

Impact Of Bitter Guard Powder Supplementation on Sugar Level Among Diabetic Patients

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Abstract: Diabetes is a serious, chronic disease that occurs either when the pancreas does not produce enough insulin (a hormone that regulates blood glucose), or when the body cannot effectively use the insulin it produces. Raised blood glucose, a common effect of uncontrolled diabetes, may, over time, lead to serious damage to the heart, blood vessels, eyes, kidneys and nerves. More than 400 million people live with diabetes. The prevalence of diabetes has been steadily increasing for the past 3 decades and is growing most rapidly in low- and middle-income countries. Associated risk factors such as being overweight or obese are increasing. Diabetes is an important cause of blindness, kidney failure, lower limb amputation and other long-term consequences that impact significantly on quality of life. For the prevention of diabetes, awareness must be creating among population. Another way to control and prevent diabetes is use of alternative therapy like supplementation of herbal or natural products which containing medicinal value for curing many diseases. Bitter guard is a kind of vegetable which also have a property to control diabetes with natural product. In the present study, the impact of bitter guard powder supplementation among diabetic patient for controlling of diabetes. For the study, 30 diabetic patients selected with purposive random sampling technique and supplemented with bitter guard powder for 30 days. Results were analyzed with suitable statistical analysis for testing significance.

Keywords: Impact, bitter guard, powder supplementation, sugar level, diabetic females.

INTRODUCTION

Diabetes caused 1.5 million deaths in 2012. Higher-than-optimal blood glucose was responsible for an additional 2.2 million deaths as a result of increased risks of cardiovascular and other diseases, for a total of 3.7 million deaths related to blood glucose levels in 2012. Many of these deaths (43%) occur under the age of 70. In 2014, 422 million people in the world had diabetes – a prevalence of 8.5% among the adult population. In 2012 there were 1.5 million deaths worldwide directly caused by diabetes. It was the eighth leading cause of death among both sexes and the fifth leading cause of death in women in 2012.

Blood glucose levels that are higher than-optimal, even if below the diagnostic threshold for diabetes, are a major source of mortality and morbidity. The diagnostic criterion for diabetes is fasting plasma glucose ≥ 7.0 mmol/L – a diagnostic point selected on the basis of micro-vascular complications such as diabetic retinopathy. The risk of macro-vascular disease, such as heart attack or stroke, however, starts increasing well before this diagnostic point.

Momordica charantia (commonly called bitter melon, cerassee, goya, bitter apple, bitter gourd, bitter squash, balsam-pear, karela (Demmers et al., 2023), karavila and (Dagogo-Jack et al., 2022) is tropical and subtropical vine of the family Cucurbitaceae, widely grown in Asia, Africa, and the Caribbean for its edible fruit. Its many varieties differ substantially in the shape and bitterness of the fruit. Bitter melon originated in Africa, (Dagogo-Jack et al., 2022) where it was a dry-season staple food of Kung hunter-gatherers (Ferlita et al., 2019). Wild or semi-domesticated variants spread across Asia in prehistory, and it was likely fully domesticated in Southeast Asia. It is widely used in the cuisines of East Asia, South Asia, and Southeast Asia.

Nutrients in Bitter guard

Bitter gourd is rich in many nutrients packed with vitamins and minerals that maintain and improve overall health. It has a good amount of vitamin C as it is essential for a strong immune system, healthy skin, and wound healing. One serving of bitter gourd can provide nearly 93% of the daily recommended intake of Vitamin C. Also has a good amount of vitamin A which supports good vision, skin health, and immune function. Folate in bitter guard is vital for cell division and the production of red blood cells, promoting overall health. Fibre helps with digestion, stabilizes blood sugar levels, and promotes satiety, aiding in weight management. It contains vital minerals like iron, potassium, and zinc, which support energy levels, metabolism, and heart health. Bitter gourd is effective for its potential to manage blood sugar levels and enhance insulin sensitivity. Blood sugar regulation is due to Bitter gourd contains compounds such as charantin, momordicin, and polypeptide-p, which play key roles in regulating blood sugar.

