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The Effect of *Muntingia calabura* (Kersen) Leaf Decoction as an Antidiabetic on Blood Sugar Levels Among Type II Diabetes Mellitus Patients

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Abstract

Diabetes is a very high-prevalence metabolic disease characterized by increased blood sugar levels and disorders in the metabolism of carbohydrates, fats, and proteins due to insulin deficiency. This disease can also be treated through non-pharmacological treatment or herbal remedies, including by consuming the Muntingia (kersen) leaves decoction. Muntingia leaves contain flavonoids and saponins which are active antidiabetic substances functioning as inhibitors of the A-glucosidase enzymes. This study aims at determining the effect of Muntingia leaves decoction on blood sugar levels among Type II Diabetes patients in Pante Gajah, Peusangan, Bireuen. The study uses a quasi-experimental research design with treatment and controlled groups. 26 sample patients were chosen by total sampling techniques. Furthermore, the research variables are blood sugar levels (dependent variable) and Muntingia leaves decoction (independent variables). This study was done on 24-31 March 2022 within the scope of the Peusangan Community Health Center. The data were then analyzed by using an independent and dependent T-test. The results of the dependent test in the treatment group before consuming the decoction is 208.04 mg/dl and 180.92 after the treatment, the decrease is 27.12 mg/dl. The results of the independent test in the treatment group before consuming the decoction are 190.85 mg/dl on average and 144.69 mg/dl after the treatment, the decrease is 46.16 mg/dl. In the controlled group is 225.23 mg/dl before the treatment and 217.15 mg/dl after the treatment, the decrease is 8.08 mg/dl. The Muntingia leaves decoction has a significant effect on blood sugar levels.
Keywords: blood sugar levels, diabetes mellitus, kersen, muntingia leaves

Introduction

Diabetes mellitus is a common metabolic disease and has a very high prevalence, this disease can affect all organs of the body, causing many complaints if not properly managed and treated, such as disturbances in eyesight, cataracts, heart disease, kidney disease, sexual impotence, wounds that are difficult to heal and decay/gangrene, lung infections, blood vessel disorders, and strokes. In people with diabetes mellitus, sugars accumulate so that they cannot be absorbed by cells. The failure to absorb is due to insufficient amounts of the insulin hormone or defective function, the insulin hormone is a hormone that helps the entry of blood sugar into cells (WHO, 2016).

Diabetes Mellitus (DM) is a disease with the highest number of adult patients in the world. Based on data from the World Health Organization (WHO) in 2016, the global prevalence of diabetes in adults over 18 years has increased from 4.7% with a total of 108,000,000 people in 1980 to 8.5% or 422,000,000 people in 2014. The International Diabetes Federation (IDF) in

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2017 shows that there are around 1,600,000 cases of death directly caused by diabetes mellitus. The IDF also reported that Indonesia ranks 7th with a total of 10,000,000 patients and it is estimated that in 2010 Indonesia ranks 6th with a total of 16,200,000 diabetes patients.

Surveillance data from the Aceh Health Service for 2016, of the top 10 non-communicable diseases in the Aceh region, Diabetes ranks 2nd after hypertension with a total of 64,092 cases. Of the 64,092 cases of diabetes mellitus, 34,164 cases were type 2 diabetes mellitus, 22,946 cases were type 1 diabetes, and 6,982 cases of gestational diabetes. As well as the number of cases of diabetes at the age of 20-44 years there were 10,567 cases and most of the cases were women (Aceh Health Office, 2016). In 2013 the prevalence of Diabetes mellitus in Banda Aceh City was in third place together with the City of Langsa and the City of Bireuen (Ministry of Health RI, 2013).

Diabetes mellitus can be treated using medication. The treatment is divided into two, namely pharmacological and non-pharmacological therapy. Pharmacological therapy is therapy using drugs while non-pharmacological is without the use of drugs (ADA, 2018). One way to prevent diabetes mellitus can be treated using non-pharmacological treatments or herbal remedies. One of them is by consuming kersen leaf stew. Kersen leaves are also believed to be able to be anti-diabetic.

Some of the content in kersen leaves is a compound that is important for the body. The ingredients in kersen leaves are water, carbohydrates, fat, protein, fiber, calcium, phosphorus, iron, carotene, riboflavin, and niacin. Kersen leaves also contain other ingredients such as flavonoids, saponins, tannins, as well as steroids. One of the benefits of kersen leaves in general is as an antioxidant, antibacterial, and anti-inflammatory. The insulin hormone is a hormone that controls blood sugar levels. Kersen leaves are able to control blood sugar levels so they are good for being used as an antidiabetic (Rahayu, 2019).

Antidiabetics are drugs developed to stabilize and control blood sugar levels in people with diabetes. The antidiabetic drugs for type 2 diabetes are more varied. Initially, it may be advisable to adjust the diet and exercise in sufferers, but if this has not succeeded in controlling blood sugar, antidiabetic food will also be given. The choice of anti-diabetic will depend on the effectiveness of the drug, side effects, price, and interactions with other drugs that the patient may be taking. Antidiabetics do not cure diabetes, but they help keep diabetes under control so that it can prevent long-term complications such as kidney and heart damage. Based on the description above, the research problem can be formulated as follows: What is the effect of giving kersen leaf decoction as an anti-diabetic for blood sugar levels in type 2 diabetes mellitus patients Pante Gajah Village, Peusangan District, Bireuen Regency.

Methods

This study used a quasi-experimental design with a pre- and post-test control group to see the effect of giving kersen leaf decoction to people with diabetes mellitus. Blood glucose levels were measured before and after a kersen leaf decoction was administered in this study. . The population in this study had type 2 diabetes mellitus in Pante Gajah Village, Bireuen District, with a total of 26 people. The sampling technique in this study was carried out using the total population method, namely the total population used as the research sample.

