Review Article

Diabetic Patients: Why Stop Sugar?

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Abstract

Diet plays an important role in the complete management of type 1 and type 2 diabetes. The aim of nutritional management of diabetes is to optimize glycemic control, help in achieving ideal body weight, and correct any lipid abnormalities to reduce the risk of long-term complications. However, there are varied and many unscientific beliefs about diet among patients with diabetes as well as in physicians, which very often makes nutritional management challenging. The most common misconception is that patients with diabetes should not consume sugar at all. The taste of food plays an important role in food choices, eating behaviors, food intake, and associated satisfaction. The more distant a recommended change is from the person's actual eating habits, the more difficult it will be to achieve long-term compliance to the recommended change. It is important to provide therefore achievable and sustainable dietary modifications that will encourage people to adopt healthier food choices without compromising their taste preferences. Special attention needs to be given to the nutrition intake in gestational diabetes mellitus. Consensus guidelines have recommended a low glycemic index, high fiber, and protein diet in gestational diabetes mellitus. Alcohol intake in nonpregnant women and supplements rich in micronutrients are both key considerations. There is clearly a need for conducting educational programs for physicians as well as patients to dispel misconceptions regarding the consumption of carbohydrates, especially added sugar, in patients with diabetes. The focus should be on balancing the calorie intake rather than placing unnecessary and inappropriate restrictions.

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Introduction

According to the International Diabetic Federation report 2021, there were 537 million adults (20–79 years) living with diabetes worldwide, indicating that 10% of the adult population in the world has diabetes. It is estimated that the total number of people with diabetes will increase to 643 million (1 in 9 adults) by 2030 and 784 million (1 in 8 adults) by 2045.[1] It is a rapidly growing health challenge and a potential epidemic, especially in the low- and-middle-income countries that are witnessing economic progress and urbanization.[2] It is projected that by 2025 the number of cases with diabetes in a middle-income country like India would be 69.9 million with most remaining undiagnosed.[3] Studies have reported a three to four times higher all cause and cardiovascular mortality in subjects with diabetes; hence there is an urgent need to prevent these deaths.[4]

Diet plays an important role in the complete management of type 1 diabetes mellitus (T1DM) and type 2 diabetes mellitus (T2DM).[5] The aim of nutritional management of diabetes is to help patients achieve glycemic control, weight control, and correct any lipid abnormalities to reduce the risk of long-term complications. Patients' lifestyle, socioeconomic factors, and cultural background should be taken into account when making individual nutritional plans.[6] The 2016 World Health Organization

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(WHO) action plan in addressing diabetes includes effective education to provide correct information and quelling myths and misconceptions.[7]

Common Beliefs about Dietary Intake among Patients with Diabetes

The key barriers in dietary management of diabetes are the varied unscientific beliefs about diet among patients. A cross-sectional study from an urban healthcare center in Puducherry (India) reported a high prevalence of beliefs such as bitter foods reduce elevated blood sugar level (42%–49%), once antidiabetic medications have been started, no dietary restrictions are required (30%–32.5%), all carbohydrates should be eliminated from the diet of a diabetic patient (25%–28%), and diet has no role in diabetes treatment (21%–22%).[8] Another study reported beliefs such as all sweet substances are harmful, leading to exclusion of dietary fruits, milk, and tubers.[9] Other patient attitudes reported in various studies include diabetic patients should not consume sugar at all,[10,11] special diabetic food is necessary for patients with diabetes,[10-12] adding sugar to food is prohibited for patients with diabetes,[11] being a vegetarian helps control blood sugar levels,[13] reduction of sugar and carbohydrates are the only means to control diabetes,[14] a high intake of sugar and sweets causes diabetes,[15] sugar substitutes (artificial sweeteners) are carcinogenic,[12,16] sweets and chocolates must be avoided by patients with diabetes, honey is good for diabetes, rice is prohibited for patients with diabetes, and they should eat only a small amount of starchy foods such as bread and potatoes, high protein diet is not suitable for diabetic patients, underground vegetables such as carrots and radish increase the blood glucose level, and an increase in the dosage of antidiabetic agents decreases the effect of uncontrolled food intake.[12]

For successful and effective nutritional management of diabetes, it is necessary to provide proper and timely counseling to patients and prevent them from falling prey to unscientific beliefs and misconceptions.

