



A Review Article on Low Glycemic Index Diet Useful for Diabetes Mellitus

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ABSTRACT

The growing incidence of diabetes globally demands new methods, and to manage Glucose response; low Glycemic index has been proposed as a valuable means. Though, it has been observed that there are many variances in the outcome of the studies as concerns usefulness and the reports are inconsistent. Besides, it's still indistinct the impact of low GI index diet and their longtime practice in Type-2 Diabetes patient. The objective of this article is to find out the impact of various foods with low glycemic index on T2DM. Criteria for selecting the studies were, Experimental studies which are showing impact of low GI foods on patient with T2DM (published between 2008 and 2022). Thus, studies which are involving Type 1 Diabetes and gestational Diabetes are excluded. Studies which come under inclusion criteria, involved in this article. Food with low glycemic index are more impactful in controlling fasting blood glucose level and HbA1C of T2DM patients.

KEYWORDS: Type 2 Diabetes mellitus, Glycemic Index, Flattened rice, Poha.

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INTRODUCTION

In case of Type 2 Diabetes Mellitus body either is not able to produce sufficient insulin or the function of insulin is impacted. It is a condition in which body is affected by not producing enough insulin. "Diabetes mellitus is a group of metabolic diseases characterized by elevated levels of glucose in the blood (hyperglycemia) Resulting from defects in insulin secretion, insulin action, or both." (American Diabetes Association [ADA] Expert Committee on the Diagnosis and Classification of Diabetes Mellitus, 2003) According to World Health Organization, in 2014 8.5% of the adults who are 18 or more than 18-year-old had diabetes mellitus. In 2019, 1.5 million deaths were due to diabetes which was 48% of total death, in case the occurrence of diabetes is before 70 years. In countries with high income between 2000-2010, premature mortality rate due to diabetes has been decreased but from 2010-2016 it increased again. In case of lower-middle-income countries, diabetes has increased in both periods. This report also says that, the number of person with diabetes mellitus has increased in a period of 1980- from 108 million to 422 million 2014 and this rate is higher in lower middle-class countries than in higher middle-class countries. Due to diabetes, there are various diseases like blindness, kidney diseases, heart diseases and lower limb amputation. In 2019 diabetes was one of the leading causes of death [1]. The Prevalence of Diabetes Its Determinants in the Young Adults Indian Population 65% of the population in India are young who all are adapting a very fast sedentary lifestyle which was not the case earlier.

GLYCEMIC INDEX & ITS ROLE IN DIABETES MELLITUS

Glycaemic Index (GI) of food is the meaning of how fast foods are dissolving in blood and helps to rise your blood glucose level. Foods which contain carbohydrates those have GI value. Foods with fats, oils, and meats do not show GI value.

Generally, Food with Low Glycaemic Index helps to control the sudden rise of glucose in the blood. But Foods with a high glycaemic index do the opposite.

All the carbohydrates do not work in our blood in the same way. Some of these work slowly and some of these very rapidly. People with Diabetes Mellitus have to choose the right food for them. They have to ignore high GI foods to avoid a rapid increase of blood glucose level.

The Glycaemic Index Scale Contains the value of 0-100. Original Glucose has 100 values which is the highest and bad for DM patients because it rapidly increases the sugar level in blood. In GI Scale < 55 is low glycemic index food which helps to control Blood glucose level, body weight and cholesterol level also.

Some studies show that Low GI foods also helps to control the appetite of T2DM patients as it dissolve in blood very slowly [1].

DIET USED IN DIABETES MALLITUS WITH LOW GLYCEMIC INDEX

At the time of developing meal plan for diabetic patients consisting carbohydrate, all food should be considered as sources. After digestion, 100% of carbohydrates and even 50% protein are converted into glucose.

