Journal Getsempena Health Science Journal
Volume 3, Number 1, 2024 pp. 90-96
P-ISSN: - E-ISSN: 2964-4402
Open Access: https://ejournal.bbg.ac.id/ghsj

APPLICATION OF BOILED BEAN WATER IN REDUCING BLOOD SUGAR LEVELS IN TYPE 2 DIABETES MELLITUS PATIENTS

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ARTICLE INFO

Article history:
Received : Jan 19, 2024
Revised : Feb 21, 2024
Accepted : Mar 23, 2024
Available online : Mar 30, 2024

Keywords:
Boiled bean water, Blood sugar levels, Type 2 diabetes mellitus.

ABSTRACT

Type II diabetes is metabolic disorder stemming from endocrine marked with a glycemic imbalance. Decoction of soursop leaves is an intervention in lowering blood sugar levels in patients with type 2 diabetes mellitus. To prevent such complications, it could be overcome with one of the non - pharmacological therapies used in bean stew. The study was intended to illustrate the application of beans' boiled water in reducing blood sugar in diabetes patients with type 2. Respondents in this study were 2 diabetes mellitus patients with the criteria of diabetes mellitus patients who were willing to be respondents and were cooperative, composmentist awareness, famale aged 40-45 years, who experienced increased blood sugar (>200 mg/dL). Research has found that bean stew therapy is effective in reducing blood sugar in diabetes patients. On the subject I was given a blood-sugar therapy 382 milligrams is moderate after administering blood-sugar therapy to 300 milligrams. And the subject will be obtained before treatment with blood sugar levels of 260 mg/ dl, while administered with blood-sugar therapy to 207 mg/ dl. It is hoped that these bean stew water can be one of the non-pharmacological therapies used in reducing blood sugar in type 2 diabetes patients.

INTRODUCTION

Diabetes Mellitus is a chronic disease characterized by random blood glucose levels equal to or greater than 200 mg/dl, and fasting blood glucose levels above or equal to 130 mg/dl (Padila, 2013). Hyperglycemia is marked by weight loss, polyuria, polydipsia, and sometimes polyphagia, as well as blurred vision (American Diabetes Association, 2020). Around 442 million people worldwide suffer from diabetes, most of whom live in low- and middle-income countries, and 1.5 million deaths are directly attributed to diabetes each year. Both the number of cases and the prevalence of diabetes have continued to increase over the past few decades (WHO, 2020).

The Indonesian population aged over 20 years is 133 million, with a prevalence of diabetes mellitus of 14.7% in urban areas and 7.2% in rural areas. It is estimated that in 2003 there were 8.2 million diabetes patients in rural areas. Based on population growth patterns, it is projected that by 2030 there will be 194 million people over 20 years old. Assuming the prevalence of diabetes in urban areas (14.7%) and rural areas (7.2%), it is estimated that there will be 28 million diabetes patients in urban areas and 13.9 million in rural areas (Basic Health Research, 2018).

Data from the Aceh Health Office reported that in 2019 there were 138,291 diabetes patients in Aceh, while those who received treatment according to standard procedures were 95,005, or 69% (Aceh Health Office, 2019). Management of diabetes mellitus can be carried out both medically and non-pharmacologically. Medically, diabetes mellitus can be treated with modern drugs and injections. However, alternative therapies can also be used, such as natural treatments utilizing traditional medicinal plants. Traditional medicinal plants commonly consumed by the community include ginger, turmeric, bitter melon, ginseng, cinnamon, and green beans (Dalimartha, 2003).

Green beans (Phaseolus vulgaris) are a type of leguminous vegetable that can be consumed. They have gained more attention as a food rich in phytochemicals beneficial to health, including flavonoids, quercetin, steroids, terpenoids, and trypsin inhibitors. Green beans (Phaseolus vulgaris) are also an excellent source of essential amino acids and help regulate blood glucose (Peter, 2008). The anti-hyperglycemic effect of green beans (Phaseolus vulgaris) can stimulate pancreatic β-cells to secrete more insulin (insulin secretagogue) or increase insulin sensitivity in peripheral tissues, thereby reducing fasting blood glucose levels more rapidly (Faradhila, 2011).

RESEARCH METHODS

The research method used in this study is descriptive with a case study approach. Descriptive research is a research design that portrays the observed phenomenon and illustrates the magnitude of the problem under investigation. This method is often applied to solve or respond to problems encountered in current situations. The research will be carried out through several stages: data collection, classification, processing, drawing conclusions, and reporting (Swarja, 2015). The purpose of this study is to examine the application of boiled green bean water therapy in reducing blood glucose levels in patients with diabetes mellitus. In this study, two respondents were observed at the Istiqomah Wound Care Clinic. The intervention consisted of administering boiled

green bean water to reduce blood glucose levels. The method was carried out using a pre- and post-test design with the administration of boiled green bean water.

