

The Effect of Soursop Leaf Decoction (*Annona muricata* L) on Blood Sugar Levels in Diabetes Mellitus Patients

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ABSTRACT

Background: Diabetes mellitus is a chronic disease with a prevalence that continues to rise globally. This condition is characterized by hyperglycemia resulting from impairments in insulin production or function, which can lead to long-term complications affecting the cardiovascular system, kidneys, nerves, and other organs. Blood glucose control is generally managed through pharmacological therapy; however, the use of chemical drugs often causes side effects. Therefore, the development of alternative therapies based on natural products has become increasingly important, including the utilization of soursop leaves (*Annona muricata* L), which are known to contain bioactive compounds with potential antihyperglycemic effects. **Objective:** This study was designed to evaluate the extent to which administration of soursop leaf decoction can reduce blood glucose levels in patients with diabetes mellitus in Desa Sampuabalo. **Methods:** The study employed a quantitative approach using a pre-experimental, one-group pretest-posttest design. Ten respondents were selected using purposive sampling. The intervention consisted of administering 150 mL of soursop leaf decoction twice daily for 14 consecutive days. Blood glucose levels were measured before and after the intervention using a glucometer. Data were analyzed using a paired t-test. **Results:** The findings demonstrated an average reduction in blood glucose levels of 35.8 mg/dL with a standard deviation of 11.72. Statistical analysis using the t-test yielded a value of 9.66 with a significance level of $p = 0.000$ ($p < 0.05$), indicating a significant difference between blood glucose levels before and after the intervention. **Conclusion:** Soursop leaf decoction has been shown to be effective in reducing blood glucose levels in patients with diabetes mellitus, suggesting its potential as a safe and complementary alternative therapy.

INTRODUCTION

According to a report from the International Diabetes Federation (IDF), in 2021 there were approximately 19.47 million people with diabetes in Indonesia, and it is estimated that the number of people with diabetes will increase significantly to 28.57 million by 2045. This increase reflects a global trend that also shows a surge in diabetes cases, which is estimated to reach 783.7 million people in 2045, an increase of 46% compared to 536.6 million in 2021 (IDF, 2021). Indonesia currently ranks fifth in the world as the country with the highest number of diabetes cases. This achievement shows a significant increase compared to 2019, when Indonesia was still ranked seventh globally. This condition is even more worrying because it is estimated that around half of the total 19.5 million sufferers have not received a proper medical diagnosis.

Diabetes mellitus is a disease caused by a disturbance in the body's glucose metabolism, accompanied by various metabolic problems caused by hormonal disorders. This leads to damage to the basal membrane, indicating hyperglycemia and various complications in the kidneys, eyes, and blood vessels (AASD, 2023). This situation has prompted more people, especially those with diabetes mellitus, to seek alternative glucose control methods through non-pharmacological therapies using natural ingredients from herbal plants (Dewi et al., 2022).

The use of traditional medicine in Indonesia is currently gaining attention, both from the general public and academics. This situation has prompted the need for scientific evidence regarding the effectiveness of various plants that are often used as traditional therapies (Syamson & Fakta, 2021). Herbal-based medicines are considered to have advantages over chemical medicines, including relatively milder side effects, more affordable prices, and the availability of raw materials that are easy to obtain (Putri & Novitasari, 2016).

One of the most widely used herbal plants is soursop, a member of the Annonaceae family, which not only functions as a nutritious fruit plant but also has properties as a traditional medicine. Almost all parts of this plant can be used for medicinal purposes. Soursop leaves, in particular, are known to have the potential to lower blood glucose levels when used as a complementary therapy to pharmacology. leaf extract or decoction can affect blood sugar levels, thereby supporting non-pharmacological treatment as an alternative in diabetes management (Yazid & Suryani, 2020).

Research conducted by Febryanti and Yola (2020) showed a significant difference in blood sugar levels before and after administering soursop leaf decoction. Before the intervention, the average blood glucose level of the respondents was recorded at 431.20 mg/dL, while after the treatment it decreased to 267.9 mg/dL. The standard deviation before the decoction administration was recorded at 104.83, while after the intervention it was 100.14, with an average decrease of 163.3 mg/dL.

