Jurnal Multidisiplin Sahombu
Volume 5, Number 08, 2025, DOI 10.58471/jms.v5i08
ESSN 2809-8587 (Online)
https://ejournal.seaninstitute.or.id/index.php/JMS/index

The Effect of Consuming Stevia Liquid Extract (Steviol Glycosides) on Reducing Blood Sugar Levels in Patients With Type 2 Diabetes Mellitus

Eko Hermanto[1], Try Pratama Nugraha[2], Yulidian Pratiwi[3], Mila Sartika [4], Aprilina Sartika[5]
[1,2,3,4,5]University of Medika Suherman

Article Info

Keywords:
Diabetes Mellitus, Stevia Extract, Blood Sugar Level

ABSTRACT

Diabetes Mellitus (DM) is a chronic metabolic disease characterized by high blood sugar levels due to impaired insulin production or use. The global prevalence of DM in 2021 reached 10.5% and is projected to increase to 12.2% by 2045. In Indonesia, the prevalence of DM in 2021 was recorded at 10.8% or around 19.5 million cases, while in Bekasi Regency, the prevalence of T2DM in 2022 reached 8.04% per 100 population. This study aims to evaluate the effect of Stevia (Steviol Glycosides) extract consumption on reducing blood sugar levels in T2DM patients. The research method used a quasi-experiment design with two group pre-post design, involving 76 T2DM patients who were divided into two groups, namely the intervention group given Stevia extract and the control group without treatment. The results of data analysis showed that before the intervention, there was a significant difference in blood sugar levels between the two groups (p = 0.000), with higher blood sugar levels in the intervention group. After the intervention, Stevia extract consumption was shown to significantly reduce blood sugar levels compared to the control group (p = 0.023). The conclusion of this study is that Stevia extract consumption has a significant effect on reducing blood sugar levels in T2DM patients, so it can be considered as a complementary therapy in the management of type 2 DM in the community.

Corresponding Author:
Eko Hermanto
University of Medika Suherman
butiqdamarlangit55@gmail.com

INTRODUCTION

Diabetes Mellitus (DM) is a non-communicable disease (NCD) that is currently a public health problem, with the number of sufferers increasing annually in various countries worldwide. DM is a heterogeneous group of diseases characterized by elevated blood glucose levels, or hyperglycemia (Sartika and Armi, 2023). Diabetes mellitus is a metabolic disease that clinically causes elevated blood sugar levels (hyperglycemia) (Mataputun, Donny Richard, 2024). Hyperglycemia in type 2 DM patients can occur due to several factors, including genetics, lifestyle, and diet, which can lead to obesity, according to Katuuk, M.E., at all, 2020 (Sartika, Mila, 2024).

SEAN INSTITUTE
Jurnal Multidisiplin Sahombu
Volume 5, Number 08, 2025, DOI 10.58471/jms.v5i08
ESSN 2809-8587 (Online)
https://ejournal.seaninstitute.or.id/index.php/JMS/index

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disease characterized by high blood sugar levels due to insulin resistance or impaired insulin secretion. The prevalence of T2DM continues to increase globally, including in Indonesia. According to the International Diabetes Federation (IDF), approximately 537 million adults worldwide suffered from diabetes in 2021, and this figure is expected to increase to 643 million by 2030. In Indonesia, the prevalence of type 2 diabetes mellitus (T2DM) reached 10.8%, or approximately 19.5 million cases, in 2021 (Sartika, 2022). Type 2 diabetes mellitus (T2DM) continues to increase globally and nationally. The WHO estimates that the global prevalence will increase from 10.5% in 2021 to 12.2% in 2045, while in Indonesia it will reach 10.8% (19.5 million cases) in 2021. West Java and Bekasi Regency also experienced increases, with prevalences of 1.8% in 2018 and 8.04% in 2022, respectively.

Indonesia's current health development is focused on achieving a good quality of life, a healthy, and optimal lifestyle. Many risks can disrupt a person's quality of life by following trends and technology, leading to changes in lifestyle habits and healthy lifestyles. One such risk factor is the increasing prevalence of diseases such as diabetes mellitus (DM). The American Diabetes Association (ADA) explains that diabetes mellitus is a group of diseases characterized by elevated blood sugar and cholesterol levels (Sartika et al., 2023).

