Intervention Of Ambon Banana Blossom As An Alternative Food To Reduce Blood Glucose Levels In Diabetic Patients In The Working Area Of Kemalo Abung Health Center

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Article Info

ABSTRACT

Background: *The prevalence of diabetes in Indonesia based on the results of the Riskesdas in 2013 is 2.1%; the figure is higher compared with the year 2007 (1.1%). Complications in people with diabetes occur due to uncontrolled blood glucose increases. The necessity of controlling glucose is easily obtainable and cheap, such as granting high fiber with Ambon's Banana as in Pringsewu Regency. This research aims to know the influence of consuming refined Ambon's Banana blossom against the decrease in blood glucose levels in people with diabetes.*

Research Methods: *Types of quantitative research and analysis by a quasi-experimental approach. The population in this research is a citizen who lived in the region of clinics Abung Kemalo Kab. North Lampung affected by diabetes mellitus amounted to 116 people. Sample 10 people. Analysis of a t-test using the bivariate test.*

Research Result: *The results showed the average blood glucose level before the banana blossom given to the intervention group was 224.4. While in the group, the control was 280.4. After the banana blossom preparations were given in the intervention group, average blood glucose levels were 172. At the same time, the control group was 251.0.*

Conclusion: *There is a difference between consuming the refined Ambon's banana blossom and not consuming the refined Ambon's banana against the decrease in blood glucose levels in people with diabetes (p-value 0.022). This research is expected to advise health workers should be socialized heart Ambon's banana as an alternative for patients with DM.*

BACKGROUND

Diabetic is a type of chronic disease characterized by increased blood sugar levels. Diabetic cannot be cured but can be controlled. Diabetic begins with increased glucose levels in the blood due to disturbances in the metabolic system in the body's blood. The lack of insulin beta cells produced in the pancreas to process blood sugar (glucose) into energy becomes the trigger, so the sugar in the blood cannot be processed into energy (Soedarsono, 2019).

Diabetic mellitus is characterized by increased blood glucose levels (hyperglycemia). Hyperglycemia occurs due to decreased insulin action, caused by a loss of 80% - 90% of the secretory function of insulin beta cells in the islets of Langerhans in the pancreas. Suppose the increase in blood glucose levels due to hyperglycemia exceeds the renal threshold for glucose reabsorption. In that case,

glucosuria will occur, and when it occurs, it can cause symptoms typical for people with diabetes mellitus, namely: polyuria, polydipsia, and polyphagia (Echtay et al., 2013).

Atlas Diabetic 7th edition of 2015 from the International Diabetic Federation (IDF) states that in 220 countries worldwide, the number of diabetics is expected to increase from 415 million in 2015 to 642 million in 2040. Almost half of these numbers are in Asia. , especially in India, China, Pakistan, and Indonesia (Cho et al., 2018). According to the 2015 IDF, Indonesia has around 9.1 million people with diabetes. Moreover, it is estimated that by 2035, the number will reach 14.1 million. The impact of this disease is not only personal but also makes it difficult for families, burdens all parties, and is detrimental to the country (Cho et al., 2018). The prevalence of diabetes in Indonesia, based on the results of the 2013 Riskesdas, was 2.1%; this figure was higher than in 2007 (1.1%). A total of 31 provinces (93.9%) showed a significant increase in the prevalence of diabetic mellitus. Riskesdas prevalence results in 2013 Diabetic at age ≥ 15 years according to doctor's diagnosis/symptoms in Lampung Province (0.8%) and preparation results in North Lampung district (0.6%).

In this study, researchers surveyed the incidence of hyperglycemia in 2016 in three North Lampung Puskesmas areas, namely the Kotabumi Health Center, which experienced an increase in diabetics in 2016, namely 101 diabetics. In February 2017, 104 people with diabetes experienced an increase of 3 %, Kemalo Abung Health Center experienced an increase in diabetics in 2016, namely 111 diabetics, and in February 2017, namely, 116 experienced an increase of 5%, Wonogiri Health Center experienced an increase in diabetic in 2016, namely 86, and in February 2017, namely 89 sufferers diabetic or experienced a 2% increase. This shows that the highest incidence of increased hyperglycemia among the three health centers is the Kemalo Abung Health Center (Rusdi & Afriyeni, 2019).