- Charantin: Increases insulin secretion and improves its efficacy.
- Momordicin: Enhances glucose uptake by cells, aiding in better energy use.
- Polypeptide-p: Mimics insulin, helping to control blood sugar, particularly in Type 2 diabetes where insulin resistance or inadequate production occurs.

One of the significant benefits of bitter gourd is its ability to improve insulin sensitivity. This is especially crucial for Type 2 diabetics, as it helps the body utilize insulin more effectively, potentially reducing the need for higher insulin levels and aiding better blood sugar control. It is also helping to control weight, cholesterol and reducing oxidative stress. It can be also used in a diet as vegetable, juice, curry, powder, some Gujarati recipes like thepla, muthiya and many more. We can use it as a super food with a effective remedial aspects leads to a good health of humans.

METHODOLOGY

For the present study, 30 diabetic respondents were selected purposively. 10 g of bitter guard powder was the daily supplementation dose given to diabetic respondents. Every day bitter guard powder were consumed by diabetic respondents at fix time that is in the morning for the period of 30 days. Before and after supplementation, blood sugar was analyzed at pathological laboratory. Glyco hemoglobin i.e. HbA1C analyzed with HPLC and plasma glucose was analyzed with photometric hexokinase at laboratory. Anthropometric measurements data were collected for the Body Mass Index analysis. Suitable statistical analysis were applied for testing significance.

REVIEW OF LITERATURE

Bitter melon is consumed as a vegetable and is cooked in different cuisine in different ways depending upon their tradition and taste (Islam and Jalaluddin, 2019). In Chinese cuisine, bitter melon is consumed as stir fries with soup or herbal tea. In Indian cuisine, it is simply cooked in curry form with yogurt. In Pakistan, it is known as karela and is often cooked as sabzi and served with riata or mint chatni. It is also consumed as whole, unpeeled bitter melon to be boiled and then stuffed with cooked minced beef, served with hot tandoori naan, chappati (Jan et al., 2019).

Bitter melon has three main active ingredients which are charantin, lectin, and vicine which have insulin like properties and having compound like polypeptide - p, which lowers the blood glucose level (Kumaree and Prasansuklab, 2023). This substance not only controls the insulin level within the blood but also helps in the impairment of β -cells production and its functioning. These constituents of bitter melon provide pharmacologic effects including a hypoglycemic effect, antiviral, and antineoplastic activities (Tanwar et al., 2022).

A study conducted by Khalid et.al. 2025 on Efficacy of Bitter Melon Powder on Type 2 Diabetes and stated that Momordica charantia (bitter melon) is commonly used in traditional medicine for the management of diabetes, due to its insulin-like properties. This study was conducted to assess the effectiveness of bitter melon powder in managing Type 2 diabetes by evaluating its impact on Random Blood Glucose (RBG), Fasting Blood Glucose (FBG), and Glycosylated Hemoglobin (HbA1c) levels. The study was carried out over five months at the Diabetic Clinic of Benazir Bhutto Hospital, Rawalpindi, involving 60 patients (30 males and 30 females) aged 35 to 60 years, selected through convenience sampling based on inclusion criteria. Patients were given 1/2 teaspoon of bitter melon powder daily before breakfast. The patients followed a sugar-free, low-fat diet, and blood glucose levels were measured through biochemical tests before and after the intervention. Data analysis and statistical validation were conducted using ANOVA. The treatment group showed a significant reduction in RBG (244.43 to 201.20 mg/d l, $P=0.001$) compared to an increase in the control group (246.63 to 275.10 mg/d l, $P=0.005$). FBG decreased in the treatment group (11.21 to 10.43 mg/d l, $P=0.02$), while the control group slightly increased (11.21 to 11.26 mg/d l, $P=0.10$). HbA1c levels also dropped in the treatment group (8.09 to 7.62 %, $P=0.01$) versus a rise in the control group (8.02 to 8.14 %, $P=0.09$). The findings indicate that bitter melon supplementation can significantly lower blood glucose levels and provide a safe alternative conventional diabetes treatments.

RESULTS AND DISCUSSION

Present study was aimed with supplementation bitter guard powder supplementation to diabetic respondents of 40 to 60 years. All the collected data presented as below including age, duration of diabetes, BMI, types of diet and awareness regarding diabetes.