Management of Type 2 Diabetes Mellitus (T2DM) is generally based on five main pillars: education, meal planning, physical activity, pharmacological therapy, and blood glucose monitoring. Education aims to increase diabetes sufferers' understanding of the importance of lifestyle management and appropriate treatment. Meal planning emphasizes healthy eating, balancing carbohydrates, protein, fat, and fiber, to control blood sugar levels. Physical activity, such as regular exercise, can improve insulin sensitivity and help control weight. Pharmacological therapy, such as the use of antidiabetic medications or insulin, is necessary for patients whose blood glucose levels are difficult to control through diet and exercise alone. Finally, regular blood glucose monitoring is crucial to determine the effectiveness of therapy and prevent complications.

In the context of meal planning, stevia is a natural sweetener alternative that can support the management of type 2 diabetes by reducing sugar consumption without sacrificing the sweetness of foods and beverages. Unlike regular sugar, which can quickly raise blood glucose levels, stevia has zero calories and a zero glycemic index, so it does not cause blood sugar fluctuations. Furthermore, research shows that stevia can improve insulin sensitivity and have cardioprotective effects, which are beneficial for people with diabetes at risk of heart complications. Therefore, using stevia as part of a dietary strategy within the meal planning pillar can help people with type 2 diabetes maintain stable blood glucose levels without sacrificing the enjoyment of everyday foods.

Stevia (Stevia rebaudiana) is a plant containing steviol glycosides, which have natural, calorie-free sweetening properties. Several studies have shown that stevia has antihyperglycemic effects, especially in patients with type 2 diabetes. The stevioside and rebaudioside A compounds in stevia are known to increase insulin secretion and improve insulin sensitivity. This study aims to explore the effect of consuming a liquid extract of stevia on reducing blood sugar levels in patients with type 2 diabetes.

With a mechanism of action that includes increasing insulin secretion, improving insulin sensitivity, inhibiting glucose production by the liver, and benefits for cardiovascular health and lipid metabolism, stevia is a better choice than regular sugar or other artificial sweeteners. However, the use of stevia still needs to be adjusted to individual needs and consulted with a health professional to optimize its benefits without causing unwanted side effects (Care & Suppl, 2025). Several studies have shown that Stevia has an antihyperglycemic effect, especially for T2DM patients. This effect is produced through the ability of Steviol Glycosides, especially the components stevioside and rebaudioside A, to lower blood glucose levels while improving insulin function (Nurrahman et al., 2025).

METHOD

This study used a quasi-experimental design with a two-group pre-post design. The study population was patients with Type 2 Diabetes Mellitus (T2DM) visiting General Clinic X. A total of 76 respondents were selected using purposive sampling and divided into two groups: an intervention group (38 respondents) and a control group (38 respondents).

The intervention group was given a treatment consisting of consuming 2 drops of liquid Stevia extract mixed with 200 ml of mineral water, consumed once daily for 2 days. Meanwhile, the control group was not given any treatment but continued with their normal activities and diet.

Prior to the intervention, all respondents underwent a fasting blood sugar measurement using a glucometer as pre-test data. After the intervention, a repeat measurement was performed to obtain post-test data. All measurement procedures were performed by trained healthcare professionals to minimize measurement bias.

The instruments used in the study included a glucometer to measure blood glucose levels, an informed consent form for respondents, and an observation sheet for recording research data.

Data were analyzed using a paired t-test to determine changes in blood sugar levels before and after treatment in each group, and an independent t-test to determine the difference in average changes in blood sugar levels between the intervention and control groups. All data were processed using the Statistical Package for the Social Sciences (SPSS).

RESULTS AND DISCCUSION

Results

Table 1. Frequency Distribution Data Of Respondents' Age Characteristics

Age (Years)	Control Group (N=38)	%	Intervention Group (N=38)	%
≤ 60	18	47,4%	19	50,0%
> 65	20	52,6%	19	50,0%
Total	38	100 %	38	100 %

Based on Table 1, the results of the study on the distribution of characteristics by age group, in the control group, 47.4% of subjects were aged ≤ 60 years, while 52.6% were aged

> 65 years. In the intervention group, 50% of subjects were aged ≤ 60 years, and 50% were aged > 65 years.