In the diabetic complications study conducted by Permana, the results of complications were coronary heart disease in 50-70% of diabetics, 50% of neuropathy in diabetics, and eight out of ten people with diabetes died as a result of cardiovascular complications and neuropathy. In 2013, WHO said the number of deaths due to lung tuberculosis was 1.5 million people, 1.5 million people died from AIDS/HIV, and 600,000 people died from malaria. Whereas in 2015, the results of the International Diabetic Federation (IDF) report stated that there were 5 million people who died from diabetes (Rusdi & Afriyeni, 2019).

From these data, it shows that the increase in the number of people with diabetes in Indonesia is very high. And there is a possibility that there will be an increase in the number of diabetics in the future, so it becomes a hefty burden for specialist doctors and even all health workers to handle alone. So the need for early prevention, namely by providing education, medical, nutritional therapy, physical exercise (exercise), and pharmacological therapy (Maisun, 2018).

Research results (Arfina, 2019) concluded that the effect of a high-fiber diet could reduce blood glucose levels in people with diabetic mellitus with data on the average blood glucose level (GDS) before the intervention of 344 mg/dl. After the intervention, the blood glucose level (GDS) was 237 mg/dl. Banana blossom research (Rilyani & Wulandasri, 2020) concluded that banana blossoms are rich in nutrients such as protein, fat, carbohydrates, minerals such as calcium, phosphorus, iron, and vitamins such as vitamin A, vitamin B, and vitamin C. This study aims to determine the effect of the consumption of Ambon banana blossom on reducing blood glucose levels in people with diabetes.

RESEARCH METHODS
The research design used a quasi-experimental pre-post test control group design study group and control group. However, taking respondents has yet to be done by randomization. The study group is the group that gets the intervention, while the control group is the group that does not get the intervention from the researcher, and data collection is done in both groups (Salindeho et al., 2016).

The method of collecting data collected by researchers for the smooth process of direct interviews with respondents was in the form of collecting respondents assisted by the Kemalo Abung Health Center, North Lampung. During the research process, the researchers controlled the food consumption of DM patients and the measurement data of blood sugar levels resulting from measurements by taking peripheral blood because, in general, there was no significant difference between capillary blood and venous blood as

hematological examination specimens, using a glucometer/test strip. Pre-lunch blood glucose level data collection was carried out before lunch, and post-lunch blood glucose level data collection after lunch.

This research method has two types of data analysis. The univariate analysis aims to explain or describe the characteristics of each research variable. The form of univariate analysis depends on the type of data (Notoatmodjo, 2012). The second Bivariate analysis was used to see the relationship between the independent variable and the dependent variable for the two groups, namely the study group and the control group pre-test and post-test glucose levels, whether or not there was a difference in blood glucose levels between the study group and the control group, and a comparison between levels blood glucose before and after being given a high-fiber diet of Ambon banana blossom.

RESULTS AND DISCUSSION
Analysis Results based on Univariate Analysis
Average Blood Glucose Levels in Diabetic Before treatment

Table 1. Average Blood Glucose Levels in Diabetic before treatment

Blood glucose level before treatment	Mean	Median	SD	Min-max	95 % CI
Intervention	224.4	225.0	6.39	217-232	216.5-232.3
Control	280,4	263.0	43.22	231-333	226.7-334.1

Based on Table 1, the results of the analysis showed that the average blood glucose level before being given banana blossom in the intervention group was 224.4 gr/dl (95% CI: 216.5-232.3), median 225.0 gr/dl, the standard deviation of 6.39 gr/dl, the lowest value was 217 gr/dl and the highest was 232 gr/dl. Whereas in the control group, it was 280.4 gr/dl (95% CI: 226.7-334.1), the median was 263.0 gr/dl; the standard deviation was 43.22 gr/dl, the lowest value was 231 gr/dl and the highest 333 gr/dl.