Based on the above description, the researchers were interested in conducting a study entitled "The Effect of Soursop Leaf Decoction (*Annona muricata* L) on Blood Glucose Levels in Patients with Diabetes Mellitus." This study aims to determine the effect of soursop leaf decoction administration on blood glucose levels in diabetes mellitus patients in Sampuabalo Village. It is hoped that the results of this study can contribute scientifically to the development of natural-based complementary therapy and serve as a basis for considering the use of soursop leaves as a complement to conventional treatment.

Method

This study used a quantitative approach with a pre-experimental design through a one-group pretest-posttest design (Sugiyono, 2018). The research process involved two stages of measurement, namely before and after the intervention in the form of soursop leaf decoction, with the aim of observing changes in the participants' blood glucose levels. This study was conducted in the village of Sampuabalo on June 23, 2025.

Population and Sample

The population in this study consisted of 38 people, while the sample used was 10 people selected based on predetermined criteria.

Table 1 Respondent Approval

No	Respondent Initials	Age/Year	JK	Herbal Therapy Other Than Soursop Leaves	Willing to Participate for 14 Days	Informed Consent Signed
1.	Mr. K	68	L	No	Yes	Yes
2.	Mrs. S	49	P	No	Yes	Yes
3.	Mrs. N	67	P	No	Yes	Yes
4.	Mrs. S	66	P	No	Yes	Yes
5.	Mrs. M	56	P	No	Yes	Yes
6.	Mrs. S	47	P	No	Yes	Yes
7.	Mr. D	49	L	No	Yes	Yes
8.	Mrs. A	41	P	No	Yes	Yes
9.	Mr. N	45	P	No	Yes	Yes
10	Mr. M	53	L	No	Yes	Yes

Sampling Technique

Sampling in this study used *purposive sampling* based on inclusion criteria.

Diabetes patients

Aged 45-68, both men and women

Not currently in critical condition or suffering from severe diabetes complications such as kidney failure and acute stroke.

Not currently undergoing herbal therapy other than soursop leaf decoction

Willing to participate in all research procedures for 14 days

Complete and sign the informed consent form

Data Collection Techniques

Data collection techniques in this study were carried out in three stages, namely pretest, treatment, and posttest. In the pretest stage (day -1), the respondents' fasting blood sugar levels were measured using a glucometer in the morning before eating, and the results were recorded as initial data. Next, in the treatment stage (days 1 to 14), respondents were given an intervention in the form of 150 mL of soursop leaf decoction to be drunk twice a day, namely in the morning before eating and at night before bed, with routine monitoring by researchers. After the treatment was completed, the

posttest stage was conducted on day 15 with a re-measurement of blood sugar levels using a glucometer under fasting conditions to determine changes in blood sugar levels after the intervention.

Data Analysis

This study aimed to examine the effect of soursop leaf decoction on blood sugar levels in patients with diabetes mellitus. Data analysis was performed using a paired t-test with the application of the t-test formula to compare the results before and after the intervention.

$$t = D / ((SD / \sqrt{n}))$$

Explanation:

D = mean difference (pre-test and post-test)

SD = standard deviation of the difference

n = number of samples

t = t-test value

RESULTS & DISCUSSION

This study was conducted to assess the effect of soursop leaf decoction on blood glucose levels in patients with diabetes mellitus. Research data were obtained by measuring blood glucose levels before and after the intervention, which was carried out continuously for 14 days. The following are the average blood glucose levels of respondents before and after the administration of soursop leaf decoction:

Table 2 Calculation of the Average Difference Between *Pre-Test* and *Post-Test*

No	Respondent	Before (mg/dL)	After (mg/dL)	Difference
1	Mr. K	261	233	28
2	Mrs. S	251	200	51
3	Mrs. N	230	210	20
4	Mrs. S	248	217	31
5	Mrs. M	314	274	40
6	Mrs. S	321	268	53
7	Mr. D	292	263	29
8	Mrs. A	231	190	41
9	Mr. N	400	356	44
10	Mr. M	227	206	21

Source: Primary Data 2025

Based on data from Table 2 obtained from 10 respondents, blood sugar levels were measured before and after treatment. From these results, the difference in blood sugar level reduction for each respondent was calculated, then all differences were added together to obtain the total blood sugar level reduction, which was 358 mg/dL. Next, the average difference in blood sugar level reduction was calculated. These results indicate that there was an average decrease in blood sugar levels of 35.8 mg/dL after treatment. Individually, all respondents experienced a decrease in blood sugar levels.