Poha is very famous grain in the context of favorite food of Indians. Poha is used differently in different parts of India and it is also very easy to make. Poha is rich in iron, proper amount of carbohydrates and low in glycemic index. To make poha rice is partly cooked and sun dried it. It is not processed and polished. As poha is not that much processed so it is very easy to cook and digest. There have mainly 6 reasons why we should use poha in our daily diet. Poha contains healthy carbohydrate, good source of iron, easy to digest, rich in probiotic, has very low calorie, and helps to reduce blood sugar. Poha helps to control sudden spike in blood sugar.³

Dieticians recommend food with low glycemic index diet to people with diabetes. This is not possible that a person will measure the value of carbohydrate in every food. For that a person with diabetes can use glycemic index table in which the level of glycemic index is mentioned of food, as per that 70 units and above in this scale is high glycemic index, between 55-69 is considered as medium glycemic index and 55 or less is considered as low glycemic index. Food with low glycemic index helps to control body weight, cholesterol and improve daily diet. There are several lists which shows the level of glycemic index like list of fruits, vegetables, grains and other items [4].

As poha is very rich in fibre, because of that helpful in diabetes mellitus so, patients can consume home based diets with high dietary fibre and low glycemic index foods [5].

Since few years there has been an increasing trend to research the benefits of various plants worldwide. Among these, Avena Sativa is a very good source of lipid, glucagon, minerals, proteins, sterols, fibres. It has various effects like antidiabetic, antioxidants, anti-obesity, anti-inflammatory, immunomodulatory, hypolipidemic, gastrointestinal, cardiologic etc. Common name of Avena Sativa is oats. Cultivation of Oats is from past 5000 over years. Traditional use of Oats was colitis, palpitation, depression, sleepiness. Anti-Diabetic effect of oats is now very trending, Avena Sativa helps to increase insulin activity and reduce production of glucose from liver. The response of glycemic patient and insuleamic patient is very significant. In various studies they tested the effect of oat bread, lingonberry fiber with oat bread, oat buckwheat bread on glycemic level with a small scale (KHSHP E514/09). Barley food and Oat have significantly shown reduction of blood glucose level [6].

S. Cumini is also known as jamun, a tropical plant. Jamun seeds contain protein, starch, ash, phytochemical, antioxidants, glucoside jamboline. S. Cumini plant and its parts are used to reduce blood glucose levels as well as other diseases like cancer, mouth ulcer, etc. It is very helpful as it has anti-inflammatory, antioxidants, anti-diarrheal, antiulcerogenic, and radioprotective. In diabetes Mellitus, it shows Hepatoprotective, Dyslipidemia, Glycogen metabolism, Glucose metabolism, homeostasis, and Inhibition of glucose absorption actions.

M. Charantia plant is very useful. This is a vegetable cultivated in Asia and some other countries, and use to treat diabetes generally. It contains antioxidants, minerals, vitamins, and bioactive chemicals. It helps to reduce blood glucose levels significantly. It stimulates the peripheral muscles to utilize glucose, inhibits glucose uptake, and suppresses gluconeogenic enzymes.

One study was conducted to evaluate the effectiveness of Fenugreek Seeds on Blood Glucose and Lipid Profiles in Type 2 Diabetic Patients. In a trial, study researchers used 10 gms/day of fenugreek seeds on 24 persons with type 2 diabetes mellitus. They gave fenugreek seeds as powdered form with yogurt or hot water for 8 weeks. Before and after the study they took some measurements like weight, BMI, FBS, HbA1C, Total Cholesterol, LDL, HD and record of food. There were significant differences on food report, they analyzed BMI and Serum variables using paired t test and t student test where $P < \text{or} = 0.05$ which is considerable. Researcher excluded 6 cases who had medication and problem in personal life. 18 participants were left and 7 of them consumed fenugreek seed with yogurt, 11 in hot water. The study result indicated that there was significant change in VLDL C, TG, and FBS were decreased significantly (30.6, 30 and 25 respectively). Protein, carbohydrate intake, fat intake, BMI, Energy was unchanged in the time period of study. This study concluded that fenugreek seeds we can use with hot water in case of type 2 diabetes mellitus to control blood glucose level.

