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Nutritional Aspect of Type-2 Diabetes Mellitus

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Abstract:

Background: India is diabetes capital with home to 69.1 million people with DM, the second highest number of cases after china. 425 million people worldwide, or 8.8% of adults 20-79 years, are estimated to have diabetes. Urgent solution for reducing the predominance of this illness will require particularly the modifiable components including physical action, weight and diet. The role of nutrition for the management and prevention of diabetes is significant. The person suffering from type 2 diabetes are suggested by reasonable drug however dietary rules are frequently ignored and they give least unassuming consideration regarding diet while dietary guidelines are very important to achieve glycemic control.
Aims and Objectives: Give dietary guidelines to people who are suffering from type 2 diabetes mellitus.
Database and Methodology: In this retrospective study dietary guidelines for diabetic patients are summarized as given by Indian Institute of nutrition and WHO. Help is also taken from various websites and journals to collect relevant information. The study covers the original article of recent seven years i.e. from 2011 to 2017.
Conclusion: Variety of different food patterns related to diabetes risk. High consumption of minimally processed plant based foods; consumption of monounsaturated fat; low- to-moderate consumption of dairy products, fish, and poultry; low consumption of red meat; and low-to- moderate consumption of wine with meals have been associated with lower incident of type 2 diabetes.
Keywords: Diabetes mellitus; Nutrition; Diet

1. INTRODUCTION

Diabetes is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. Insulin is a hormone that regulates blood sugar.[1] The term diabetes was first coined by Aractus of Cappodcia (81 – 133AD).The symptoms of diabetes include frequent urination, increased thrust and increased hunger.[2] There is two major forms of diabetes. Type 1 diabetes is characterized by a lack insulin production and type 2 diabetes results from body ineffective use of insulin.[3] The number of people with diabetes has risen from 108 million in 1980 to 422 million in 2014.[4] The global prevalence of diabetes mellitus among adults over 18 years of age has risen from 4.7% in 1980 to 8.5% in 2014.[5] Waist circumferences (WC),

body mass index, smoking habit, hypertension, and total cholesterol level were significantly associated with the diabetes. These factors associated with diabetes mellitus were potentially modifiable. The role of nutrition for the management and prevention of type 2 diabetes is significant. Diets rich in whole grains, fruits, vegetables, legumes, nuts, moderate in alcohol consumption, and lower in refined grains, red/processed meats, and sugar-sweetened beverages have demonstrated to reduce diabetes risk and improve glycemic control and blood lipids in patients with diabetes.[5] Therefore, targeting the prevention strategy to such modifiable risk factors might reduce the prevalence of diabetes mellitus in the area.[6] Target of this examination was to aware individuals by giving dietary guidelines to oversee diabetes.

2. DATABASE AND METHODOLOGY

In this retrospective study dietary guidelines for diabetic patients are summarized as given by Indian Institute of nutrition and WHO. Help has also been taken from various websites and wide range of journals to collect relevant information regarding the related issues. The study covers the original article of recent seven years.

Dietary guidelines for diabetes

The current issues for management of type 2 diabetes mettilus has based on balance diet and eating schedule. There is need of guidelines that advice such person to manage their disease. The guidelines that recommend 50-60% energy from carbohydrates, 10-15% from protein, and less than 30% from fat.[7] A low carbohydrate diet for weight and glycaemic control has gained popularity among some experts, clinicians, and the public. Others conclude that a low carbohydrate diet combined with low saturated fat intake is best.[8]

Balance of Energy

By balancing input and output of energy we should balance our body weight. It is recommended to obese diabetic people to reduce weight by limiting their energy intake with healthy eating pattern. Diet mainly composed of unprocessed food avoiding processed food (meat, refined grains, sugar) and more physical activity are advised. Among overweight or obese patients with type 2 diabetes and inadequate glycemic, blood pressure and lipid control, and/or other obesity-related medical conditions, lifestyle changes that result in modest and sustained weight loss produce clinically meaningful reductions in blood glucose.[9]

Carbohydrate

Low-carbohydrate diets are not recommended in the management of diabetes. Recently the National Academy of Sciences–Food and Nutrition Board recommended that diets provide 45–65% of calories from carbohydrate, with a minimum intake of 130 g carbohydrate/day for adults.[10] In fact, a variety of factors intrinsic to a given food can influence its impact on blood glucose. These include the physical form of the food (i.e., juice versus whole fruit, mashed potato versus whole potato), ripeness, degree of processing, type of starch (i.e., amylose versus amylopectin), style of preparation (e.g., cooking method and time, amount of heat or moisture used), and the specific type (e.g., fettucine versus macaroni) or variety (e.g., long grain versus white) of the food.[11] Substituting low–glycemic load foods for higher–glycemic load foods may modestly improve glycemic control[12] . It has been proposed that foods containing resistant starch or high amylose foods such as specially formulated cornstarch may modify postprandial glycemic response, prevent hypoglycemia, and reduce hyperglycemia.[13]