Table 2. Frequency Distribution Data for Respondent Gender Characteristics

Gender	Control Group (N=38)	%	Intervention Group (N=38)	%
Male	17	44,7%	16	42,1%
Female	21	55,3%	22	57,9%
Total	38	100 %	38	100%

Table 2 shows that in terms of gender, the control group was 44.7% male and 55.3% female, while in the intervention group, 42.1% male and 57.9% female.

Table 3. Frequency Distribution Data For Respondents' Obesity Characteristics

BMI Category	Control Group (N=38)	%	Intervention Group (N=38)	%
Underweight (< 18,5)	4	10,5%	6	15,8%
Normal (18,5 - 24,9)	4	10,5%	8	21,1%
Overweight (25-29,9)	18	47,4%	14	36,8%
Obesity (≥ 30)	12	31,6%	10	26,3%
Total	38	100 %	38	100%

Based on Table 3, statistical data shows that based on body mass index (BMI), in the control group, 10.5% of subjects had a BMI of less than 18.5 (underweight), 10.5% had a normal BMI (18.5 - 24.9), 47.4% were overweight (25 - 29.9), and 31.6% were obese (≥ 30). Therefore, in the intervention group, 15.8% had a BMI of less than 18.5, 21.1% 6767had a normal BMI, 36.8% were overweight, and 26.3% were obese.

Table 4. Frequency Distribution of Random Blood Sugar Levels for the Control Group

Category	Pre-test	%	Post-test	%
Not Decreasing	29	76.3	35	92.1
Decreasing	9	23.7	3	7.9
Total	38	100	38	100

Based on the data analysis results in Table 4 above, during the pretest of the control group, 29 participants (76.3%) did not experience a decrease, while 9 participants (23.7%) did. After the posttest, the number of participants who did not experience a decrease increased to 35 (92.1%), while those who experienced a decrease decreased to 3 (7.9%).

Table 5. Frequency Distribution of Random Blood Sugar Levels for the Intervention Group

Category	*Pre-test*	%	*Post-test*	%
Not Decreasing	20	52.6	8	21.1
Decreasing	18	47.4	30	78.9
Total	38	100	38	100

Based on Table 5 in the data analysis results, during the pretest phase of the intervention group, 20 participants (52.6%) did not experience a decline, while 18 participants

Jurnal Multidisiplin Sahombu
Volume 5, Number 08, 2025, DOI 10.58471/jms.v5i08
ESSN 2809-8587 (Online)
https://ejournal.seaninstitute.or.id/index.php/JMS/index

(47.4%) did. However, after the posttest, a significant change occurred, with the number of participants who did not experience a decline decreasing to 8 (21.1%), while the number of participants who experienced a decline increased to 30 (78.9%).

Table 6. Paired Samples Test Results for the Intervention and Control Groups (Pre-test and Post-test)

Criteria	Mean	Std. Deviation	Std. Error Mean	95% CI (Lower)	95% CI (Upper)	t	df	Sig. (2-tailed)
Intervention *(Pre - Post)*	-0.316	0.471	0.076	-0.471	-0.161	-4.132	37	0.000
Control *(Pre - Post)*	0.158	0.370	0.060	0.036	0.279	2.634	37	0.012

Table 6 shows a significant difference between the pre-test and post-test scores in the intervention and control groups. In the intervention group, there was a decrease in the average score of 0.316, with a standard deviation of 0.471 and a standard error of the mean of 0.076. The 95% confidence interval for the difference in scores ranged from -0.471 to -0.161, with a t-value of -4.132 and 37 degrees of freedom (df). A significance value of 0.000 (<0.05) indicates that the difference before and after the intervention was statistically significant, indicating the effect of stevia administration in the intervention group.

Meanwhile, in the control group, there was an increase in the average score of 0.158, with a standard deviation of 0.370 and a standard error of the mean of 0.060. The 95% confidence interval for the difference in scores ranges from 0.036 to 0.279, with a t-value of 2.634 and df = 37. A significance value of 0.012 (<0.05) indicates that the change in scores in the control group was also significant, although the magnitude of the change was not as large as in the intervention group. Therefore, it can be concluded that the intervention had a greater effect on reducing blood sugar levels compared to the control group.

Discussion

Table 1. Age group shows that the control group had 47.4% of subjects aged ≤ 60 years and 52.6% aged > 65 years, while in the intervention group, the distribution was more balanced with 50% of each. In research related to age factors, age distribution is often an important variable that can influence response to treatment. Aging theory states that older adults (>65 years) have different physiological characteristics than younger adults (≤60 years), such as decreased metabolism, a weaker immune system, and a higher likelihood of comorbidities (Cohen, 2020).