Table 3 Normality Test

One-Sample Kolmogorov-Smirnov Test

		Before	After
N		10	10
Normal Parameters ^{a,b}	Mean	277.50	241.70
	Std. Deviation	55.030	50.144
Most Extreme Differences	Absolute	,218	,189
	Positive	,218	,189
	Negative	-.179	-.151
Test Statistic		.218	.189
Asymp. Sig. (2-tailed)		.196 ^c	.200 ^{c,d}

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Based on Table 3, the results of the normality test using the One-Sample Kolmogorov-Smirnov Test obtained a significance value (Asymp. Sig. 2-tailed) of 0.196 for blood sugar level data before treatment and 0.200 for data after treatment. The significance values for both measurements are above 0.05. Thus, it can be concluded that the blood glucose level data, both before and after administration of soursop leaf decoction, show a normal distribution. Based on the results of the normality test using the One-Sample Kolmogorov-Smirnov Test, a significance value (Asymp. Sig. 2-tailed) of 0.196 was obtained for blood sugar level data before treatment and 0.200 for data after treatment. The significance values of both measurements are greater than 0.05, so it can be concluded that the blood glucose level data before and after administration of soursop leaf decoction have a normal distribution.

Table 4 T-Test (Paired Test)
Paired Samples Test

Paired-Samples Test									
Paired Differences									
	Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)	
				Lower	Upper				
Pair 1 Before - After	35,800	11,727	3,708	27,411	44,189	9,654	9	,000	

Based on Table 4 of the Paired Samples Test results, it is known that the average difference between the before and after conditions is 35.800 with a standard deviation of 11.727 and a standard error mean of 3.708. The 95% confidence interval range shows that the difference value is between 27.411 and 44.189, thus providing confidence that the difference is consistent. The t-test results show a value of 9.654 with a degree of freedom (df) of 9 and a significance level (Sig. 2-tailed) of 0.000, which is less than 0.05. This indicates a significant difference between the conditions before and after the intervention. Thus, the administration of soursop leaf decoction has been proven effective in lowering blood glucose levels.

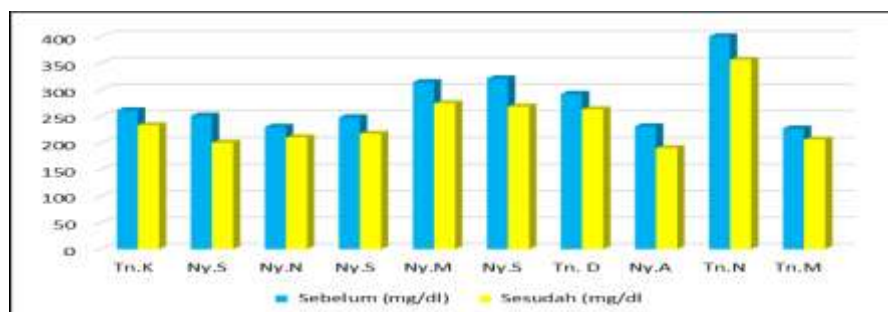


Figure 1 Comparison Diagram of Blood Sugar Levels Before and After Administration of Soursop Leaf Decoction

Based on Figure 1, the graph shows the results of the intervention of administering soursop leaf decoction for 14 days. Each pair of bars on the graph shows the pretest (light blue) and posttest (yellow) values for each respondent. All respondents experienced a decrease in blood sugar levels after treatment. All respondents experienced a decrease in blood sugar levels, with the highest decrease of 53 mg/dL (in respondent #6, Mrs. S) and the lowest decrease of 20 mg/dL in respondent #3 (Mrs. N). Respondent #9 (Mrs. N), aged 45, had been using pen insulin therapy regularly. Insulin therapy is used to control very high blood sugar levels. Although Mrs. N had been using insulin pens regularly, her blood sugar level before the intervention was still very high at 400 mg/dL, indicating that her blood sugar control was not optimal. After being given boiled soursop leaves for 14 days, her blood sugar level decreased to 356 mg/dL, a decrease of 44 mg/dL.

CONCLUSION

The results of this study indicate that the administration of soursop leaf decoction significantly affects the reduction of blood glucose levels in patients with diabetes mellitus. This evidence is evident from the average decrease in blood sugar levels after intervention, which was 35.8 mg/dL over 14 days of treatment, with a *paired-test* significance value of 0.000 ($p < 0.05$).

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