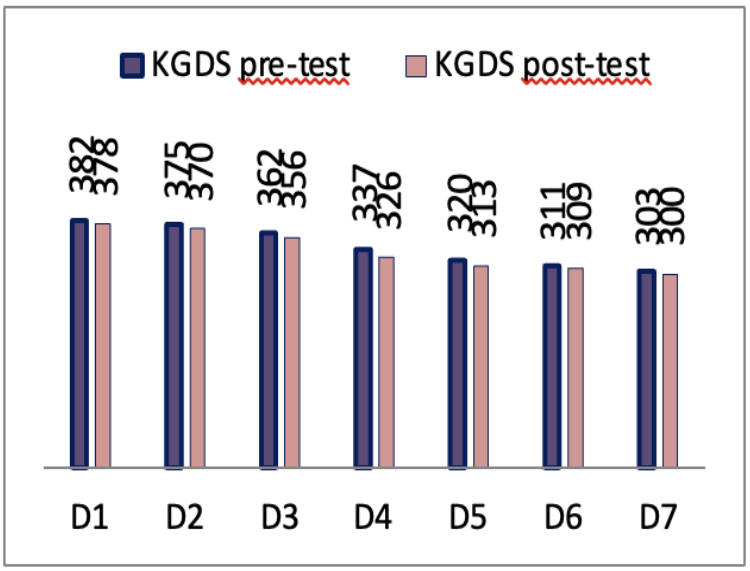
The study was conducted from July 28 to August 10, 2023. The intervention was administered for seven consecutive days, with respondents consuming the boiled preparation once daily in the morning. The preparation consisted of 300 grams of green beans boiled in one glass of water until it reached boiling point. The instruments used in this study included a Standard Operating Procedure (SOP) designed by the researcher, observation sheets, assessment sheets, a glucometer, glucose test strips, alcohol swabs, a kidney dish, a sphygmomanometer, and a stethoscope, which were applied during the administration of the green bean water therapy.

RESULTS AND DISCUSSION

It was found that after the administration of boiled green bean water, the vital signs of Subject I and Subject II were as follows:

Subject I

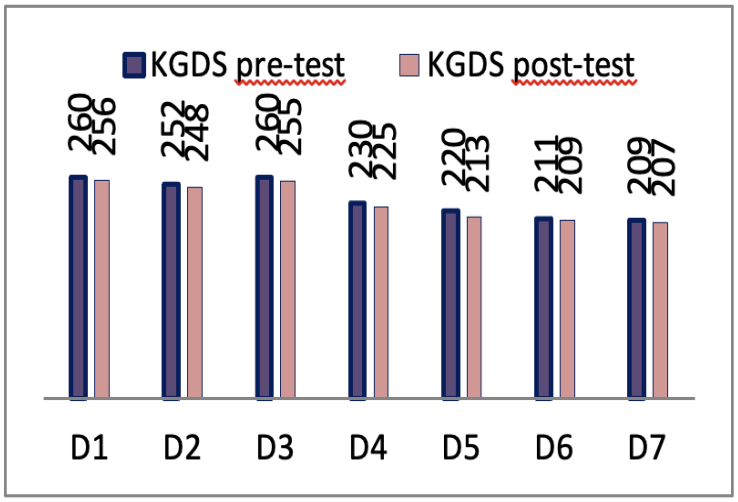
To further clarify the blood glucose level values of Subject I after the administration of boiled green bean water, the results can be illustrated in the following diagram:



Based on Figure I, it was observed that there was a gradual decrease in blood glucose levels in Subject I from the first day to the seventh day, with the final blood glucose level recorded at 300 mg/dL.

Subject II

Furthermore, to clarify the blood glucose level values of Subject II after the administration of boiled green bean water, the results can be illustrated in the following diagram:



Based on Figure II, it was observed that there was a gradual decrease in blood glucose levels in Subject II from the first day to the seventh day, with the final blood glucose level recorded at 207 mg/dL.

DISCUSSION

Based on the administration of boiled green bean water in reducing blood glucose levels in subjects with type II diabetes mellitus, the results showed a change/decrease in blood glucose levels before and after the intervention.