Average Blood Glucose Levels in Diabetic after treatment

Table 2 Average blood glucose level in diabetic after treatment

Blood glucose level after treatment	Mean	Median	SD	Min-mak	95 % CI
Intervention	172	167	9.67	164-188	159.9-184.0
Control	251	251	45.7	184-298	194.2-307,8

Based on Table 2, the results of the analysis showed that the average blood glucose level after being given banana blossom in the intervention group was 172 gr/dl (95% CI: 159.9-184.0), median 167.0 gr/dl, the standard deviation of 9.67 gr/dl, the lowest value is 164 gr/dl and the highest is 188 gr/dl. Whereas in the control group, it was 251.0 gr/dl (95% CI: 194.2-307.8), the median was 251.0 gr/dl; the standard deviation was 45.7 gr/dl, the lowest value was 184 gr/dl, and the highest was 298 gr /dl.

Analysis Results based on Bivariate Analysis
Differences in Blood Glucose Levels in Diabetic Patients Before and After Treatment in the Intervention Group

Table 3. Differences in Blood Glucose Levels in Diabetic Patients Before and After Treatment in the Intervention Group

Variable	Mean	SD	SE	P value	n
Before	224.4	6.39	2.86	0,001	5
After	172	9.67	4.32		5

Table 1 shows that the average blood glucose level in the intervention group before therapy was 224.4gr/dl, with a standard deviation of 6.39 gr/dl. While the average blood glucose level in the intervention group after therapy was 172 gr/dl, the standard deviation was 9.67 gr/dl. The results of the p-value obtained

were 0.001, so it could be concluded that there were differences in blood glucose levels in people with diabetes before and after consuming Ambon banana blossom in the intervention group.

Differences in Blood Glucose Levels in Diabetic Patients Before and After Treatment in the Control Group

Table 4. Differences in Blood Glucose Levels in Diabetic Patients Before and After Treatment in the Control Group

Variabel	Mean	SD	SE	P value	n
Before	280	43.2	19.3	0,007	5
After	251	45.7	20.4		5

Table 2 shows that the average blood glucose level in the control group before therapy was 280gr/dl, with a standard deviation of 43.2gr/dl. While the average blood glucose level in the control group after therapy was 251gr/dl, the standard deviation was 45.7gr/dl. The results of the p-value obtained were 0.007, so it could be concluded that there were differences in blood glucose levels in people with diabetes before and after consuming Ambon banana blossom in the control group.

Differences in Consuming Ambon Banana blossom and Not Consuming Ambon Banana blossom on Decreased Blood Glucose Levels in Diabetics

Table 5. Differences in Consuming Ambon Banana blossom and Not Consuming Ambon Banana blossom on Decreased Blood Glucose Levels in Diabetics

Variable	Mean	SD	SE	P value	n
Intervention	52.4	12.58	5.63	0,022	5
Control	29.4	13.09	5.85		5

Table 4.5 shows that the average value of changes in blood glucose levels in the group given banana blossom in the intervention group was 52.4gr/dl, with a standard deviation of 12.58 gr/dl. At the same time, the average change in blood glucose levels in the group not given banana blossom in the intervention group was 29.4 gr/dl, with a standard deviation of 13.09 gr/dl. The p-value obtained was 0.022, so it can be concluded that there is a difference between consuming Ambon banana blossom and not consuming Ambon banana blossom in reducing blood glucose levels in people with diabetes.

The results showed a difference between consuming Ambon banana blossom and not consuming Ambon banana blossom in reducing blood glucose levels in people with diabetes (p-value 0.022). This study's results align with the theory that the banana flower is a food rich in nutrients; it contains calcium, phosphorus, and several vitamins. Very good for dieting because it has little fat, safe for consumption by people with diabetes; the banana flower has a low glycemic index and slows down the emergence of blood glucose (glucose) so that less insulin is needed to convert glucose into energy. They improve the health of the digestive tract by increasing bowel movement, binding fat and cholesterol, and then excreting it through the feces (Pertanian, 2010).

