



The Application of Cherry Leaf (*Muntingia calabura* L.) Decoction in Reducing Blood Glucose Levels Among Patients with Type 2 Diabetes Mellitus

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Abstract: Diabetes Mellitus (DM) is a chronic metabolic disease characterized by elevated blood glucose levels resulting from impaired insulin secretion or insulin action. One potential non-pharmacological approach to support blood glucose control is the administration of cherry leaf (*Muntingia calabura* L.) decoction, which contains bioactive compounds such as flavonoids, chalcones, and tannins. This study aimed to determine the application of cherry leaf decoction in reducing blood glucose levels among patients with Type 2 Diabetes Mellitus at Aroel Wound Care Clinic, Blang Bintang District, Aceh Besar Regency. A case study design with a nursing care approach was employed, involving two patients with Type 2 Diabetes Mellitus whose random blood glucose levels ranged from 250–300 mg/dL. The intervention consisted of administering cherry leaf decoction regularly for seven consecutive days. Data were collected through interviews, observations, and blood glucose measurements before and after the intervention. The results demonstrated a reduction in blood glucose levels in both subjects, from 275 mg/dL to 198 mg/dL in Subject I and from 280 mg/dL to 220 mg/dL in Subject II. The application of cherry leaf decoction demonstrated potential in helping reduce blood glucose levels and may be considered a complementary nursing intervention for patients with Type 2 Diabetes Mellitus, while continuing prescribed medical therapy.

Keywords: Type 2 Diabetes Mellitus, cherry leaves, blood glucose level, non-pharmacological therapy, nursing care.

Introduction

Diabetes Mellitus (DM) is a metabolic disorder characterized by hyperglycemia associated with abnormalities in carbohydrate, fat, and protein metabolism. It is caused by impaired insulin secretion, decreased insulin sensitivity, or both, and may lead to chronic complications, including cardiovascular disease and neuropathy. Clinically, an individual may be diagnosed with Diabetes Mellitus when presenting with characteristic symptoms, including polyphagia (increased hunger), polydipsia (excessive thirst), and polyuria (increased frequency of urination), which may

be accompanied by unexplained weight loss. These clinical manifestations are associated with persistent hyperglycemia resulting from impaired insulin secretion, reduced insulin sensitivity, or a combination of both mechanisms. by a fasting blood glucose level of >126 mg/dL or a 2-hour plasma glucose level of >200 mg/dL following the ingestion of 75 g of glucose (Tandra, 2017).

The normal fasting blood glucose level ranges from 60–120 mg/dL. Individuals with blood glucose levels exceeding 140 mg/dL are considered to be at high risk of developing diabetes mellitus (Susanto, 2017).

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Diabetes is a metabolic disorder caused by defects in insulin secretion, insulin action, or both, resulting in elevated blood glucose concentrations (hyperglycemia) (Habtewold et al., 2016). Diabetes Mellitus (DM) is classified as a non-communicable disease (NCD) and has become a major public health concern at the global, regional, national, and local levels. It is one of the metabolic diseases with the fastest-growing prevalence, with the number of affected individuals continuing to increase each year in countries around the world.

According to the World Health Organization (World Health Organization [WHO], 2016), diabetes mellitus is a serious chronic disease that occurs when the pancreas does not produce sufficient insulin (the hormone that regulates blood glucose levels) or when the body cannot effectively use the insulin it produces. Diabetes mellitus is a major public health concern and is recognized as one of the four priority non-communicable diseases (NCDs) targeted for action by world leaders. The number of diabetes cases and its prevalence have continued to increase over the past several decades.

The Ministry of Health of the Law of the Republic of Indonesia Number 17 of 2023 on Health Jakarta, Indonesia: Government of the Republic of Indonesia, reported that the prevalence of diabetes mellitus continues to increase, with approximately 422 million people worldwide currently living with the disease. Diabetes mellitus is most commonly found among middle-aged and older adults and has a high prevalence among South Asian populations. In Indonesia, the prevalence of diabetes mellitus (DM), based on physician diagnosis among individuals aged ≥ 15 years, increased from 1.5% in 2013 to 2.0% in 2018.

In Indonesia, the prevalence of diagnosed diabetes mellitus is 1.5%, while the combined prevalence of diagnosed diabetes mellitus and individuals presenting with diabetes-related symptoms is 2.1%. The highest combined prevalence of diagnosed diabetes mellitus and symptomatic cases was reported in DKI Jakarta, reaching 3.4% (Riskasdas, 2018). The increasing prevalence of diabetes mellitus has led to its inclusion among the ten leading causes of disease and has contributed significantly to diabetes-related mortality (Bustan, 2015).

