Mellitus in Central Java was 2.1 %

The prevalence of Diabetes Mellitus which tends to increase makes many researchers interested in developing anti diabetes drugs. Oral hypoglycemic drugs (OHO) are the main line treatment for type 2 Diabetes Mellitus. These oral hypoglycemic drugs have also been effective in reducing high blood sugar levels, but complications caused by diabetes. It's not well prevented so efforts are still needed to find new drugs with anti diabetic physiological abilities that are right target, safe and easily affordable or economically [3]

Dragon fruit weight 200 grams given for 10 days can reduce blood sugar levels, measurements were taken on day 0 and day 11 in the control group and intervention group. Based on the results of this study it was found that there were differences in average blood glucose levels in the control group and the intervention group after being given a red dragon fruit. The difference in blood glucose levels is possible because in the intervention group respondents were given a red dragon fruit that can provide hypoglycemic effects, while the control group was not given any intervention [4]. Vitamin C contained in dragon fruit can help lower blood sugar levels, and can reduce the complications due to diabetes in blood vessels. a daily intake of vitamin C 1000 mg in people with diabetes mellitus can result in a significant decrease in blood sugar levels so that blood sugar balance is better maintained in the body [5]

Juice therapy that can be used in treating diabetes mellitus is using tomatoes. Tomatoes are done of the fruits or some are categorizing these tomatoes as vegetables. Tomatoes contain vitamin A for eye health, vitamin C for cell regeneration and the immune system and vitamin K for bone health. Tomatoes also contain lycopene which is an antioxidant to fight free radicals and reduce to blood sugar levels [6]. Food intake from tomato products containing lycopene has been shown to reduce the risk of chronic diseases such as preventing cardiovascular disease, diabetes, osteoporosis, infertility, and cancer [7]. These

effects are related to the antioxidant activity of tomatoes. Lycopene acts has an influence in reducing the risk of various chronic diseases including cancer and can be increases in the body if tomatoes are processed into juice, sauce and others [8]

II. METHOD

This study use a pre experimental method with the one-group pretest and post test design approach by used a control group as a comparison [9]. Sampling using purposive sampling technique and a total sample of 48 respondents. 16

respondents with a tomatoes juice, 16 respondents with a dragon fruit juice and 16 respondents are control groups. Inclusion criteria are 45-60 years old, diagnose with Diabetes Melitus more than 1 year, GDS more than 150 mg/dl and willing to become respondents. The instruments used check list observation and glucometer. Juice was given once a day for 2 week. Analysis used paired t test to determine differences in blood sugar levels before and after the intervention.

III. RESULTS AND DISCUSS

TABLE I. BLOOD SUGAR LEVELS WITH TOMATO JUICE INTERVENTION (N=32)

	Pretest				Posttest				Average
	min	Max	Mean	SD	Min	Max	Mean	SD	
Tomato	162	181	169.31	5.449	140	156	148.81	4.833	20.50
Control	160	172	166.13	4.064	136	160	146.75	6.708	19.38

Blood sugar levels in diabetics can decrease due to pharmacological and non-pharmacological therapy. Management for patients with diabetes mellitus according to them is non pharmacological therapy which includes

management of diet, exercise, monitoring blood sugar levels, health education and pharmacological therapy, namely pharmacological drugs for diabetes mellitus [1].

TABLE II. BLOOD SUGAR LEVELS BEFORE AND AFTER DRINKING TOMATO JUICE (N=32)

Group	Perlakuan	N	Mean	p value
Tomato Fruit	Pretes	16	169,31	0,000
	Posttest		148,81	
Control	Pretes	16	166,13	0,000
	Posttest		146,75	

The results of this study can be reduce blood sugar levels. This research was conducted for 10 days every day and respondents still consume insulin. Therapy modalities or interventions that can be used by patients to improve his health and has become part of nursing orders [10]. Tomato

juice is a combination of nutrition and pharmacy Tomatoes contain vitamin A for eye health, vitamin C for cell and immune system, vitamin K for bone health. Tomatoes also contain lycopene which is a antioxidant to fight free radicals and reduce blood sugar levels [8]

TABLE III. ANALYSIS OF DIFFERENCES IN BLOOD SUGAR LEVELS IN CLIENTS WITH THE DIABETES MELLITUS INTERVENTION GROUP AND THE CONTROL GROUP (N=32)

	N	Mean	SD	P value
Tomato juice	16	20.50	2.852	0.363
Control	16	19.38	3.948	

The results that there is no difference in blood sugar levels in respondents who drink tomato juice with insulin compared to respondents who drink consumption insulin. This study control group consume anti diabetic sugar so blood sugar levels also a decrease, the same as the group of respondents who were treated with consumption of tomato juice. this study proves that blood sugar levels can go down if given tomato juice. The results of other studies indicate that the tomato paste affects the blood sugar levels of diabetes mice. The most effective amount of tomato paste to reduce blood sugar levels. In 62 mg tomato paste 40 mg lycopene) with percentage decrease in blood sugar levels reaching 75.60%. In pure lycopene content is 135 mg/100 g, vitamin C 37.84 mg/100g, antioxidant 446.76%, water content 94.51%, whereas in paste lycopene content is 169