In this study, the researchers found several obstacles, including that not all respondents wanted to consume banana blossom due to the slightly bitter taste and the limited ingredients of Ambon banana blossom. In addition, it was found that respondents did not experience a significant decrease after being given banana blossom; this could be due to respondents' non-compliance with the diet given or respondents consuming calories over a predetermined amount, besides that Respondents also lacked activity, resulting in a decrease in blood glucose.

CONCLUSIONS
Based on the study's results, it can be concluded that the average blood glucose level before being given banana blossom in the intervention group was 224.4. While in the control group was 280.4. Then the average blood glucose level in the intervention group after being given banana blossom was 172. Whereas in the control group, it was 251.0. So that the p-value obtained was 0.022, it can be concluded that there is a

difference between consuming Ambon banana blossom and not consuming Ambon banana blossom in reducing blood glucose levels in people with diabetes.

RECOMMENDATION

The results of this study can be used as an alternative healthy food that is beneficial for people with diabetes. However, needed further research about the maximum dosage and duration of pigeon pea consumption to avoid unwanted hypoglycemic effects.

REFERENCES

Arfina, A. (2019). Pengaruh Edukasi Pengaturan Diet Terhadap Perilaku Pengelolaan Diet Pada Penderita Diabetes Melitus Di Kelurahan Agrowisata Kecamatan Rumbai Kota Pekanbaru. Indonesian Trust Health Journal. https://doi.org/10.37104/ithj.v2i2.41

Cho, N. H., Shaw, J. E., Karuranga, S., Huang, Y., da Rocha Fernandes, J. D., Ohlrogge, A. W., & Malanda, B. (2018). IDF Diabetes Atlas: Global estimates of diabetes prevalence for 2017 and projections for 2045. Diabetes Research and Clinical Practice. https://doi.org/10.1016/j.diabres.2018.02.023

Echtay, A., Tsur, A., Hasan, M. I., Abu-Hijleh, M. O., Khatib, N. Al, Andari, E., Atallah, P., Qureshi, S., Zafar, J., Sandalci, L., Ademogullari, A., Haddad, J., & Dagan, B. (2013). Clinical experience with insulin detemir in patients with type 2 diabetes from the near East Countries. Diabetes Therapy. https://doi.org/10.1007/s13300-013-0041-z

Maisun, N. F. (2018). Analisis Rasionalitas Penggunaan Antidiabetes Pada Pasien Diabetes Melitus Tipe 2 di RSUD dr. Soediran Mangun Sumarso Wonogiri Tahun 2017. In Journal of Physical Therapy Science.

Pertanian, P. P. dan P. T. P. B. P. dan P. P. K. (2010). Dendeng Jantung Pisang.Pdf.

Rilyani, R., & Wulandasri, R. (2020). Konsumsi sayur jantung pisang terhadap peningkatan produksi ASI pada ibu masa nifas. Holistik Jurnal Kesehatan. https://doi.org/10.33024/hjk.v13i4.1626

Rusdi, M. S., & Afriyeni, H. (2019). Pengaruh Hipoglikemia pada Pasien Diabetes Melitus Tipe 2 terhadap Kepatuhan Terapi dan Kualitas Hidup. Journal of Pharmaceutical And Sciences. https://doi.org/10.36490/journal-jps.com.v2i1.13

Salindeho, A., Mulyadi, N., & Rottie, J. (2016). Pengaruh Senam Diabetes Melitus Terhadap Kadar Gula Darah Penderita Diabetes Melitus Tipe 2 Di Sanggar Senam Persadia Kabupaten Gorontalo. Jurnal Keperawatan UNSRAT.

Soedarsono, S. (2019). Effect of Diabetes Mellitus on Treatment Outcomes and Side Effects in Drug-Resistant Pulmonary Tuberculosis Patients Receiving DR-TB Regimens in Dr. Soetomo Hospital. A Retrospective Study. https://doi.org/10.1164/ajrccm-conference.2019.199.1_meetingabstracts.a4424