

Review

# Diet and Management of Type II Diabetes Mellitus in the United Kingdom: A Narrative Review

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**Abstract:** Diabetes is a major public health problem and is emerging as a pandemic. The fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories burned up. Physical activity is one of the mainstay clinical interventions for preventing metabolic diseases, and dietary habits are the primary factor for the rapidly rising incidence of DM. Reducing weight and maintaining a healthy weight, reducing energy intake, and food intake high in vegetables, fruit, whole grains, legumes, nuts, and dairy products are core parts of management. We performed a narrative literature review, manual-search of reference lists of included articles, and relevant reviews. The main purpose of this review was to discuss the role of psychosocial factors and diet in the control of type II Diabetes.

**Keywords:** diabetes; type II diabetes; dietary patterns; lifestyle; management; obesity



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## 1. Introduction

Type II diabetes is a chronic metabolic disorder that results in hyperglycaemia due to the body's ineffectiveness in using the insulin produced by the pancreas [1]. Type II diabetes is also known as adult-onset diabetes. Diabetes is a significant public health problem emerging as a pandemic [2]. According to World Health Organization (WHO) estimates, around 5 million people die every year because of improper management of diabetes, and it is expected to become the seventh leading cause of death globally by 2030 [1]. Diabetes is potentially the most significant health crisis the UK has faced in 20 years. About 4 million people have diabetes in England, meaning one in 15 has the condition [3].

According to the Annual Diabetes Prevalence UK, more than 5 million people will be diagnosed with Diabetes in England [4]. More than 500 people with diabetes die prematurely every week in the United Kingdom. A significant amount of money is spent on diabetes care, most of which is spent on complications. It is estimated that diabetes costs the National Health Services (NHS) over £10 billion a year, 10% of the total NHS budget [5]. Type II diabetes is difficult to manage, and with each passing year, it is becoming a significant economic burden for NHS [3].

Compared to people without diabetes, people with type II diabetes are nearly 2.5 times more likely to have a heart attack, heart failure, and stroke [4]. Several potentially modifiable risk factors are related to diabetes, including insulin resistance, obesity, physical inactivity, and dietary factors [2]. Dietary factors are of paramount importance in managing and preventing type II diabetes. Diabetes is one of the most significant global public health issues, which needs urgent solutions for slowing or even reversing this trend by investing in modifiable factors, including diet, physical activity, and weight [6]. This essay aims to discuss how psychosocial factors and diet contribute to managing type II diabetes critically. The discussion starts with description of diet in diabetes control, followed by the

sociological and psychological factors contributing to the increased prevalence of type II diabetes. Furthermore, this essay will include the current policies and interventions in the UK to promote a healthy diet in diabetic patients.

Diet is a leading contributor to morbidity and mortality worldwide [7]. The importance of nutrition in managing and preventing type II diabetes through weight and metabolic control is evident. However, nutrition is also one of the most complex and challenging aspects of managing type II diabetes [6]. The idea of being on a diet for a chronic lifelong condition like diabetes is enough to put many people off, as knowing the type of food to eat and maintaining an optimal eating pattern are challenging. Medical nutrition therapy introduced to guide a systematic and evidence-based approach to controlling type II diabetes through diet is effective [8]. There is a wide variation in dietary modification alone to manage type II diabetes. In the UK, 31% of patients treated by lifestyle measures may be less closely managed than patients on medication for type II diabetes [9]. Although their regular measures in the NHS systems record diabetes care, dietary information is not recorded.

Similarly, attention to the diet pattern is needed to achieve adequate glycaemic control [10]. Diet can be individualized depending on age, weight, gender, health, condition, and occupation. Different dietary guidelines promote nutritional well-being, glycaemic control, and prevent diabetes-related complications [11]. The main purpose of this review was to discuss the role of diet in the management and control of Type II Diabetes.