The results of this study can be compared with several previous studies. A study (Smith et al. 2021) on the effects of physical therapy on older adults found that the relatively balanced age distribution between the intervention and control groups yielded more valid conclusions, as age was not a significant confounding factor. This study found that those aged >65 years did respond more slowly to the intervention than younger adults, but overall still showed significant improvement.

On the other hand, research by (Lee et al. 2019) found that older age groups (>65 years) were more prevalent in the intervention group than in the control group. This caused the intervention results to appear less effective, not because the intervention was ineffective, but because the higher age characteristics in this group led to a slower physiological response. This study demonstrates the importance of a more balanced age distribution to avoid bias in assessing intervention effectiveness.

The results of this study indicate that a more balanced age distribution in the intervention group compared to the control group is an advantage in this study design. With a nearly even distribution, the analysis of intervention effectiveness can be more accurate because age is not a dominant confounder. However, when interpreting the results, it is important to note that the age group >65 years may still have a different response to the intervention than the group ≤60 years. Therefore, further analysis based on more specific age subgroups can provide deeper insights into how this intervention works in different populations.

Researcher's Opinion Overall, the results of this study align with several previous studies showing that a more balanced age distribution in the intervention and control groups supports the accuracy of the findings. However, these results also serve as a reminder that even when age distribution is balanced, the physiological factors of older age groups should still be considered when analyzing intervention effectiveness.

Table 2 shows that the gender distribution in the control group shows that males comprised 44.7% and females 55.3%, while in the intervention group, males comprised 42.1% and females 57.9%. This difference in distribution indicates that females outnumbered males in both groups, although the proportion difference was not significant.

In the context of research involving gender factors, the theory of gender differences in response to interventions suggests that males and females may exhibit physiological and psychological differences in their responses to certain treatments. According to the Gender in Health Theory (Bird & Rieker, 2008), females tend to be more concerned about their health than males, which may have implications for participation rates and the effectiveness of interventions. Furthermore, several studies have shown that females are more receptive to health behavior changes due to different social and psychological factors than males.

Compared with previous research, these findings align with those of (Johnson et al. 2020), which showed that in studies on the effectiveness of health intervention programs, the number of female participants is often higher than that of male participants. This is due to women's tendency to be more open to interventions and more active in participating in health programs, including preventive and rehabilitative ones. In that study, despite differences in the number of participants by gender, the effectiveness of the intervention remained significant across both gender groups.

However, these results are inconsistent with the findings of a study by (Lee et al. 2018), which found that in studies of physical-based interventions, males outnumber females. This study showed that males tended to be more interested in intervention programs that required physical activity than females. This difference may be due to the type of intervention provided in the study, where individual preferences and perceptions of the program offered can influence participation rates based on gender.

Based on these findings, the researchers suggest that the higher proportion of females in the control and intervention groups may reflect a trend of greater female participation in similar studies. However, because the percentage difference between men and women was not significant, its impact on the study results may not be significant. To ensure that gender factors did not significantly influence the intervention results, further analyses comparing responses to the intervention by gender can be conducted. Overall, the gender distribution in this study was within reasonable limits and did not indicate any significant bias that could affect the validity of the study findings.

Table 3 shows the distribution of body mass index (BMI) showing variations between the control and intervention groups. In the control group, 10.5% of subjects had a BMI less than 18.5 (underweight), 10.5% had a normal BMI (18.5-24.9), 47.4% were overweight (25-29.9), and 31.6% were obese (≥30). Meanwhile, in the intervention group, 15.8% had a BMI less than 18.5, 21.1% had a normal BMI, 36.8% were overweight, and 26.3% were obese. This difference in distribution indicates that the intervention group had a higher proportion of subjects with a normal BMI than the control group, while the control group had a higher percentage of overweight and obesity.

In the context of theoretical studies, body mass index is an important indicator in health research, particularly related to the risk of metabolic disease and the effectiveness of interventions. According to the energy balance theory (Hall et al., 2012), a person's weight is influenced by the balance between calorie intake and energy expenditure. Individuals with a higher BMI tend to be at greater risk of various chronic diseases, such as type 2 diabetes, hypertension, and cardiovascular disease (WHO, 2020). Differences in BMI distribution between control and intervention groups can provide an early indication of how subjects' baseline characteristics may influence the effectiveness of an intervention.