Table: 1 Age of selected diabetic respondents.

Age in years	Frequency (F)	Percentage (%)
41-50	15	50
51-60	15	50

Table 1 depicts the data regarding age among selected diabetic respondents. In the study, 50 % respondents were in the age group of 41-50 years. 50 % respondents were in the age group of 51-60 years.

Table: 2 Types of diet among diabetic respondents.

Diet type	Frequency (F)	Percentage (%)
Vegetarian	20	66.67
Non vegetarian	10	33.33

Table 2 shows the data regarding types of diet consumed by selected diabetic respondents. Data shows that 66.67 % consumed vegetarian diet and 33.33 % diabetic respondents consumed non vegetarian diet. Majority i.e. 66.67 % diabetic respondents consumed vegetarian diet.

Table: 3 BMI classification of selected diabetic respondents.

BMI classification	Frequency (F)	Percentage (%)
<18.5	--	--

18.5 -24.9	18	60
≥25	06	20
25-29.9	06	20

Table 3 depicts the data regarding BMI classification of diabetic respondents. In the study, 60 % diabetic respondents had normal BMI. 20 % had BMI > 25 and 20 % diabetic respondents had 25- 29.9 BMI which is a obese condition and it leads to a mal nutrition condition. Majority of i.e. 60 % diabetic respondents had normal BMI.

Table: 4 Impact of bitter guard powder supplementation on blood parameters.

Impacts	F	%
Reduces blood glucose level	30	100.00
No constipation	30	100.00
Weight loss	07	23.33

Table 4 depicts the data regarding impact of bitter guard powder supplementation on various parameters. In the study, 100 % diabetic males reduce blood sugar level. 100 % diabetic males had no constipation and 23.33 % had weight loss due to bitter guard powder consumption. All the selected diabetic males reduced blood sugar level and no constipation.

Table: 5 Impact of Bitter guard powder supplementation on sugar level.

Name of herbal products	Initial A	After 15 days B	After 30 days C	Difference		
				A-B	B-C	A-C
Bitter guard powder						
Fasting	124	115	112	10	3	12
Post prandial	170	128	130	42	2	40

Table 5 depicts the data regarding impact of bitter guard powder supplementation on fasting blood parameters. A fasting blood sugar test measures sugar (glucose) in blood. It's a simple and common way to screen for pre diabetes, diabetes or gestational diabetes. Respondents were instructed that don't eat or drink anything (except water) for eight to 12 hours before the test. Fasting blood sugar is a simple, common blood test to screen for diabetes, pre diabetes or gestational diabetes (during pregnancy). It's also called a fasting blood glucose test. In the present study, fasting blood sugar level was analyzed at different intervals. Initially fasting sugar was 124 mg/dl. After 15 days interval fasting sugar was 115 mg/dl which was reduced to 10 mg/dl (A-B). 15 days to 30 days interval, fasting blood sugar was reduced to 3 mg / dl (B-C). Difference between initial and 30 days interval was 12 mg/dl. The impact of bitter guard powder supplementation on post prandial blood glucose level were also studied. Initially post prandial sugar was 170 mg/dl. After 15 days interval post prandial sugar was 128 mg/dl which was reduced to 42mg/dl (A-B). 15 days to 30 days interval, post prandial blood sugar was reduced to 2 mg / dl (B-C). Difference between initial and 30 days interval was 40 mg/dl. Thus, it can be

concluded that there was a positive impact of bitter guard powder supplementation on fasting and post prandial sugar level among selected male and female respondents.

CONCLUSION

Bitter guard powder supplementation may help to control blood sugar level. Regular consumption may also improve cholesterol levels, solves digestive problems and inflammation also. It also helping out the body's harmful toxin removal. Overall, it definitely lowers the blood sugar level and also improves health and keep body in a non - toxic eco system. Bitter gourd is a nutrient-dense vegetable that holds promise for supporting diabetes management. Though it should not replace standard diabetes treatments, bitter gourd can be a valuable part of a balanced diet. With the right guidance from healthcare professionals, adding bitter gourd to meals can contribute to better diabetes management and overall health.

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