For Subject I, the administration of boiled green bean water resulted in a significant decrease in blood glucose levels, showing steady progress each day. From the first day to the seventh day, the subject experienced a consistent decline in blood glucose levels. The subject reported that they had begun to control their diet by reducing the intake of sweet foods. This is consistent with the theory of Linder (2018), which explains that carbohydrates are digested and absorbed in the form of monosaccharides, mainly glucose. The absorption of glucose leads to an increase in blood glucose levels, and excessive intake of sugars or carbohydrates will further increase the risk of hyperglycemia. The final blood glucose level recorded for Subject I was 300 mg/dL.

For Subject II, after the administration of boiled green bean water for seven consecutive days, a decrease in blood glucose levels was also observed. However, on the third day, there was an increase in glucose levels due to the subject consuming a glucose-containing beverage. This aligns with Yani (2018), who explained that excessive sugar

intake can cause insulin resistance, meaning insulin is unable to properly metabolize glucose into energy, resulting in elevated blood glucose levels and increasing the risk of diabetes mellitus. Nevertheless, after the intervention continued, a decrease in blood glucose levels was observed, with a final level of 207 mg/dL.

When comparing both subjects, Subject I showed a greater reduction in blood glucose levels than Subject II, with a difference of 78 mg/dL. This difference may be attributed to Subject I's better dietary control, particularly in reducing the consumption of sweet foods and beverages. Green beans (Phaseolus vulgaris L) are known to have anti-hyperglycemic properties and can be used as a traditional alternative therapy for diabetes mellitus (Nadira, 2017).

Green beans contain chemical compounds in both the seeds and the pods. The seeds contain glycoproteins, trypsin inhibitors, hemagglutinin, and stigmasterol, while the pods contain quercetin, pelargonidin, cyanidin, malvidin, and myricetin (Nadira & Rasmi, 2017). Another factor supporting the success of therapy in diabetes mellitus patients is family support and adherence to medication. According to Alya Azzahra (2020), family support plays an important role because the family is the closest environment for the individual, providing motivation that strengthens adherence to therapy. In addition, several other factors may influence changes in blood glucose levels in type II diabetes mellitus patients, including age, sex, and dietary habits. Both subjects in this study were in late adulthood, with Subject I aged 48 years and Subject II aged 45 years. According to the researcher's assumption, aging contributes to reduced insulin production and sensitivity, leading to increased blood glucose levels. Tandra (2018) noted that physiological decline typically begins at ages 30–40 and becomes more pronounced after age 45, especially when accompanied by overweight and obesity. In Indonesia, most diabetes mellitus patients are between 30 and 47 years old, accounting for 25.3%, with risk increasing with age.

Gender also plays a role, as both subjects in this study were female. Women are more prone to diabetes due to a higher proportion of body fat compared to men. This is consistent with the findings of Hadi and Suprayitna (2018), who reported that women have a higher prevalence of diabetes mellitus than men, largely due to greater fat accumulation, which reduces insulin sensitivity in muscle and liver tissues. Almatsier (2005) also emphasized that when blood lipid levels are elevated, insulin is increasingly utilized for fat metabolism, leaving insufficient insulin available for glucose metabolism, thereby raising the risk of diabetes in women. Dietary habits are another key factor

influencing blood glucose levels. Subject I previously consumed many sweet foods and carbohydrate-rich meals, while Subject II reported frequent excessive carbohydrate intake. According to the researcher, poor dietary patterns, including excessive sugar and carbohydrate consumption, contribute to increased blood glucose levels in type II diabetes mellitus patients. Betteng & Mayulu (2014) also confirmed that frequent consumption of sweet foods increases the risk of type II diabetes, as it elevates blood glucose concentrations. Similarly, poor dietary patterns such as high-fat diets have also been shown to raise blood glucose levels.

Another factor supporting the effectiveness of therapy is the frequency of its administration. According to the researcher's assumption, the more routinely the intervention is given, the more effective it becomes, due to the bioactive compounds in boiled green bean water that contribute to lowering blood glucose levels. Therefore, boiled green bean water has been proven to reduce blood glucose levels in patients with diabetes mellitus.

CONCLUSION

After administering boiled string bean water, it can be concluded that this therapy is able to reduce blood glucose levels in patients with type 2 diabetes mellitus. In subject I, blood glucose decreased from 382 mg/dL to 300 mg/dL, while in subject II it decreased from 260 mg/dL to 207 mg/dL. These results indicate that consuming boiled string bean water has the potential to provide optimal effects in lowering blood glucose levels, especially when combined with a healthy lifestyle.

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