Carbohydrate rich food to avoid: baked food items made with highly processed white flour; sweets, candies, and any foods with added sugar; white breads, cookies, pastries, legumes such as peas, lentils and beans; starchy vegetable like potato, sweet potatoes; fruit juice, soft drink, watermelon, pineapple[14]

Carbohydrate Recommended: The body does not break fiber down in the same way as other carbohydrate, so it does not raise blood sugar levels as quickly. Non starchy vegetables includes

green vegetables; in fruits berries like blueberries, strawberries; in grains brown rice, barley, high fiber-cereals that contain 5g of fiber per serving, oatmeal, millet, amaranths were recommended.[14]

Protein

Protein helps the body build, maintain, and replace tissue. As with carbohydrate a person should choose their protein sources with care, especially if they have diabetes. Eating red meat, such as beef, pork, and lamb, may increase the risk of diabetes; even at low levels of consumption.[15] A smaller serving of processed red meat increased the risk of type 2 diabetes by 51%. Replacing red or processed red meat with other protein sources, such as poultry, fish, low-fat dairy, whole grains, or nuts, may cut the risk of diabetes by up to 35%. Protein foods that are also high in fat are not healthful for many people with diabetes as they can lead to weight gain and high levels of cholesterol.[15] The FDA recommend that adults consume 50 grams of protein a day, as part of a 2,000-calorie diet. A person's daily value may be higher or lower depending on their calorie needs.

Protein to avoid: red meat, such as beef, pork, and lamb; breaded, fried, and high-sodium meats; processed meats, such as bacon, hot dogs, and deli meats; ribs and other fatty cuts of meat; poultry with the skin on; deep-fried fish.

Proteins recommended: beans, lentils, nuts, soy products, tofu, fish, seafood, poultry without the skin, eggs.

Dairy

Dairy foods provide calcium, protein, and vitamins. They also contain a sugar called lactose. It is best to opt for low-fat dairy foods. There is a neutral or moderate inverse association between dairy consumption and T2D risk. Yogurt was especially associated with a lower T2D risk.[16] there are components in dairy which have been suggested to be beneficial for T2D, such as flavonoids, calcium, medium-chain and odd-chain saturated fats, unsaturated fats, branched-chain amino acids (BCAAs), *trans*-palmitoleic acid (*trans* 16:1 n–7), probiotics, and phylloquinone (vitamin K-1) and menaquinones (vitamin K-2).[17] However, dairy products also contain saturated fats, trans fats, and sodium, which could be harmful for T2D[18].

Dairy foods to avoid: whole milk, full-fat yogurt, full-fat cottage cheese, full-fat cheese, full-fat sour cream, full-fat ice cream, sweetened yogurts, milk-based drinks with added sugar.

Dairy product recommended: reduced-fat or fat-free foods, 1%, 2%, or skim milk, low-fat plain yogurt, low-fat cottage cheese, low-fat sour cream. Dairy alternatives, such as soy or nut milk, can be a healthful choice, but some brands contain added sugar. People should check the label before buying or consuming these products.

Fruits and vegetables

Fruit and vegetable provide fiber, vitamins, and minerals. These foods help a person to manage body weight and reduce their risk of heart disease, some cancer, and other chronic diseases. People suffering from diabetes should take care when consuming the *Fruit juice (*Even when people make it with fresh fruit, juice is more likely to cause a sugar than whole fruits, and it also provides less fiber because juicing is a kind of processing that breaks down the fiber. Premade fruit juices contains a lot of added sugar, so it should be avoided), *Dried fruit (*contains concentrated natural sugars, which spike blood glucose levels), *Salt and sodium (People* with high blood pressure should avoid sodium, or salt). Many processed foods, including canned and pickled vegetables, may contain added sodium. The Centers for Disease Control and Prevention advise people to limit their sodium intake to no more than 2300 mg per day.

Fruit to be avoid: dried fruit with added sugar, canned fruit with sugar syrup, jam, jelly, and other preserves with added sugar, sweetened applesauce, fruit drinks and fruit juices, canned vegetables with added sodium, pickles that contain sugar or salt.

