

Implementation of Proper Nutrition in Managing Diabetes-A Review Article

Sunandita Ghosh*

Department of Food Science and Nutrition, University of Leeds, UK.

*Corresponding author: Ghosh S, Department of Food Science and Nutrition, University of Leeds, UK, E-Mail: sunandita.ghosh11@gmail.com

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Abstract

Diabetes is a disease in which the ability of the body to produce or respond to the hormone, insulin is impaired. There is an increase in the incidence of people affected by diabetes worldwide. Earlier people from developed countries were mostly affected by it but now it is also affecting the people from low and middle income countries. Improper eating habits and sedentary lifestyle is one of the leading reasons for this increase. Diabetes can have major health impacts and can cause premature deaths. As diabetes cannot be cured completely, professionals should come up with different ways in order to delay the onset of the disease or to manage it so that even a diabetes affected individual can lead a healthy life. This review article deals with the type of macronutrients that should be consumed to manage diabetes and also highlights the benefits of Mediterranean diet. The beneficiary effects of Medical Nutrition Therapy and Diabetes Self-Management Training has been discussed. As nutrition complexities cannot be individualized, it is essential to consult a dietician before starting any dietary interventions. This shows that implementation of a healthy diet along with modification of lifestyle can help in managing diabetes.

keywords: *Medical nutrition therapy (MNT); Mediterranean diet; Diabetes self-management training(DSMT)*

Introduction

Diabetes is a chronic disease in which the body is unable to produce insulin or is unable to utilize the insulin produced. Glucose is the primary source of energy of our body and is available from our diet. Insulin is a hormone secreted by the pancreas and helps in controlling the glucose level in blood. Insulin helps in the intake of glucose from food into the cells to be converted into energy [1-6]. If the insulin is not functional there will be glucose accumulation in the blood leading to diabetes. Most common types of diabetes include Type 1 diabetes, Type 2 diabetes and Gestational diabetes. The lesser known diabetes is monogenic diabetes (which is inherited) and cystic fibrosis related diabetes.

Type 1 diabetes is an autoimmune condition in which the body does not make insulin as the immune system destroys the pancreatic beta cells which produces insulin. It is also known as Diabetes mellitus or juvenile-onset diabetes. It is generally diagnosed in children and young adults, although the disease can set at any age [7-13]. People with type 1 diabetes generally needs insulin intake through injection or pump in order to survive. This type of diabetes is not caused due to lifestyle and habits but healthy lifestyle choices can help in reducing the effects of the complications related to diabetes. The overall increase of Type 1 Diabetes worldwide is around 3% [14].

Type 2 diabetes is a progressive condition in which the body does not utilize the insulin efficiently and becomes insulin resistant. Overtime the body loses the ability to produce enough insulin to keep the blood glucose level normal [15-21]. Type 2 diabetes represents 90-95 per cent of all cases of diabetes [22]. People are at a higher risk of being affected by Type 2 diabetes if they have family history of diabetes (genetic disposition) and/or display modifiable lifestyle factors like hypertension, obesity, insufficient physical activity and unhealthy diet [23-29]. There is no complete cure for this type of diabetes. However, along with taking medications, insulin (in some cases), maintaining a healthy lifestyle and a proper diet it can be managed to prevent further health complications.

Gestational diabetes is glucose intolerance diagnosed during pregnancy. It is common among obese and women with family history of diabetes. These women are at an increased of complicated pregnancy. Also their children are at an increased risk of Type 2 diabetes [30].

Diabetes leads to many health complications and also leads to premature deaths in people. Some of the complications due to diabetes are heart disease and stroke, hypertension, blindness and eye problems, kidney disease, nervous system disease, amputations, dental disease and complications of pregnancy etc [31]. Diabetes is becoming a major health problem and gaining global concerns. In 2014, 422 million people had diabetes worldwide. The prevalence of diabetes is rapidly spreading to developing countries. There were around 1.5 million deaths due to diabetes in 2012 [31].

Medications and lifestyle intervention are important ways to treat diabetes. Research has shown that following a healthy lifestyle is more effective than taking medications to prevent or delay type 2 diabetes [31-35].

Summary

Low carbohydrate and high fiber diet

A low carbohydrate and high fiber diet is suggested by many researchers, this has shown to improve the glycemic control which led to the reduction of insulin or medicine intake. This was proved by studying 49 obese and diabetic volunteers, in which they had to consume less than 20 g of carbohydrates per day [36].

Researchers also suggested that low carbohydrate diet especially diet containing food with low glucose availability lowers the blood glucose level [37]. Carbohydrate intake should be from sources like whole grains, vegetable, fruits, legumes etc.

However, carbohydrates should not be avoided completely as carbohydrate containing food is also a good source of fiber, vitamins and minerals which are essential for the proper functioning of the body. High fiber diet containing 50 g or more dietary fiber is effective in metabolic control and being beneficial for diabetic patients [38]. According to American Dietetic Association guidelines the dietary fiber should be around 25 g/day for women and 38 g/day for men. It is believed that water soluble dietary fibers are more effective on the blood glucose and lipoprotein metabolism; however more research has to be done to confirm this. Fibers work by retarding the digestion of food and slowing down the conversion of fat into glucose [39].

Unsaturated fat

High content of fat in the diet, especially diet high in saturated fat impairs insulin functionality and increases Low-density lipoprotein cholesterol levels. Trans fatty acids in the diet should be replaced by non-hydrogenated polyunsaturated fatty acids to reduce the risk of diabetes [40-44]. Total and saturated fat intake is associated with higher risk of diabetes. A study has also showed that frequent meat consumption may also increase the risk of type 2 diabetes as animal meat is a source rich in saturated fat [45]. The dietary fat alters the fatty acid composition of the lipid membrane; this in turn affects the insulin sensitivity. Unsaturated fatty acids are recommended as they have shown to enhance the insulin signaling by increasing the membrane fluidity and improving the lipid profile; thus helping in glycemic control [46].

