

The Effect of Providing Local Plant-Based Herbal Drinks on Glycemic Control in Type 2 Diabetes Mellitus Patients in Tanah Merah Village, Badar District, Southeast Aceh Regency

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Type 2 Diabetes Mellitus (DM) is a chronic metabolic disease characterized by elevated blood glucose levels due to impaired insulin secretion and insulin resistance. The increasing prevalence of Type 2 DM is influenced by unhealthy lifestyles, lack of physical activity, and changes in people's dietary patterns. One effort to control blood sugar levels is the use of local herbal plants as complementary therapy. This study aims to analyze the effect of providing herbal drinks based on local plants on glycemic control in patients with Type 2 DM in Tanah Merah Village, Badar District, Southeast Aceh Regency. This study used a quantitative method with a quasi-experimental design through a one-group pretest-posttest design. A sample of 60 respondents was selected using a purposive sampling technique. Data collection was carried out by examining blood glucose levels before and after administering the herbal drink based on local plants using a glucometer. Data analysis used a paired t-test with a significance level of 0.05. $\alpha = 0.05$. The results of the study showed that the average blood glucose level before giving herbal drinks was 238.6 mg/dL and after the intervention decreased to 187.3 mg/dL. The results of the statistical test obtained a p-value = 0.000 ($p < 0.05$), indicating that there was a significant effect of giving local plant-based herbal drinks on glycemic control in Type 2 DM patients. A decrease in blood glucose levels of 51.3 mg/dL indicates that local plant-based herbal drinks have the potential to help control blood sugar levels in Type 2 Diabetes Mellitus patients. The results of this study are expected to be a source of information for the public and health workers regarding the use of local herbal plants as complementary therapy in controlling Type 2 Diabetes Mellitus.

Keywords: Herbal drinks, glycemic control, Type 2 Diabetes Mellitus

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1. Introduction

Type 2 diabetes mellitus (DM) is a non-communicable disease that continues to increase in various countries, including Indonesia. Type 2 DM is characterized by impaired glucose metabolism due to insulin resistance and decreased pancreatic beta cell function, leading to chronically elevated blood sugar levels. (Goyal et al., 2023) Uncontrolled hyperglycemia can cause complications such as cardiovascular disease, nephropathy, neuropathy, retinopathy, and a decrease in the patient's quality of life. (Antar et al., 2023). According to Ahmed et al. (2024) The increase in cases of Type 2 DM is influenced by changes in people's lifestyles, lack of physical activity, unhealthy eating patterns, and low public awareness in controlling blood sugar levels.

Glycemic control in patients with type 2 diabetes is generally achieved through pharmacological therapy, dietary management, physical activity, and lifestyle modifications. Long-term use of antidiabetic medications leads to dependency, increased treatment costs, and the risk of side effects. Therefore, people are increasingly utilizing complementary therapies based on natural ingredients as an adjunct to their treatment. (Sriraman et al., 2023). Study Estiasih et al. (2025), the use of local herbal plants is an alternative

because it is considered easier to obtain, economical, and has long been used traditionally by the Indonesian people.

Several local plants are known to contain bioactive compounds that have the potential to help control blood glucose levels. Keumala et al. (2024) Bay leaves contain flavonoids, tannins, and essential oils which act as antioxidants and help glucose metabolism. Yang et al. (2026) Cinnamon contains cinnamaldehyde and polyphenols, which can increase insulin sensitivity and help lower blood sugar levels. Red ginger contains gingerol and shogaol, which have anti-inflammatory and antioxidant properties, thus helping improve metabolism in diabetic patients. (Sharma et al., 2023) The combination of these ingredients in a brewed herbal drink has the potential to be a practical and easy-to-consume complementary therapy.

Southeast Aceh Regency is one of the regions that still maintains the use of traditional herbal plants in maintaining health. Tanah Merah Village, Badar District, is an area where the community is quite familiar with the use of local plants as traditional medicine, but its use has not been carried out in a standardized manner and has not been widely studied scientifically, especially regarding its effect on glycemic control in patients with Type 2 Diabetes Mellitus. Therefore, this study was conducted to analyze the effect of providing herbal drinks based on local plants on glycemic control in patients with Type 2 Diabetes Mellitus in Tanah Merah Village, Badar District, Southeast Aceh Regency.

2. Methods

This study used a quantitative design with a quasi-experimental approach through a one-group pretest-posttest design. This design was used to determine the effect of providing local plant-based herbal drinks on glycemic control in Type 2 DM patients by measuring blood glucose levels before and after the intervention was given. The study population was all Type 2 DM patients in Tanah Merah Village, Badar District, Southeast Aceh Regency, totaling 60 people based on data from the local Community Health Center. The sampling technique used purposive sampling with a sample size of 60 respondents. Inclusion criteria included patients who had been diagnosed with Type 2 DM, aged ≥ 30 years, able to communicate well, willing to be respondents, and following the intervention until completion. Exclusion criteria included patients with severe complications and patients who were taking other herbal therapies during the study.

The study was conducted from March 2 to April 30, 2026, in Tanah Merah Village, Badar District, Southeast Aceh Regency. The intervention involved regularly providing herbal drinks based on local plants throughout the study period. Blood glucose levels were measured before and after the intervention (pretest) using a glucometer. The research instruments included a glucometer to measure blood glucose levels, an observation sheet to monitor respondents' compliance with the herbal drink, and a Standard Operating Procedure (SOP) to ensure uniform preparation and administration of the herbal drink.