Knowledge, Attitude, and Awareness of Diabetes Nutrition in Physicians

Physicians' involvement in understanding patients' dietary habits can influence behavioral change, and their knowledge about dietary management in diabetes is crucial for advising balanced diets without unnecessary restrictions. Studies reveal physicians' lack of knowledge about nutritional therapy for diabetes, including dietary fat, glycemic index (GI) definition, and recognition of carbohydrates/monounsaturated fats.[17] Cabrera Pivaral *et al*. also reported a low to very low knowledge about nutritional management of T2DM in 72% of family physicians in Mexico.[18] In a recent study in Iran in 2020, Emami *et al*. reported that only 46% of physicians counseled their patients with diabetes about a healthy diet.[19]

A meta-analysis of 24 studies on nutrition education in medical schools across the US, Europe, Middle East, Africa, Australia, and New Zealand reveals that nutrition is not adequately integrated into medical education, despite its importance for a healthy lifestyle.[20] Kumar *et al*.'s in 2018 poll in India indicated that most doctors (84.1%) think an overall healthy man needs only 1800–2200 calories per day, while 43.8% think a woman needs 1800 calories only per day. While the optimal calorie need for an index man and woman is 2400 and 2100, respectively.[21]

A survey by the American College of Cardiology shows 72% of physicians believe patients understand nutrition and disease after counseling, but only 21% feel they received effective communication.[22] Clearly meaning, physicians need training to effectively guide patients with diabetes about the proper nutrient balance and dispel misconceptions about the condition.

Balancing the Nutrients in the Dietary Management of Diabetes

Dietary recommendations should emphasize on carbohydrate sources that are high in fiber, including vegetables, fruits, legumes, whole grains, as well as dairy products.[6] Naturally occurring fructose from whole fruits is unlikely to be harmful because of its relatively slow digestion and absorption, unless consumed in an excess amount (>10% of energy).[23] It is estimated that the average person consumes over 280 calories per day from added sugar alone, while the current recommendation is 200 calories.[24]

The farther an advised alteration is from a person's eating habits, the harder it is to stick to it. Taste and price matter more than nutrition to most individuals. Thus, product recommendations should promote economical, patient-pleasing, and healthy eating habits. It is crucial to offer realistic and sustainable dietary changes that encourage better eating without compromising taste.[25] Diabetes patients often reduce carbohydrate intake to prevent blood glucose increase, but such affluent diets often contain high-saturated fat, making the diet unhealthy.[26]

The GI ranks carbohydrate-containing foods on how quickly they elevate blood sugar levels. It is determined by comparing the increase in plasma glucose after 50 g of carbohydrates from a single food to the average

change in blood sugar levels over 2 h.[27] The glycemic index of refined sugar is only 60,[28] while that of nonstarchy vegetables is in the range of 15–50 and that of cereals like rice and wheat is 70. Hence, restricting the intake of refined sugar in particular, defies rationale[27] All types of carbohydrates consumed are converted to glucose in the body, and the excess is stored as fat.[29] Carbohydrate intake is crucial for maintaining weight and a balanced diet, with low GI, high-fiber foods such as leafy or nonstarchy vegetables being effective in replacing carbohydrates.[30] It might not be rational to restrict only added sugar thereby compromising the patients' taste, satiety, satisfaction, and cultural practices. It might be more prudent to guide patients about total daily carbohydrate consumption rather than restrict specific food items.