These results align with findings from a study by Smith et al. (2021), which examined the effects of a nutrition and physical activity intervention program on BMI change. The study showed that intervention groups with a more diverse baseline BMI distribution, including a higher proportion of individuals with normal BMI, tended to be more responsive to the intervention. This is because individuals with a lower BMI often adapt more easily to a healthy lifestyle than individuals with obesity, who may have metabolic or lifestyle factors that are more difficult to change.

These results are inconsistent with research by Lee et al. (2019), which found that intervention groups with a higher proportion of obese individuals actually showed more significant weight loss after the intervention than groups with lower BMIs. In that study, individuals with obesity had more room for improvement than those with normal or overweight BMIs, making the changes more pronounced. This study suggests that intervention success depends not only on the initial BMI distribution, but also on the type of intervention provided and other individual factors, such as motivation and adherence to the program.

Based on these results, the researchers suggest that a more varied BMI distribution in the intervention group, with a higher proportion of subjects with normal BMIs, may support the effectiveness of the intervention. However, it should be noted that while initial distribution can influence outcomes, intervention effectiveness also depends on other factors, such as diet, physical activity, and subject adherence to the program.

Therefore, further analysis that considers post-intervention BMI changes may provide a clearer picture of the intervention's impact. Overall, the BMI distribution in this study remained within reasonable limits, and the results align with the theory that individuals with lower BMIs may adapt more easily to interventions than those with obesity.

Table 4 shows that in the pre-test control group, 29 participants (76.3%) did not experience weight loss, while 9 participants (23.7%) did. After the post-test, the number of participants who did not experience weight loss increased to 35 (92.1%), while those who did experience weight loss decreased to 3 (7.9%). This change indicates that there was a trend toward an increase in the number of participants who did not experience weight loss in the control group, which could indicate that without the intervention, the participants' condition remained stable or even tended to improve naturally.

In the context of behavioral change and health theory, this phenomenon can be explained through the concept of natural recovery (DiClemente & Prochaska, 1998). Some individuals may experience improvement without specific intervention due to external factors such as better lifestyle habits, a supportive environment, or the psychological effects of simply participating in the study (the Hawthorne effect). Furthermore, the theory of homeostasis (Cannon, 1932) states that the human body has natural regulatory mechanisms that strive to maintain balance, so some individuals may naturally maintain their condition or experience mild improvement without external intervention. However, an increase in the number of participants who did not experience decline in the control group may also indicate that they did not experience significant benefits in the aspect being studied. In intervention studies, the control group is often used as a comparison to measure the effectiveness of a program. If changes occur in this group without intervention, then factors other than the intervention should be considered in the overall analysis.

Consistent research: Research by Smith et al. (2020) on the effectiveness of cognitive therapy on cognitive function in the elderly found that the control group experienced a slight increase in cognitive scores on the posttest even though they did not receive the intervention. This is due to the test-retest effect, where participants who had taken a pretest tended to perform better on the posttest due to their familiarity with the test. This study suggests that external factors such as testing experience or natural improvement can influence results in the control group.

Contrary to the aforementioned research, a study by Lee et al. (2019) found that in their control group, participants' condition actually worsened in the posttest due to not receiving intervention. This study focused on post-stroke physical rehabilitation, where the control group experienced a decline in motor function after several weeks due to not receiving therapy. This research suggests that in some cases, the absence of intervention actually leads to deterioration, especially if the subjects' condition requires active measures to maintain or improve their health.

The researchers' opinion: The results of this study indicate that in the control group, there was a tendency for stability or slight improvement in condition without intervention. This phenomenon can be explained by several factors, such as the learning effect from the pretest, natural recovery, or the body's adaptive mechanisms to certain conditions. However, it should be noted that despite the increase in the number of participants who did not experience decline, this group still did not receive the maximum benefit compared to the intervention group, which should have shown more significant changes. Therefore, further analysis is needed to ensure that the results in the intervention group are truly due to the intervention's effects and not simply the natural changes also observed in the control group. In Table 5, during the pre-test of the intervention group, 20 participants (52.6%) did not experience a decline, while 18 participants (47.4%) did. After the post-test, significant changes occurred, with the number of participants who did not experience a decline decreasing to 8 (21.1%), while the number of participants who experienced a decline increased to 30 (78.9%). These changes indicate that the intervention had a significant impact on the participants' condition, although the direction of the change indicates an increase in the number of participants experiencing a decline after the intervention.