According to the Aceh Health Profile 2021, there were 184,527 individuals diagnosed with diabetes mellitus in Aceh Province, of whom 97,131 (53%) received healthcare services in accordance with the national standards. Furthermore, the prevalence of diabetes mellitus in Aceh was reported to be 2.6%, ranking the province eighth among all provinces in Indonesia, compared with the national prevalence of 2.1% (Miko et al., 2017).

The management of diabetes mellitus can be carried out through both pharmacological and non-pharmacological approaches. Pharmacological therapy involves the use of medications to treat or manage a health condition and is widely used in the treatment of chronic diseases, infections, and various other medical conditions. Among non-insulin antidiabetic medications, the biguanide class is one of the primary therapeutic options, with metformin being the most commonly prescribed drug for patients with diabetes mellitus. Therefore, appropriate management and treatment are essential to reduce blood glucose levels through both pharmacological and non-pharmacological interventions (Widiasari, Wijaya, & Suputra, 2021).

Non-pharmacological therapy is an effective approach for managing diabetes mellitus. Several non-pharmacological interventions have been reported to help control blood glucose levels, including soy milk consumption, Madagascar periwinkle (*Catharanthus roseus*) root, 30 minutes of walking, acupressure therapy, and cherry leaf (*Muntingia calabura* L.) decoction (Aryani et al., 2021).

Cherry leaves (*Muntingia calabura* L.) are widely available and commonly found in many regions, where the trees are cultivated or grow naturally in the wild. Although the fruit is well known and commonly consumed, the leaves have also been reported to possess medicinal properties, particularly in reducing blood glucose levels. Cherry leaves contain various bioactive compounds with antihyperglycemic effects, including flavonoids, chalcones, and tannins. Flavonoids are believed to inhibit glucose absorption in the intestine, thereby reducing the amount of glucose absorbed into the bloodstream and contributing to improved glycemic control (Nova Rahmawati, 2025).

Based on a preliminary survey conducted by the researcher through an interview with the owner of Aroel Wound Care Clinic, approximately 60 patients with complaints related to Diabetes Mellitus routinely seek treatment at the clinic. The patients were predominantly aged between 45 and 55 years, comprising 32 male patients and 28 female patients, with random blood glucose levels ranging from 150 to 200 mg/dL. Furthermore, interviews with five patients revealed that Diabetes Mellitus was associated with several contributing factors, including dietary patterns, obesity, and genetic predisposition. The patients reported various clinical complaints, including tingling or numbness in the hands and feet, muscle cramps, polyuria, headaches, and fatigue.

Method

This study employed a descriptive research design with a case study approach. Descriptive research is a research method intended to systematically describe a phenomenon or condition under investigation and to

provide an overview of the magnitude and characteristics of the problem being studied. This approach is commonly used to identify and describe problems occurring in a specific context and to provide an appropriate basis for addressing existing conditions (Swarja, 2015).

The research was conducted through several systematic stages, including data collection, data classification, data processing, data analysis, and the formulation of conclusions and research reports. The study aimed to evaluate the implementation of cherry leaf (*Muntingia calabura* L.) decoction as a complementary intervention in reducing blood glucose levels among patients with Type 2 Diabetes Mellitus.

The purpose of this case study was to intervention he implementation of cherry leaf (*Muntingia calabura* L.) decoction in reducing blood glucose levels among patients with Type 2 Diabetes Mellitus at Aroel Wound Care Clinic, Gampong Cot Mancang, Blang Bintang District, Aceh Besar, Indonesia. Two participants were selected as the case study subjects, referred to as Subject I and Subject II. Both participants met the predetermined inclusion criteria, including willingness to participate in the study and the ability to cooperate throughout the research process. Subject I was 45 years old, while Subject II was 48 years old.

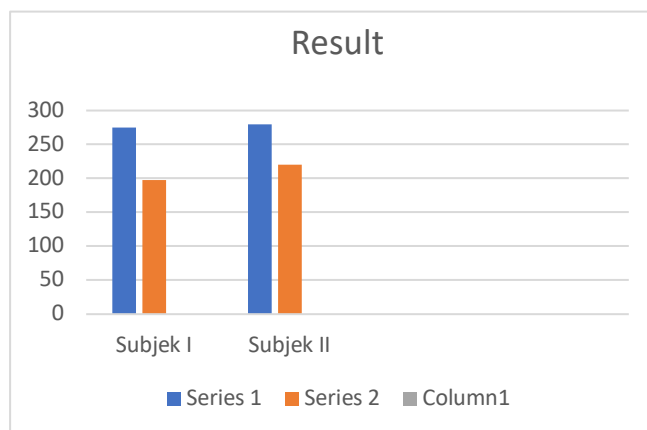
The inclusion criteria for this study were participants with blood glucose levels of 289–299 mg/dL, who had never previously received cherry leaf (*Muntingia calabura* L.) decoction therapy, had no contraindications to the intervention, had no known allergy to cherry leaf decoction, and were not receiving insulin therapy.