mg/100 g, vitamin C 4.58 mg/100 g, antioxidant 386.61, water content 92.86% and yield 66.15% [7]. Tomatoes as a non-pharmacological therapy for diabetes Mellitus is one type of fiber food. Fiber in tomatoes is insoluble dietary fiber, namely hemicellulose. Lycopene can also increase insulin concentration, decrease H2O2 so that can function as an antidiabetic Lycopene content in tomatoes can reduce oxidative damage to cellular DNA and reduce fat peroxidation caused by diabetes [11].Fiber can slow the absorption of glucose from the small intestine so that it can reduce bood glucose levels. insoluble fiber reduces the process of gluconeogenesis which affects the increase in insulin secretion so that it can reduce 47 increases in glucose levels [12]. Non pharmacological management is aimed at prevention and management healthy living.

Prevention of diabetes mellitus consist of healthy nutrition, weight control, adequate sleep, exercise or physical therapy, fruit juice therapy, monitoring blood sugar, relaxed atmosphere and stop smoking[13].Type 2 management Diabetes Mellitus consists of a healthy lifestyle, then if with

healthy lifestyle and blood glucose monotherapy has not been controlled , then given a combination of two drugs. Combination therapy must be chosen two drugs which work differently, for example sulfonylureas and metformin[14]

TABLE IV. BLOOD SUGAR LEVELS IN DIABETES MELLITUS (N=32)

Group	Pretest				Posttest				Average
	Min	Max	Mean	SD	Min	Max	Mean	SD	
Dragon Fruit	165	175	170	3,521	140	154	147,81	3,331	22,19
Control	160	172	166,19	4,064	136	160	146,75	6,708	19,38

TABLE V. BLOOD SUGAR LEVELS BEFORE AND AFTER DRINKING DRAGON FRUIT JUICE (N=32)

Group	Perlakuan	N	Mean	SD	p value
Dragon Fruit	Pretes	16	170,00	3,521	0,000
	Posttest		147,81	3,331	
Control	Pretes	16	166,13	4,064	0,000
	Posttest		146,75	6,708	

The results there is an average decrease in respondents who consume dragon fruit. Another study explained that consumption of 200 gram of dragon fruit reduces glucose levels highest compared to others and the treatment can be most effective at reducing glucose levels Diabetes Melitus [5].

Dragon fruit contains a high amount of fiber and flavonoids. Fiber will slow down absorption of glucose and

fat by increasing faecal viscosity which indirectly decreases the speed of diffusin so that blood glucose levels, lipid profiles and cholesterol decrease so that blood sugar levels are stable while antioxidants (flavonoids) work by maintaining blood vessel elasticity and improving the circulatory system [4]

TABEL VI. ANALYSIS OF DIFFERENCES IN BLOOD SUGAR LEVELS AFTER DRINK DRAGON FRUIT JUICE (N=32)

Group	N	Mean	SD	p value
Dragon Fruit	16	22,19	4,230	0,061
Control	16	19,38	3,948	

This research was conducted for 10 days every day and respondents still consume insulin. There is no difference in the blood sugar levels of the intervention group and the control group. Pharmacological and non-pharmacological therapies are equally needed by people with Diabetes Mellitus to regulate their blood sugar levelsto remain normal. Oral hypoglycemic drugs (OHO) are the main line treatment for type 2 Diabetes Melitus. These oral hypoglycemic drugs have also been effective in reducing high blood sugar levels, but complications caused by Diabetes Mellitus have not been prevented so efforts are still needed to find new drugs with physiological abilities that are right on target, safe and easily affordable [3]

Diabetic patient must also control their blood sugar in a disciplined manner through a healthy diet so that blood sugar does not rise above normal. The high amount of fiber in dragon fruit can help stabilize a person’s blood sugar level. Fiber has the ability to slow the absorption of glucose and fat by increasing the viscosity of feses which indirectly reduces the speed of diffusion so that blood glucose levels, lipid profiles and cholesterol decrease. Red dragon fruit contains fiber and antioxidants that are beneficial for diabetics and cardiovascular patients. The content of dragon fruit fiber in the form of pectin has the ability to slow the absopction of glucose by increasing the thickness of the intestinal volume which has the potential to reduce the

speed of diffusion so that glucose levels decrease. Dragon fruit contains phytochemicals that function as antioxidants that function to maintain the elasticity of blood vessels and cell permeability. Increased cell permeability will increase insulin sensitivity so that more blood glucose is carried by insulin into cells to be metabolized [5]. Another study that consume of dragon fruit powder > 100 grams for 1 month did not cause negative effects on the liver and kidneys. The control group in this study given a regular diet without consume of dragon fruit also experienced a significant decrease in blood glucose levels. these results indicate that the diet still plays an important role in maintaining glucose control.

IV. RESULT

There was an average decrease in blood sugar levels in the tomato juice group by 20.50g/dl and dragon fruit juice by 22.19 g/dl. The two groups did not have differences in blood sugar levels with the control group.

V. CONCLUSION

Based on the results of the study, it was found that dragon fruit juice had no effect on the difference in reducing blood sugar levels with a P value of 0.061. So it can be concluded that tomato juice and dragon fruit juice do not have a significant effect in reducing sugar levels.

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