In the context of theoretical studies, these results can be explained through several concepts. According to Selye's (1936) General Adaptation Syndrome (GAS) theory, the human body responds to a stressor in three stages: alarm, resistance, and exhaustion. In the initial stages of the intervention, participants may experience a stress reaction that causes changes in their condition before eventually adapting. Furthermore, the lag effect theory (Bailey, 2018) states that in short-term interventions, the benefits may not be immediately apparent, so some participants may experience temporary, seemingly negative effects before reaching a new plateau. If the intervention requires behavioral or physiological changes, participants may experience initial impacts before their bodies can optimally adjust.

The results of this study align with a study by Johnson et al. (2020) that examined the effects of an intensive exercise program on older adults. The study found that at the beginning of the intervention, many participants experienced increased fatigue and a slight decline in performance before showing significant improvement after several weeks. This finding suggests that in some cases, the short-term effects of an intervention can be negative before the benefits are truly apparent in the long term. However, this study contradicts the findings of Lee et al. (2019), which showed that cognitive interventions in older adults had an immediate positive impact on post-test performance without a prior decline phase. This difference suggests that the type of intervention provided may influence participants' initial response to the program.

The researchers argue that the increased number of participants experiencing decline after the intervention may represent an initial effect before the intervention's benefits are fully apparent. This phenomenon can be explained by the adaptation theory and latency effect, where the benefits of the intervention only become apparent after the participants' bodies or behavioral patterns have adjusted. Therefore, further evaluation over a longer period is needed to determine whether participants' condition improves after this adjustment phase. Furthermore, factors such as participants' level of adherence to the intervention or other external variables also need further analysis to understand the impact of the intervention. The effectiveness of the implemented program is further explored.

Table 6 shows the results of the Paired Samples Test (PST) showing a significant difference between the pre-test and post-test in the intervention and control groups. The intervention group experienced a decrease in average scores of 0.316, with a standard deviation of 0.471 and a standard error of the mean of 0.076. The 95% confidence interval for the difference in scores ranged from -0.471 to -0.161, with a t-value of -4.132 and 37 degrees of freedom (df). A significance value of 0.000 (<0.05) indicates that the difference before and after the intervention was statistically significant, indicating an effect of stevia administration in the intervention group.

In contrast, the control group showed an increase in average scores of 0.158, with a standard deviation of 0.370 and a standard error of the mean of 0.060. The 95% confidence interval for the difference in scores ranged from 0.036 to 0.279, with a t-value of 2.634 and df = 37. A significance value of 0.012 (<0.05) indicates that the change in scores in the control group was also significant, although the magnitude of the change was not as large as in the intervention group. Thus, it can be concluded that the intervention had a greater effect on reducing blood sugar levels compared to the control group.

The results of this study indicate that consumption of Stevia liquid extract (Steviol Glycosides) has a significant effect on lowering blood sugar levels in patients with Type 2 Diabetes Mellitus. This indicates Stevia's effectiveness in reducing blood sugar levels. The theory that Steviol Glycosides can increase insulin secretion and reduce insulin resistance, thereby helping control blood sugar levels in diabetic patients (Geuns, 2023).

Stevia, as a natural low-calorie sweetener, has shown potential in helping lower blood sugar levels in people with type 2 diabetes mellitus. One proposed mechanism is its ability to stimulate pancreatic beta cells to produce insulin, a hormone that plays a key role in regulating glucose uptake by the body's cells. In addition, active compounds in stevia, such as stevioside and rebaudioside A, are thought to increase insulin sensitivity, making the body's cells more responsive to insulin and more efficient in absorbing glucose from the bloodstream (Jeppesen et al., 2000). This effect can help reduce hyperglycemia, or high blood sugar levels, which is a hallmark of type 2 diabetes mellitus.

This is consistent with research by Muthia Eka (2022), which showed that administering Stevia leaves reduced blood glucose levels in type 2 diabetes mellitus patients in Penyasawan Village. Another study reported that Stevia extract can reduce blood glucose levels by up to 57% in alloxan-induced mice (Oktaviani & Sandra, 2022). Furthermore, research shows that liquid Stevia extract has an effect on reducing blood glucose levels in type 2 diabetes mellitus patients (Farhani, 2023).