The study was conducted from September 8 to 14, 2025, at Aroel Wound Care Clinic. During the study period, the researcher administered cherry leaf (*Muntingia calabura* L.) decoction as a complementary intervention to support the reduction of blood glucose levels among patients with Type 2 Diabetes Mellitus Gampong Cot Mancang, Blang Bintang District, Aceh Besar, Indonesia, for seven consecutive days.

The instruments used in this case study included an informed consent form, an assessment form, a standard operating procedure (SOP), an observation checklist, a glucometer (GlucoCheck), and cherry leaves (*Muntingia calabura* L.).

Result and Discussion

Based on the results of the study, the implementation of cherry leaf (*Muntingia calabura* L.) decoction was found to reduce blood glucose levels among patients with Type 2 Diabetes Mellitus at Aroel Wound Care Clinic.



Blood Glucose Level Results in Patients with Type 2 Diabetes Mellitus .

Based on Figure 1, a reduction in blood glucose levels was observed in both Subject I and Subject II from the first day to the third day of the intervention. In Subject I, the blood glucose level decreased from 275 mg/dL before the intervention to 198 mg/dL after the intervention. Similarly, in Subject II, the blood glucose level decreased from 280 mg/dL before the intervention to 220 mg/dL after the intervention.

The results of this study demonstrated that the administration of cherry leaf (*Muntingia calabura* L.) decoction reduced blood glucose levels in both participants with Type 2 Diabetes Mellitus. According to the researcher's interpretation, cherry leaf decoction is effective in lowering blood glucose levels because it contains flavonoids, which are believed to enhance insulin secretion and help regulate blood glucose levels in patients with diabetes mellitus.

This finding is supported by Nawir (2021), who reported that the flavonoid and saponin compounds present in kersen leaves act as antioxidants, thereby stimulating insulin secretion, which is essential for glucose metabolism. Consequently, regular consumption of kersen leaf decoction may help reduce blood glucose levels.

Several factors contributed to the elevated blood glucose level in Subject I, including genetic predisposition (heredity), an unhealthy lifestyle characterized by the consumption of high-fat foods, and the frequent intake of caffeinated beverages, particularly coffee.

The increase in blood glucose levels observed in Subject I was primarily associated with genetic predisposition, as the participant's mother also had diabetes mellitus. According to the researcher's assumption, hereditary factors may contribute to the development of diabetes mellitus due to genetic abnormalities inherited from one or both parents who have the disease.

This finding is consistent with the theory proposed by Imelda (2018), who stated that individuals with one or more family members—such as parents, siblings, or children—diagnosed with diabetes mellitus

have a higher risk of developing the disease than those without a family history of diabetes mellitus.

Another factor contributing to the elevated blood glucose level in Subject I was an unhealthy lifestyle, particularly the frequent consumption of high-fat foods. According to the researcher's assumption, a high-fat diet may increase blood cholesterol levels, which is a major risk factor for obesity. Obesity, in turn, can promote insulin resistance, thereby increasing the risk of developing diabetes mellitus.

This finding is consistent with the theory proposed by Suprapti (2017), who stated that excessive dietary fat intake is one of the contributing factors to insulin resistance and overweight. Therefore, the consumption of fried foods or foods prepared with excessive amounts of oil should be limited.

Another factor contributing to the elevated blood glucose level in Subject I was the frequent consumption of caffeinated beverages, such as coffee and tea. According to the researcher's assumption, the habitual intake of sugar-sweetened caffeinated beverages may contribute to the development of insulin resistance when the body is unable to use insulin effectively. Consequently, individuals who regularly consume these beverages without adequate physical activity may have an increased risk of developing diabetes mellitus.

This finding is consistent with the theory proposed by Wahidah (2022), who stated that the frequent consumption of sugar-sweetened beverages may promote chronic inflammation by activating inflammatory pathways, which can subsequently lead to long-term insulin resistance. Furthermore, the high content of rapidly absorbable carbohydrates in sugar, the primary component of sugar-sweetened beverages, may contribute to the development of diabetes mellitus.

Several factors contributed to the elevated blood glucose level in Subject II, including physical inactivity, obesity, and a family history of diabetes mellitus, as both of the participant's parents had been diagnosed with the disease.

Another factor associated with the increased blood glucose level was physical inactivity. The participant reported rarely engaging in physical exercise, including aerobic exercise and walking. According to the researcher's assumption, insufficient physical activity may increase the risk of developing diabetes mellitus. An imbalance between excessive nutritional intake and inadequate physical activity can contribute to obesity, which, in turn, may lead to elevated blood glucose levels through the development of insulin resistance.

