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THE EFFECT OF OKRA DECOCTION ON BLOOD SUGAR AND BODY WEIGHT IN DIABETIC CLIENTS

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ABSTRACT

Background: Unstable blood sugar levels make people with diabetes more at risk when infected with Covid-19. Type 2 DM clients faced problems that can minimize if the client has sufficient knowledge and ability to control their disease, namely by doing selfies diabetes care. Okra plant (*Abelmoschus esculantus*) is associated with α-glucosidase, which has an antidiabetic effect on slowing the digestion of carbohydrates to delay the postprandial increase in blood glucose. **Objective**: To determine the impact of okra decoction on blood sugar and body weight. **Methods:** This study was a pre experimental study with a pre-post test one group design. The variables in this study were: the independent variable was vegetable okra stew (*Abelmoschus esculentus*), and the dependent variable was the level of blood sugar and body weight. The research subjects were 17 people selected by purposive sampling aged 40-71 years. The research subjects received 30 grams of okra stew per day at breakfast between 7-9 am for seven days and carried out blood sugar checks and body weight measurements. **Result**: the paired t-test statistical test on okra stew on blood sugar obtained p-value = 0.153), while the p-value = 0.000 for body weight, **Conclusion**: There was no significant difference between the administration of okra stew on blood sugar and there was a significant difference between the okra stew and body weight. It was expected that nurses could promote okra vegetables as complementary therapy in controlling blood sugar in diabetic patients by paying attention to diet, activity, and treatment.

Key words: Okra, Blood Sugar, Body Weight, Diabetes Mellitus

BACKGROUND

Diabetes mellitus is a heterogeneous disorder in the metabolic process characterized by hyperglycemia as a result of insulin secretion disturbances, insulin work damage or both (Punthakee et al., 2018). Diabetes is a feature of a group of metabolic disorders characterized and identified by the presence of untreated hyperglycemia (World Health Organization, 2019). Diabetes mellitus is classified into type 1 diabetes, type 2 diabetes, gestational diabetes mellitus (GDM), and specific types of diabetes due to other causes (American Diabetes Association, 2018).

Genetic and environmental factors can cause progressive loss of b-cell mass and / or function. This is clinically manifested as hyperglycemia (American Diabetes Association, 2018). Hyperglycemia is a condition of high blood glucose (blood sugar) (American Diabetes Association, 2015).Hyperglycemia defined as a serum glucose level>180 mg/dl that lasts more than 2 hours (Rehman et al., 2011). Long-term uncontrolled complications of hyperglycemia include microvascular (nephropathy, retinopathy, neuropathy) and macrovascular (cerebrovascular disease, coronary artery disease, peripheral vascular disease) (Mouri & Badireddy, 2020).

The number of diabetics in the world in 2019 was 463 million. This number is predicted to continue to increase until 2045.

The number of people with diabetes is estimated to reach 700 million at that time. The prevalence of diabetes is expected to increase to almost 11% by 2045 (Elflein, 2020). In Indonesia more than 10 million people living with diabetes with a prevalence of 6.2% (Ligita et al., 2019). According to the Perkeni 2015 consensus, the prevalence of diabetes mellitus in people ≥ 15 years increased by 10.9%. East Java is the fifth province in Indonesia with the highest prevalence of diabetes mellitus, reaching 2.6% in 2018, increasing from 2013, which was 2.1% (Sasmiyanto, 2019). Based on the Riskesdas report, the percentage of diabetes mellitus cases in Kediri City was 2.9% in 2013 and increased to 3.4% in 2018 (Riskesdas, 2018).

The main therapy for diabetes mellitus is diet and exercise. If adequate glycemia cannot be achieved, pharmacological therapy is required (Goyal & Jialal, 2015). Alternative treatments are widely trusted and used by many people as a preference for seeking treatment from medical doctors. Based on research it is reported that 80% of people in developing countries believe traditional medicine as the main treatment for various diseases. Traditional medicine, including regular food and herbal medicine, is used as the main form of primary health care (Kasole et al., 2019). Medicinal plants have an important role in the treatment of diabetes mellitus, which is a serious metabolic disorder (Bindu & Narendhirakannan, 2019). One of medicinal plant in Indonesia is okra (*Abelmoschus esculantus*).

The fibre of okra contains 15.4% hemicellulose, 67.5%α-cellulose, 7.1% lignin, 3.9% fatty and waxy matter, 3.4% pectic matter, and 2.7% aqueous extract. Fresh fruits are rich in mucilage and pectin; they contain protein, oxalic acid, fat, minerals (sodium, potassium, magnesium, copper, sulphur , iodine and manganese), carbohydrate, calcium, and phosphorus. Petals yield 13flavanoid glycosides, hibiscetin glucosides and gossypetin. The mucilage of fruits contains d-galactose, flavonoids, l-rhamnose, and d-dalacturonic acid. Ripe seeds contain 10–22% edible oil (Islam, 2019).