Hence professional organizations like American Diabetes Association, the American Heart Association, and the U.S. Department of Agriculture recommends the total fat intake to be not more than 30% of calories and low in saturated fat [47].

Protein

Protein is needed for the growth and repair of the body. Protein cannot be broken down into glucose and hence do not directly contribute to the blood glucose level. However plant based proteins should be preferred over meaty based ones as they also contain healthy fats and protein. Protein from fish and chicken may also be included in the diet, however consumption of red and processed meat should be avoided [48-49].

Mediterranean diet

Mediterranean diet is the diet followed in Mediterranean countries. It is a healthy eating pattern and is mostly plant based; it includes whole grains, fruits, vegetables, herbs and spices, beans, nuts, seeds, and olive oil. This type of diet is beneficial as it gives a high intake of fiber and vegetable fat, a lower trans fatty acids intake, moderate protein consumption, a moderate to low consumption of dairy & meat products and a moderate intake of alcohol. It primarily uses virgin olive oil which is a good source of monounsaturated fatty acids and is beneficial to the body. Although this diet has a high intake of total fat but the ratio of monounsaturated fatty acids to saturated fatty acids is more due to the use of olive oil. They also include a lot of seasonal fruits and vegetables. Nuts which is an important part of the diet is a good source of healthy unsaturated fat. It includes fish at least twice a week which is a source of lean protein. Sweets and sugar containing food is limited thus keeping the carbohydrates in check [50-54]. This diet is also quite palatable and people tend to follow it. The Mediterranean diet has been shown to reduce blood pressure, improve blood lipid levels, improve the function of the inner walls of blood vessels, reduce markers of blood vessel inflammation and also reduce cardiovascular diseases. Being physically active is also essential along with following the diet. A study was conducted on 13380 Spanish university graduates without diabetes to analyze the correlation of adherence to the Mediterranean diet and diabetes risk. It was seen that participants who adhered closely to the diet had lower risk of diabetes [55-57].

Medical Nutrition Therapy

Medical Nutrition Therapy (MNT) is defined as “nutritional diagnostic, therapy, and counselling services for the purpose of disease management, which are furnished by a registered dietician or nutrition professional.” [58]. People diagnosed with Type 1 or 2 diabetes should consult a registered dietician (RD) to know about nutrition therapy for managing diabetes. The RD performs the nutritional diagnosis, therapy and counseling depending on the individual requirement of the patient. The goals to be attained while following nutrition therapy are: 1) to follow a healthy eating pattern which will include nutritious food in correct portions to attain the required glycemic, blood pressure and lipid goals. This will also help in attaining

improved overall health. 2) To tackle the nutrition needs in the basis of personal and cultural factors and the desire to make behavioural changes 3) to provide informed positive suggestions about food choices in order to maintain the pleasure of eating 4) to provide practical tools for helping them make daily meal plans [59] .

In order to monitor and evaluate the nutrition requirement of the diabetes patient the RD monitors biochemical factors like A1C, serum lipid levels along with the lifestyle factors. The diagnosis is based on these factors and depending on the nutritional outcomes the therapy can be revised by modifying the eating pattern. This makes MNT a more personalized process to combat or prevent diabetes related complications.

Diabetes self-management training (DSMT) is an integral part of diabetes care. It is an on-going educative training process that helps in prediabetes and diabetes self-care. DSMT incorporates nutritional management into lifestyle along with the training of effective and safe use of medication. MNT and DSMT are not same as MNT deals with more individualized diagnosis, therapy and counseling related to nutrition [60-65]. People with diabetes can follow both DSMT and MNT to effectively tackle the disease.

In a review article by Morris SF et al. it has been stated that research has shown MNT to be effective on diabetes management. American Dietetic Association reviewed 18 case studies where MNT had been implemented by RD to treat either type 1 or type 2 diabetes. In 8 cases a positive result was seen in terms of A1C levels [60]. The onset of type 1 disease cannot be controlled however type 2 diabetes can be delayed or sometimes be prevented with changes in the diet and lifestyle. The American Dietetic Association has stated that MNT is effective at reducing the incidence of type 2 diabetes based on several case studies that implement nutrition therapy and / or lifestyle changes along with nutrition therapy [60].

Some of the general dietary guidelines that need to be followed to help manage diabetes are not to skip meals, to evenly distribute the meals throughout the day in small portions and to have a diet low in saturated fat. As individual needs vary from person to person, one must consult a dietician before following any dietary regime [66-80]. There should be a balance of energy in the body such that food intake is not more or less than the energy burnt by the body. Different eating patterns are followed depending upon personal, cultural preference, metabolic goals and eating patterns. Essentially there should be an optimal mix of macronutrients and the diet interventions should be consulted with a dietician [81-100].

Conclusions

Diabetes has become a worldwide concern in the recent years. Unhealthy lifestyle and improper eating habits is the major cause of rise in the number of diabetic patients. The onset of type 1 diabetes cannot be controlled but type 2 diabetes can be delayed or prevented by the implementation of healthy lifestyle habits and intake of proper nutrition. Every individual has different dietary needs; hence a dietician should be consulted to implement nutrition therapy into diabetes management. More research is needed to know about the effect of nutrition intake on diabetes so that more defined eating patterns can be strategized and implemented on diabetic patients to reduce the health risks. Eating a well-balanced meal and maintaining proper lifestyle with sufficient physical activity is an essential part of managing diabetes for people with diabetes and those with the risk of diabetes.

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