This finding is consistent with the theory proposed by Cicilia (2018), who stated that physical activity is an important component of a healthy lifestyle and can be performed by individuals of all ages. During

physical activity, skeletal muscles increase glucose uptake and utilization, thereby enhancing glucose metabolism and contributing to a reduction in blood glucose levels.

Another factor contributing to the elevated blood glucose level in Subject II was obesity, as the participant had a body weight of 90 kg. According to the researcher's assumption, excessive body fat is one of the major risk factors for diabetes mellitus because excess adipose tissue reduces the body's ability to use insulin effectively, leading to insulin resistance and an increased risk of developing diabetes mellitus.

This finding is consistent with the theory proposed by Masi (2018), who stated that obesity is closely associated with unhealthy dietary habits and a sedentary lifestyle. Obesity contributes to increased insulin resistance, which impairs glucose uptake by skeletal muscle and adipose tissue, resulting in elevated blood glucose levels.

Another factor contributing to the elevated blood glucose level in Subject II was genetic predisposition, as both of the participant's parents had been diagnosed with diabetes mellitus. According to the researcher's assumption, a family history of diabetes mellitus is an important determinant of an individual's health risk. Individuals with a family history of diabetes have a greater likelihood of developing the disease than those without such a family history.

This finding is consistent with the theory proposed by Irwan (2021), who stated that individuals with family members diagnosed with diabetes mellitus are at an increased risk of developing the disease. Furthermore, the closer the biological relationship to the affected family member, the greater the individual's risk of developing diabetes mellitus.

Based on the study findings, both participants experienced a reduction in blood glucose levels after consuming cinnamon infusion. Several factors may have contributed to the successful reduction in blood glucose levels among patients with diabetes mellitus, including adherence to the therapeutic intervention and family support.

One of the key factors contributing to the success of the intervention was participants' adherence to the treatment protocol. Both Subject I and Subject II complied with all study procedures and consistently consumed the kersen leaf decoction for seven consecutive days as instructed. This high level of adherence contributed to the successful implementation of the intervention.

According to Rahmatillah (2019), treatment adherence can be defined as a patient's actions in utilizing pharmacological and non-pharmacological therapies and complying with all rules and advice recommended by healthcare professionals—factors closely linked to the patient's recovery.

Based on the researchers' assumptions supported by relevant journals and studies adherence to the intervention is a key factor in its success; the more consistently and faithfully the subject consumes the provided kersen (Jamaica cherry) leaf decoction, the more optimal the results will be.

Family support also contributes to the success of this intervention. Research findings indicate that the subject received full support from their family throughout the process; family members consistently encouraged the subject to maintain the regimen of drinking the kersen leaf decoction and frequently reminded them to avoid consuming foods and beverages high in sugar.

This finding is consistent with the study conducted by Aprilianawari and Wahyuni (2022), who reported that family support plays a crucial role in the successful implementation of therapeutic interventions and provides motivation for patients to maintain adherence to treatment for diabetes mellitus.

According to the researcher's assumption, family support is also an important factor influencing the success of diabetes mellitus management. This is because family members provide emotional support, encouragement, motivation, and reminders for patients to consume kersen leaf decoction as a complementary non-pharmacological intervention to help reduce blood glucose levels in patients with type 2 diabetes mellitus.

Conclusion

Based on the findings of this case study and the discussion regarding blood glucose reduction in patients with diabetes mellitus, it can be concluded that the administration of kersen leaf decoction was associated with a reduction in blood glucose levels in both participants. Blood glucose levels in Subject I decreased from 275 mg/dL to 198 mg/dL, while those in Subject II decreased from 280 mg/dL to 220 mg/dL following the intervention.

The administration of cherry leaf (*Muntingia calabura* L.) decoction may provide greater benefits in supporting blood glucose control among patients with Diabetes Mellitus when combined with a healthy lifestyle. This includes adherence to a balanced and nutritious diet, regular physical activity, and compliance with prescribed pharmacological therapy and other recommended diabetes management strategies. The integration of complementary interventions with appropriate lifestyle modifications may contribute to more effective glycemic control and improve overall diabetes management.

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Author Contributions

M.Satria Asyiyi: Conceptualization, methodology, investigation, data collection, data curation, formal analysis, interpretation of the findings, writing original draft preparation, and manuscript preparation.

Fakruddin: Supervision, methodology, validation, critical review of the manuscript, writing review and editing, and final approval of the manuscript.

Both authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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Conflicts of Interest

The authors declare that there are no conflicts of interest associated with the conduct of this study or the publication of this article. This study was conducted independently for academic purposes, without any financial, commercial, or personal relationships that could have influenced the study design, data collection, data analysis, interpretation of the findings, or the decision to publish the results.

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