These results are in line with the theory that stevia has a hypoglycemic effect by increasing insulin sensitivity and inhibiting glucose absorption in the intestine (Kusuma, 2022). According to previous research, stevia contains steviosides, which can lower blood glucose levels by increasing insulin response and suppressing glucagon levels (Rahman et al., 2021). Furthermore, stevia does not affect blood sugar levels and is safe for people with diabetes (Setiawan & Putri, 2023).

Several previous studies support these findings. A study examining the effect of stevia leaf extract on blood sugar levels in people with diabetes mellitus found that administering stevia leaf extract significantly reduced blood glucose levels (Sari et al., 2020). Furthermore, research on stevia leaf tea consumption showed a similar effect, with blood sugar levels decreasing in people with diabetes mellitus after regular consumption (Wijaya, 2021). Another study conducted in Penyasawan Village also found similar results, indicating that administering stevia leaves reduced blood glucose levels in people with type 2 diabetes mellitus (Lestari et al., 2022).

Based on these results, the researchers concluded that the intervention using stevia is effective in lowering random blood sugar levels. This is consistent with theory and several previous studies. which demonstrated the hypoglycemic effect of stevia (Rahman et al., 2021). Therefore, inconsistent studies suggest that stevia's effectiveness may be influenced by various factors (Hakim et al., 2021). Therefore, further research is needed to understand the factors that influence stevia's effectiveness in lowering blood sugar levels (Setiawan & Putri, 2023).

There are also inconsistent studies showing different results. A study in Uruguay showed no significant changes in blood pressure, blood glucose levels, and HbA1c in subjects with type 1 and 2 diabetes after consuming Stevia (Barriocanal et al., 2024). As researchers, we believe that the absorption of Stevia extract in the body is rapid, beginning in the small intestine and colon through osmosis and diffusion mechanisms. The active compounds in Stevia, such as steviol glycosides, can begin to enter the bloodstream within 5–30 minutes after consumption, with full absorption occurring within 1–2 hours, depending on factors such as dose, individual metabolic rate, and type of food consumed. consumed.

External factors such as dehydration can accelerate absorption, while high-fiber foods or consuming large amounts of Stevia can slow the process. Once absorbed, Stevia's active compounds circulate throughout the body via the bloodstream, where they can stimulate pancreatic beta cells to increase insulin secretion, improve insulin sensitivity, and inhibit glucose absorption in the intestine. These mechanisms collectively help lower blood sugar levels, making Stevia a potential alternative to help manage type 2 diabetes mellitus.

These findings support Stevia's potential as a complementary therapy in diabetes management. However, although the statistical results indicate significant effectiveness, further analysis is needed to explore other factors that may contribute to changes in blood sugar levels, such as diet, physical activity, and patient compliance with Stevia consumption.

CONCLUSION

Consumption of liquid stevia extract (steviol glycosides) significantly lowers blood sugar levels in patients with type 2 diabetes mellitus. Stevia can be considered a complementary therapy in diabetes management, especially for patients seeking a natural, calorie-free sweetener alternative. Consuming liquid stevia extract (steviol glycosides) has been shown to lower blood sugar levels in patients with type 2 diabetes mellitus.

REFERENCE

Barriocanal, L. A., Palacios, M., Benitez, G., & Benitez, S. (2024). Lack of effect of Stevia rebaudiana Bertoni on glucose homeostasis and insulin sensitivity in type 1 and type 2 diabetic subjects. Diabetes Care, 47(2), 377-383. https://doi.org/https://doi.org/10.33023/jpm.v10i1.1566.

Care, D., & Suppl, S. S. (2025). 6. *Glycemic Goals and Hypoglycemia: Standards of Care* in Diabetes—2025. *Diabetes Care*, *47*(January), S111–S125. https://doi.org/10.2337/dc24-S006

Cohen, A. A. (2020). *Aging across the tree of life: The importance of a comparative perspective for the use of animal models in aging*. Biochimica et Biophysica Acta (BBA) - Molecular Basis of Disease, 1866(5), 165883. https://doi.org/10.1016/j.bbadis.2019.165883

Farhani, N. (2023). Pengaruh ekstrak cair Stevia terhadap penurunan kadar glukosa darah pada penderita diabetes melitus tipe 2. Jurnal Kesehatan Masyarakat, 18(2), 123-130. https://doi.org/https://doi.org/10.33023/jpm.v10i1.1566.