Another study was conducted to evaluate the effectiveness of Cinnamon on Glucose Of Type II Diabetes Patient. One of the main reasons of death is Diabetes Mellitus in the world now in current situation. It is raising day by day from 171 million in 2000 to 366 million in 2030. Diabetes Mellitus is a chronic disease characterized by impaired insulin function and secretion. Diabetes Mellitus is generally controlled by

anti-diabetic drug, diet control, and physical activity. Long term Drug use causes various side effects so it is very high time to control diabetes by using herbal medicine and nutritional supplements [8].

Various studies have shown that people are more using herbal medicine because it is more natural and healthier. Various studies show that some spices like cinnamon, green tea and mint have very strong effect on Diabetes Mellitus. Among them Cinnamon is the most bioactive spice which helps to reduce blood glucose level. This study used a double-blind randomization. They used Bio system kit, Pars azmoon glucose kit, Biochemistry auto analyzer, Demographic data as data collection tool. The data was analyzed by SPSS software. The study result indicated that there was no significant change in blood glucose level after taking 1g cinnamon for 30- 60 days but various studies are showing the effectiveness. This study result concluded that effectiveness of cinnamon varies age to age, place to place, culture to culture [9].

Diabetic Mellitus is a combination of multiple metabolic abnormalities, characterized by insulin malfunction. There can be two types of Diabetes Mellitus, Type I and Type II. Hence this study says about the effect of ginger powder on Fasting Blood Sugar, HbA1c, and Apolipoprotein B in diabetes patient of Type II. The methodology of this study was randomized, Placebo controlled technique, 20-60 years old with NIDDM patients were the population (HbA1c was 6-8%). Inclusion criteria were Zero supplements of Antioxidants like Zinc, beta carotene, selenium from 3 months before the study, no drinking and smoking. Exclusion Criteria were insulin treatment at the time of study, medication dose and diet and physical activity were changed, some diseases like liver and kidney and cardiac, pregnancy and lactation, hypersensitivity to ginger, ginger consumption. Sample size was 20 in each group, for safety they put 25 persons. They used International Physical Activity Questionnaire to collect data. Socioeconomic status, Anthropometric measurement and Fasting glucose level were collected before and after 12 weeks of intervention. They prepared Ginger capsule which contains 2gm ginger powder. At last, with the help of SPSS software data analysis were done. In experimental group there were 5 males and 17 females. In result there was significant change in value of FBS, HbA1c, Apo B, MDA, reduced than baseline data.

HELPFUL PROPERTIES OF RECOMMENDED DIET IN CONTROL OF BLOOD SUGAR LEVEL

Diabetes is a chronic disease that affects people's mental health. Diabetes can be managed with little changes in the diet without compromising on taste. People with diabetes need to substitute their food with low glycemic index food. Food with a low glycemic index helps to control diabetes, regulate appetite, control cholesterol levels, Improve blood pressure levels, and control weight. The glycemic index of food depends upon some factors like processing level, nutritional components, how much that food is ripening, sugar level, method of cooking, and its time. They measure the glycemic index of food with a scale (0-100), in which 55 or less is low, 56-69 is medium and 70 or above means high glycemic index. How much lower the glycemic index that food will take more time to digest. Food with a high glycemic index is digested easily and people will feel hungry and will consume more unhealthy food which will increase blood sugar levels rapidly. With glycemic index, it is very important to remember glycemic load because it shows how many calories you take in a meal [7].

CONCLUSION

The article findings shows that diets with low-GI are more effective in controlling fasting blood glucose and HbA1c compared to diets with higher-GI or control appetite in patients with type 2 diabetes. Lower Glycemic Index foods help to control blood glucose level & appetite of Type 2 Diabetes Mellitus patients. This is not mandatory for T2DM patients who cannot take carbohydrates. All they have to do that have to take food with a lower glycemic index and proper glycemic load.⁸

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