Results

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Blood sugar levels before and after being given treatment in the case and control groups in patients with type 2 Diabetes Mellitus in Pante Gajah Village, Peusangan District, Bireuen Regency.

Table 1. Blood Sugar Levels Before and After In-Case and Control Group

Blood sugar levels	**Group**							
	Case				**Control**			
	Mean	**Min**	**Max**	**SD**	**Mean**	**Min**	**Max**	**SD**
Pre	193.3	174	226	16.9	230.9	177	273	26.6
Post	147.4	138	176	14.0	226.1	170	287	30.0

Based on Table 1, it can be seen that in the treatment group, the average blood sugar level before giving kersen leaf decoction to type 2 Diabetes Mellitus patients was 193.3 mg/dl and the average blood sugar level after giving kersen leaf decoction was 147.4 mg /dl. Meanwhile, in the untreated group, the average blood sugar level before giving kersen leaf decoction to type II Diabetes Mellitus patients was 230.9 mg/dl, and the average blood sugar level after giving kersen leaf decoction was 226.1 mg/dl.

The effect of giving kersen leaf decoction to blood sugar levels before and after being given treatment in the case and control groups in patients with type 2 Diabetes Mellitus in Pante Gajah Village, Peusangan District, Bireuen Regency.

Table 2. Differences in Blood Sugar Levels in Patients With Type 2 Diabetes Mellitus, Before and After Being Given Kersen Leaf Decoction

Blood sugar levels	**n**	**Mean ± SD**	**P Value**
Pre	26	208.04± 26.42	0.005
Post	26	180.92±40.71	

From the calculation of the dependent T-test carried out on the effect between blood sugar levels before and after being given kersen leaf decoction, a p-value of (0.005) < 0.05 was found. An average value of blood sugar levels in patients with type 2 Diabetes Mellitus before being given kersen leaves was 208.04 mg/dl, while after being given a decoction of kersen leaves it becomes 180.92 mg/dl. Based on these results, there was a decrease in blood sugar levels in the treatment group, namely, 27.12 mg/dl, after being given 7 days of kersen leaf decoction. This shows that there is an influence between blood sugar levels before and after being given kersen leaf decoction in Pante Gajah Village, Peusangan District, Bireuen Regency.

Discussion

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The results showed that, on average, Type 2 Diabetes Mellitus patients who received kersen leaf decoction herbal therapy experienced a significant decrease in blood sugar levels after the intervention, namely from 208.04 mg/dl to 180.92 mg/dl. There was a decrease in blood sugar levels, namely 27.12 mg/dl, after being given 7 days of kersen leaf decoction. This is different from the control group, which, although experiencing a decrease, is not statistically significant. The dependent T-test analysis in table 5 shows that there is a significant difference or effect on blood sugar levels of type 2 Diabetes Mellitus patients in the treatment group in Pante Gajah Village, Peusangan District, Bireuen Regency, with a p-value of 0.005 (< 0.05).

Based on the research results, the authors assume that kersen leaf decoction can lower blood sugar levels. This can help control blood sugar levels in people with type 2 Diabetes Mellitus. This is the advantage of non-pharmacological treatment or herbal therapy, one of which is kersen leaf decoction. This herbal therapy has side effects that are less dangerous than chemical drugs; besides that, it is cheap and easy to obtain. This is because the effects of kersen leaves are natural and different from those of chemical drugs. In comparison to chemical drugs, drugs derived from plants are relatively easy for the human body to accept. (Muhlisah, 2007).

One of the benefits of kersen leaves in general is as an antioxidant, antibacterial, and anti-inflammatory. The insulin hormone is a hormone that controls blood sugar levels. Kersen leaves are able to control blood sugar levels, so they are good for being used as an antidiabetic (Rahayu, 2019). Another benefit of kersen leaves is that they boost the immune system so that they can prevent certain diseases and speed up the recovery process. In addition, antioxidants can also slow down the aging process in the body.

Kersen leaves contain saponins and flavonoids, which can lower blood sugar levels and act as anti-diabetic agents by inhibiting the α-glucosidase enzyme. . Saponins can inhibit the absorption of glucose from the intestine, so carbohydrates are not absorbed much by the intestine. These saponins and flavonoids are highly efficacious in lowering blood sugar levels and repairing beta cells in the pancreas to produce insulin again. Kersen leaves have an advantage compared to Moringa leaves, namely, they contain more flavonoids to lower blood sugar levels. (Rahayu, 2019).

This research can provide new information about herbal medicines that grow around us, one of which is kersen leaves, which usually grow in yards. The use of this leaf is very minimal as medicine because of limited information in the community. Kersen leaves have extraordinary properties and potential because of the various ingredients in them.

This is in line with the research that has been conducted by Angga (2020), which found the results of the research to have a p-value of 0.000 (<0.05), meaning that there is an effect of giving kersen leaf decoction to people with type II Diabetes Mellitus. Kersen leaves contain saponins and flavonoids, both of which have an effect on reducing blood sugar levels.

Conclusion

The average blood sugar level in Type 2 Diabetes Mellitus patients was 208.04 mg/dl before being given kersen leaf decoction. After being given kersen leaf decoction, the average blood sugar level becomes 180.92 mg/dl. Thus, there is an effect on blood sugar levels by giving kersen leaf decoction. Based on these results, there was a decrease in blood sugar levels of 27.12 mg/dl. Therefore, it can be concluded that there is a significant effect of giving kersen leaf

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decoction to type 2 Diabetes Mellitus sufferers in Pante Gajah Village, Peusangan District, Bireuen Regency.

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Journal of Applied Nutrition and Dietetic
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