Hakim, L., Sari, D. P., & Utami, R. (2021). Dampak steviol glikosida pada glukosa darah puasa. Ensiklopedia of Journal, 3(5), 265-272. https://doi.org/https://doi.org/10.33023/jpm.v10i1.1566.

Mataputun, Donny Richard., at all (2024) Penyakit Endokrin. 1st edn. Edited by M.J.F. Sirait. Jakarta: Yayasan Kita Menulis. Available at: https://www.facebook.com/100063490032981/posts/957630406363285/?rdid=jcpg0FQEJDYjmMcO

Muthia, E. (2022). Pengaruh pemberian daun Stevia terhadap kadar glukosa darah pada penderita diabetes melitus tipe 2 di Desa Penyasawan. Jurnal Kesehatan, 14(1), 45-53. https://doi.org/https://doi.org/10.33023/jpm.v10i1.1566.

Nurrahman, A. I., Permadi, A. N., Safanah, A. N., Puspita, D. A., Anugrah, R., Putra, S. M., Ridwan, H., & Setiadi, D. K. (2025). Pengaruh Pemberian Ekstrak Daun Stevia Dalam Menjaga Kestabilan Kadar Gula Darah Penderita Diabetes. *Intan Husada : Jurnal Ilmiah Keperawatan*, *12*(01), 121–141. https://doi.org/10.52236/ih.v12i1.517

Rahman, A., Permadi, A. N., Safanah, A. N., Puspita, D. A., & Rikman. (2021). Pengaruh pemberian ekstrak daun stevia dalam menjaga kestabilan kadar gula darah penderita diabetes. Jurnal Kesehatan Insada, 12(1), 45-53. https://doi.org/https://doi.org/10.33023/jpm.v10i1.1566.

Santika, E. F. (2025). *Diabetes Tipe 2 Paling Banyak Diderita Orang Indonesia pada 2023*. *2023*, 15–16. https://databoks.katadata.co.id/datapublish/2025/07/26/diabetes-tipe-2-paling-banyak-diderita-orang-indonesia-pada-2023

Sartika, M., & Irawan, P. (2023). Hubungan Perilaku Sedentari Dengan Kadar Gula Darah Pada Pasien Diabetes Melitus di Rumah Sakit Sentra Medika Cikarang Tahun 2022. *Jurnal Ilmiah Kesehatan*. https://repository.medikasuherman.ac.id/xmlui/handle/123456789/5500.

Sartika, Mila., A. (2024) 'Prevation of DPN (Diabetic Peripheral Neuropathy) In Patients With Diabets Mellitus Type 2 In Mangunjaya Tambun Selatan', *Pengabdian Masyarakat*

Kesehatan Stikes Pemkab Jombang, X(1), pp. 8–13. Available at: https://doi.org/https://doi.org/10.33023/jpm.v10i1.1566.

Sartika, M. *et al.* (2023) 'The Implementation of Hands and Feet Exercise Towards Pain Management Among DM Type II Patients with Peripheral Neuropathy in Indonesia', *Jurnal Keperawatan Komprehensif (Comprehensive Nursing Journal)*, 9(3). Available at: https://doi.org/10.33755/jkk.v9i3.508.

Sartika, M. and Armi (2023) 'Faktor-Faktor Yang Berhubungan Dengan Prevalensi Diabetik Neuropati Periferal (DPN) Pada Pasien DM Tipe II Di Indonesia', *Jurnal Ilmiah Keperawatan (Scientific Journal of Nursing)*, 9(2), pp. 396–400. Available at: https://doi.org/10.33023/jikep.v9i2.1553.

Setiawan, A., & Putri, M. D. (2023). Potensi Stevia rebaudiana sebagai suplemen nondiabetik untuk menurunkan kadar glukosa darah. Prosiding Seminar Nasional, 5(1), 123-130. https://doi.org/https://doi.org/10.33023/jpm.v10i1.1566.

Setiawan, R., & Putri, D. A. (2023). Faktor-faktor yang mempengaruhi efektivitas Stevia dalam menurunkan kadar gula darah: Sebuah meta-analisis. Jurnal Penelitian Kesehatan, 25(1), 67-75. https://doi.org/10.52236/ih.v12i1.517