Okra has pharmacological activities including antioxidants, anti-inflammatory and immunomodulatory effects, antibacterial activity, gastroprotective effect, anticancer effect, antidiabetic effect, lipid-lowering effect, neuropharmacological effects, and other activities (Islam, 2019)(Durazzo et al., 2019). Okra has many benefits, so it is useful to do research on The Effect of Okra Decoction On Blood Sugar and Body Weight in Diabetic Clients

METHODS

This study was a pre experimental study with a pre-post test one group design. The variables in this study were: the independent variable was vegetable okra stew (*Abelmoschus esculentus*), and the dependent variable was the level of blood sugar and body weight. This research was conducted in Tamanan village, Mojoroto sub-district, Kediri city, in August-September. The research subjects were 17 people selected by purposive sampling aged 40-71 years. The research subjects received 30 grams of okra stew per day at breakfast between 7-9 am for seven days and carried out blood sugar checks and body weight measurements. The data were analyzed by paired t-test.

RESULTS

Table 1. Average blood sugar levels before and after okra administration

Okra Administration	Average blood sugar levels (mg/dl)
Before okra administration	302.76
After okra administration	284.35

Table 1 shows the mean blood glucose levels before and after okra administration. Blood glucose levels before administration of okra had a higher mean when compared to after administration of okra.

Table 2. Average body weight before and after okra administration

Okra Administration	Average body

	weight (kg)
Before okra administration	59.00
After okra administration	58.88

Table 2 shows the mean body weight before and after okra administration. Body weight before administration of okra had a higher mean when compared to after administration of okra.

Table 3. The results of the normality test with the Shapiro Wilk test

Variable	Okra administration	Significance
Blood sugar levels	Before	0.820
	After	0.288
Body weight	Before	0.301
	After	0.279

Table 3 shows the results of the normality test using the Saphiro Wilk-test. Normality test results on all variables ≥ α (0.05), it proves that all the variables with normal distribution.

Table 4. Paired T test results

Variable	Okra administration	Significance
Blood sugar levels	Before	0.153
	After	
Body weight	Before	0.000
	After	

Based on table 4, the results of the paired T test on the blood sugar variable, the significance value (p value) was 0.153. This value is ≥ α (0.05) so that the difference in blood sugar levels before and after okra administration has insignificant differences.
Table 4 also shows the result of the paired T test on the body weight variable. The significance value (p value) was 0.000. This value is ≤ α (0.05) so that the difference in body weight before and after okra administration has significant differences.

DISCUSSION

Table 1 show the mean blood glucose levels before and after okra administration. The mean blood sugar decreased from 302.76 mg/dl to 284.35 mg/dl. Okra polysaccharides have anti-hyperglycemic activity (Dubey & Mishra, 2017). The dominant polysaccharide of okra was rhamnogalacturonan. β-D- (1 → 6) -glucan increases insulin levels and hepatic glycogen accumulation, and lowers blood sugar levels. Polysaccharides have a composition mainly rhamnose, mannose, and glucose. This can inhibit glucose absorption in a dose-dependent manner (Liu et al., 2018).

Flavonoids act as antihyperglycemic because the inhibitory activity of antioxidants and aldose reductase. Quercetin, acts as a radical transporter and inhibits free radicals which can damage pancreatic beta cells by transferring hydrogen atoms (H) from their phenolic and binding with free radical (R) substituents to produce flavonoid free radicals (Herowati et al., 2020).

Triterpenoids play a role in lowering blood sugar levels by inhibiting the enzyme aldose reductase. This enzyme serves to catalyze the transformation of sugar into sorbitol by reducing NADPH to NADP + in the polyol pathway. Glucose is metabolized through the glycolysis pathway, then it enters the Krebs cycle and produces ATP. When hyperglycemia occurs, the enzyme aldose reductase is active and glucose is metabolized in the polyol pathway. This condition causes an increase in sorbitol in cells as well as a decrease in ATP yield in the mitochondria. Apart from that, it also increases the increase in apoptosis and necrosis of pancreatic β cells. Therefore, triterpenoids and flavonoids have an important role in the regeneration of pancreatic cells and insulin release channels (Zhang et al., 2018).

Based on table 4, the results of the paired T test on the blood sugar variable, the significance value (p value) was 0.153. This value is ≥ α (0.05) so that the difference in blood sugar levels before and after okra administration has insignificant differences. This can happen because the dose is not high enough, so that even though there is a decrease in blood sugar levels, the decrease is not statistically significant. In a study conducted

by Baridah (2017), the dose used was 45 mg, which concluded that there were significant differences in blood glucose levels before and after okra administration (Baridah, 2017).

Table 2 show that body weight before administration of okra had a higher mean when compared to after administration of okra. Body weight decrease from the average 59.00 kg to 58.00 kg. Based on table 4 shows the result of the paired T test on the body weight variable. The significance value (p value) was 0.000. This value is ≤ α (0.05) so that the difference in body weight before and after okra administration has significant differences.

Okra is able to lose weight. The high fiber content will make the body feel full for a long time. Low calorie and fat content will keep you from gaining weight (Mishra & Dubey, 2017).

CONCLUSION

There was no significant difference between the administration of okra stew on blood sugar and there was a significant difference between the okra stew and body weight

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