Evidence on the Effect of Sugar Intake on Diabetes

Studies have focused on the role of consumption of fructose-containing sugars in promoting T2DM. A systematic review and meta-analysis of prospective cohort studies showed that neither total sugars nor fructose-containing sugars had an unfavorable association with incident T2DM.[31] There was also no association with fructose-containing sugars, such as sweets and cakes[32] and pure fruit juice,[33] while a protective association for fruits[33] was found in individual prospective cohort studies and in systematic reviews and meta-analyses of prospective cohort studies. Yet, patients with diabetes are often advised restrictions on fruit intake, due to misconceptions about the association between intake of fruits and blood glucose. Nine studies have shown that sucrose or fructose had no adverse effects on fasting glucose, insulin levels, or postprandial glucose.[22] There is currently no scientific data indicating that sucrose or fructose have a negative impact on glycemic control and T2DM. Studies have shown that isocaloric exchange of sucrose with other carbohydrates did not affect glycemic control, including HbA1c level in patients with T2DM even with large intakes of sucrose (220 g/day).[34] A recently published network meta-analysis of Randomized Controlled Trials showed no effect on HbA1c level following isocaloric replacements of glucose, fructose, or sucrose with starch.[35]

Some researchers believe that there is a lack of evidence about the association between added sugar and risk of T2DM.[36-38] Evidence indicates moderate intake of sucrose (<10% total energy) or other added sugars may be included in the diet of people with diabetes without worsening glycemic control.[26] Other studies have reported that individuals who consume added sugar, increase their total daily calorie intake which can lead to weight gain and thus, increased risk for T2DM.[38-40] Consuming sweets, as long as their calorie content remain within recommended limits, is innocuous and therefore, there is no justification for prohibiting them from diabetics' daily diets. Unjust limitations in diabetes treatment can cause significant anxiety and guilt in patients and their families, potentially contributing to their depression.[21]

Nutritional Management in Women with Diabetes

Medical nutrition therapy and lifestyle modifications are crucial for managing gestational diabetes mellitus (GDM). Carbohydrate restriction is a common approach, with recommendations ranging from 35% to 60% of total calories, however a diet high in complex carbohydrates may improve insulin resistance and reduce infant fat. Low-GI diets positively impact maternal outcomes without negatively affecting newborns. High-fiber foods can also serve similar functions.[39] While managing maternal glycemia is the primary focus in GDM, evidence suggests that maternal triglyceride levels might more significantly influence fetal growth than glucose levels. Adequate protein intake, 10%–20% of daily energy or 60–80 g per day, is essential to prevent maternal muscle loss. Indian guidelines recommend an additional 23 g of protein daily during pregnancy.[41] Moreover, for women planning pregnancy, a multivitamin supplement may provide benefits in diabetes-related outcomes.[42,43]

Menopause increases the risk of chronic diseases due to decreased estrogen levels. Lifestyle factors can influence symptoms and severity. A healthy diet can counteract these symptoms and prevent chronic diseases. Overweight or obese individuals should consume 500–700 fewer kcal and 1.0–12.00 g less protein while adopting a balanced diet.[44,45] Postmenopausal status, diabetes and low estrogen levels increase the risk of heart disease and bone fractures. Thus for a menopausal woman, maintaining a healthy diet is essential and for that one should try to consume more fruits, vegetables, whole grains, and veggies while consuming fewer refined and processed foods.[46] Dietary guidelines that emphasize low consumption of saturated and trans unsaturated fats, balanced intake of carbohydrates, high intake of fiber, fruits, and vegetables, as well as low-fat dairy products, can help to avoid and treat metabolic syndrome.[47]

The Way Ahead

Educating doctors and patients on the misunderstandings surrounding the role of carbohydrates, especially

added sugars, in the management of diabetes is crucial. In general, nutrient-dense meals should be prioritized, calorie balance should be maintained, and dietary recommendations should be customized to meet the needs of each patient. These strategies help promote family dynamics and mental health. It is also critical to control fat consumption and adjust dietary recommendations according to ethnic customs and preferences. Blood glucose control in GDM is mostly dependent on careful monitoring of carbohydrates and a diet high in low-glycemic, high-fiber foods. Both mother and fetal health are supported by a moderate fat intake and an adequate protein intake. Tailored meal planning improves adherence and leads to better health outcomes for mother and child.

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Conflicts of interest

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