Fruits and vegetables recommended: raw, steamed, roasted, or grilled fresh vegetables, frozen vegetables, canned unsalted or low sodium vegetables, fresh, whole fruit, frozen fruit with no added sugar, canned fruit without added sugar

Fats

Fat can provide essential fatty acids which is an integral part of a healthful, balanced diet. Fat also helps the body to absorb vitamins A, D, E, and K. However, people need to choose the right types of fat, especially if they have diabetes. Consuming unsaturated fats instead of saturated fats and trans fats can lower cholesterol and reduce the risk of heart disease. Try and stop the intake of red meat completely and shift towards vegetarian diet, decrease the consumption of eggs and poultry, however, eat lean fish two to three times a week.

Fats to avoid: butter, lard, oils, such as palm oil, cream-based dressings, full-fat mayonnaise, French fries, breaded and battered foods, potato chips, many premade meals, burgers and most fast foods.

Fat recommended: people should always consume fats in moderation. Unsaturated oils, such as olive, sunflower, and canola oil, reduced-fat dressings or dips.

Sugar

Sugary foods, sweets, and desserts consist mostly of sugar and low-quality carbohydrates. They often contain little to no nutritional value and can cause a sharp spike in blood glucose.

Foods that are often high in sugar include: doughnuts, baked goods, such as croissants, breakfast pastries, cakes, and cookies, pizza dough, many sauces and condiments, table sugar, agave nectar and other sweeteners, maple and other syrups, desserts and candy bars, premade fruit-flavored yogurts, sodas, sweetened iced tea and lemonade, flavored coffee drinks ,chocolate drinks. Some alcoholic beverages contain carbohydrates and added sugars. People should limit their consumption of alcoholic beverages, especially: beer, alcoholic fruit drinks, dessert wines, sweet mixers.

More healthful options include for sugar: whole fruits for mixers, especially apples, oranges, pears, or berries, unflavored, plain, or sparkling water, flavored water without added sugar or artificial sweetener, black coffee or coffee with low-fat milk.

Vitamins and minerals

Magnesium intake was inversely associated with diabetes risk. Conversely, higher heme-iron intake was associated with higher diabetes risk.

Beverages

The amounts of alcohol consumption most protective of diabetes were 24 ml/d in women and 22 ml/d in men, but alcohol became harmful at a consumption level above 50 ml/d in women and 60 ml/d in men. In a randomized trial, moderate alcohol consumption improved insulin sensitivity. Coffee consumption was inversely associated with diabetes risk in a dose-response manner. Do not have than two cups of the conventional tea or decaffeinated coffee every day. Try to switch to herbal teas.

Table 1: Diet chart recommended for type 2 diabetic patients

1.	At 6 a.m.	½ teaspoon methi powder + water.
2.	At 7 a.m.	1 cup sugar free tea + 1-2 biscuits.
3.	At 8.30 a.m.	1 plate oatmeal + half bowl sprouted grains + 100 ml milk
4.	At 10.30 a.m.	1 small fruit or 1 cup lemon water.
5.	At 1 p.m.	2 roti of mixed flour, 1 bowl rice, 1 bowl pulse, 1 bowl yogurt, half bowl green vegetable, one plate salad
6.	At 4 p.m.	1 cup tea without sugar + 1-2 less sugar biscuits or toast
7.	At 6 p.m.	1 c1 cup soup

8.	At 8.30 p.m.	2 roti of mixed flour, 1 bowl rice, 1 bowl pulse, half bowl green vegetable, one plate salad
9.	At 10.30 p.m.	take 1 cup fat free milk without sugar.

Table 2: Advice for diabetic patients

1.	Walk every day for 35-40 minute.
2.	Eat food between small time intervals.
3.	Avoid fast and also party.
4.	Wear syounaa diabetic socks who are severe diabetic
5.	Eat food slowly.
6.	Routinely check blood sugar in the morning and 2 hours after at least one meal a day.
7.	Eat different variety of foods
8.	Take care with serving sizes, for example, use a smaller plate.

Table 3: Calorie requirement for diabetic patients

Energy source	Total calories
Carbohydrate	180 gm
Protein	60gm-110gm
Fat	50gm-150gm

3. CONCLUSION

Follow a food patterns in routine life should lower the diabetic risk. High consumption of minimally processed plant based foods; olive oil as the principal source of fat; low- to-moderate consumption of dairy products, fish, and poultry; low consumption of red meat; and low-to- moderate consumption of wine with meals have been associated with lower incident of type 2 diabetes.

CONFLICT OF INTEREST

Authors declared that there is no conflict of interest

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