Data analysis was performed using Microsoft Excel and SPSS. Univariate analysis was used to describe respondent characteristics and the distribution of research variables in the form of frequencies, percentages, means, and standard deviations. Bivariate analysis was performed using paired t-tests with a significance level of 0.05. $\alpha = 0.05$ to determine the effect of providing local plant-based herbal drinks on glycemic control in Type 2 DM patients

3. Results and Discussion

Results

Table 1. Frequency Distribution of Respondent Characteristics (n=60)

Variables	Frequency f	Percentage (%)
Age		

Variables	Frequency f)	Percentage (%)
30 – 45 years	28	46.7
46 – 60 years	22	36.7
> 60 years	10	16.7
Gender		
Man	24	40.0
Woman	36	60.0
Long time suffering from Type 2 DM		
< 5 years	21	35.0
5 – 10 years	29	48.3
> 10 years	10	16.7
Total	60	100

Table 1 shows that most respondents were in the 30–45 years age group (46.7%), female (60.0%), and had suffered from Type 2 DM for 5–10 years (48.3%).

Table 2. Analysis of Glucose Levels Before and After Giving Herbal Drinks

Variables	Mean	Elementary School	Min	Max
Pretest Blood Glucose Level	238.6 mg/dl	32.4	185	310
Posttest Blood Glucose Levels	187.3 mg/dL	28.7	140	250

Table 2 shows that the average blood glucose level before administering the local plant-based herbal drink was 238.6 mg/dL with a standard deviation of 32.4 mg/dL. After the intervention, the average blood glucose level decreased to 187.3 mg/dL with a standard deviation of 28.7 mg/dL.

Table 3. Effect of Providing Local Plant-Based Herbal Drinks on Glycemic Control in Type 2 DM Patients

Variables	Mean	Elementary School	p-value
Pretest	238.6	32.4	0,000
Posttest	187.3	28.7	

Table 3 shows that the results of the paired t-test obtained a p-value = 0.000 ($p < 0.05$), so it can be concluded that there is a significant effect of providing herbal drinks based on local plants on glycemic control in Type 2 DM patients in Tanah Merah Village, Badar District, Southeast Aceh Regency. This study showed a decrease in average blood glucose levels of 51.3 mg/dL after providing herbal drinks based on local plants.

Discussion

The results of the study in Table 3 show that the p-value is 0.000 ($p < 0.05$), meaning there is a significant effect of providing herbal drinks based on local plants on glycemic control in patients with Type 2 Diabetes Mellitus (DM) in Tanah Merah Village, Badar District, Southeast Aceh Regency. The average blood glucose level of respondents before the intervention was 238.6 mg/dL, while after the administration of the herbal drink it decreased to 187.3 mg/dL. These results indicate a decrease in the average blood glucose level of 51.3 mg/dL after respondents consumed herbal drinks based on local plants regularly during the intervention period. The results of this study are in line with studies Husna et al. (2025), giving herbal drinks made from local plants can help lower blood sugar levels in Type 2 DM patients through the content of active compounds such as flavonoids, saponins, and antioxidants. Karunakaran et al. (2025) Traditional herbal therapy has hypoglycemic effects that can help improve insulin sensitivity and reduce insulin resistance in people with diabetes. Ni et al. (2024) Regular consumption of herbs can help improve glucose metabolism and maintain stable blood sugar levels in Type 2 DM patients.

Local herbal plants contain various bioactive compounds that play a role in controlling blood glucose levels. Flavonoids function as antioxidants, helping protect pancreatic cells from damage caused by oxidative stress. Alkaloids and polyphenols can help enhance insulin function, allowing glucose to more easily enter the body's cells and prevent it from accumulating in the blood. (Bouyahya et al., 2024). According to Dilworth et al. (2024) The antioxidant content in herbal plants can improve the body's metabolic function and reduce complications caused by diabetes.

The use of local herbal plants as complementary therapy has benefits in controlling blood glucose levels when combined with a healthy diet and adherence to treatment. (Prasopthum et al., 2022). Regular use of herbs provides more optimal effects than irregular use. According to Krsnik & Erjavec (2024), Understanding of medicinal plants has a strong influence on the routine and sustainable use of medicinal plants.

According to the researchers' analysis, the significant effect of administering local plant-based herbal drinks on glycemic control suggests that herbal therapy can be used as an alternative complementary therapy in the management of Type 2 Diabetes Mellitus. The reduction in blood glucose levels in respondents was influenced by the active compounds contained in herbal plants that can help insulin function and improve glucose metabolism in the body. Furthermore, respondents' compliance in consuming herbal drinks throughout the study was a key factor in the success of lowering blood sugar levels.

The use of local plants as herbal drinks has potential for community development due to their easy availability, relative affordability, and long-standing use as traditional medicine. With the proper and regular use of local herbal plants, patients with Type 2 diabetes can more easily control their blood sugar levels, thereby minimizing the risk of diabetes complications.

4. Conclusion

Based on the results of the study, it can be concluded that the average blood glucose level of Type 2 DM patients before administering local plant-based herbal drinks was 238.6 mg/dL and after the intervention decreased to 187.3 mg/dL. The results of the paired t-test statistical test showed a p-value = 0.000 ($p < 0.05$), so there is a significant effect of administering local plant-based herbal drinks on glycemic control in Type 2 DM patients in Tanah Merah Village, Badar District, Southeast Aceh Regency. Local plant-based herbal drinks have the potential to be used as a complementary therapy in helping control blood sugar levels in Type 2 Diabetes Mellitus patients. The use of local herbal plants is expected to be an alternative that is easily accessible to the community and supports the development of traditional medicine based on local wisdom.

5. References

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