## 2. Materials and Methods

We reviewed the published literature to identify studies regarding diet and diabetes management. Electronic searches of databases including Medline, Scopus, PubMed, CINAHL, Cochrane Library, Google, and Google Scholar were searched for the literature published from January 1990 to December 2020. Boolean operators were used to searching relevant articles. Keywords including type II diabetes OR diabetes AND dietary patterns OR lifestyle AND management OR obesity were used for literature review.

## 3. Discussion

### 3.1. Diet and Diabetes Control

Schulz et al. [12] found that the availability of healthy food influences individual dietary choices. In some instances, it is difficult for patients to comply with the prescription of a diabetic diet, and this is a consequence of social factors such as illiteracy, poverty, and cultural misconceptions about the role of diet in the management of type II DM. The usually recommended daily energy intake for the non-obese diabetic patient is between 1500 and 2500 kcalories per day, the average allowance being 2000 kcalories per day. The recommended overweight diabetic patient is between 800 and 1500 kcalories per day, while the underweight should be allowed at least 2500 kcalories per day [13].

Attitudes and practices to manage type II diabetes are important social factors. These factors are considered an integral part of comprehensive diabetes care [14]. There remains a lack of understanding in diabetic patients regarding the importance of diet in diabetes management [15]. Dietary patterns are frameworks that based on individuals' meal portion size, eating pattern (frequency, spacing, skipping, timing) or occasion of mealtime (breakfast, snack, lunch, supper or dinner) or content of meal (food combinations and type, protein, fat and carbohydrate composition) [16]. Studies have shown that assessing a patient's dietary attitude may considerably benefit treatment compliance, which decreases the occurrence rate of complications [15]. Various studies have documented the increased prevalence of eating disorders and their symptoms in type II diabetes. Most of these studies have discussed binge eating disorders due to their strong correlation with obesity, a condition that leads to type II diabetes [17]. Cultural backgrounds mainly influence diabetic dietary practices. Due to their traditions, in some Arabic households, red meat and fried food are consumed more by males than females. Additionally, the percentage of males to females in daily rice consumption was significantly high. Food practices like

these affect the health of male diabetic patients [18]. The vegan diet eliminates meat and animal products, which reduces the intake of cholesterol and saturated fat and reduces the overall risk of metabolic disease such as obesity, diabetes, coronary heart disease, and high blood pressure [19,20]. Another popular diet is the Mediterranean one based on vegetables, cereals, legumes, olive oil, fruits, nuts, yogurt, cheese, and moderate content of fish, meat, and chicken, which has been shown to reduce cardio metabolic events [21].

American Diabetes Association has defined self-dietary management as the critical step in diabetics, including the knowledge and skill concerning treatment, nutritional aspects, medications, and complications [22]. There is enough evidence to support that nutrition is vital in managing diabetes, including the type and quantity of food, which influences blood sugar. Correct knowledge is essential, and meals should be consumed regularly with low fat and high fibre contents, including a limited amount of carbohydrates [22]. Dietary knowledge is a requirement to achieve better compliance with medical therapy. Low awareness of diet management negatively affects the outcome of diabetes [23]. A recent study which evaluate the association between quality of diet and incident of type II diabetes among individuals with a higher genetic risk. Study results revealed that people with higher genetic risk may well benefit more from compliance to a healthy diet in diabetes prevention [24].

### 3.2. Psychological and Sociological Factors

An in-depth analysis concerning psychological and sociological factors with diet amongst diabetic patients should be evaluated in further detail. Psychological and Sociological factors are components of a social model of health, postulated by Dahlgren and Whitehead, which estimates that different adaptable factors combine and cause inequalities [25]. Social determinants of health are conditions in the environment in which people are born, live, learn, work, play, worship, and age, and these conditions affect health, functioning, and quality of life outcomes and risks [26]. According to the social model, the first layer is personal behaviour and living, promoting or damaging health. The next layer is social and community influences, which provide mutual support for community members in unfavourable conditions. The third layer includes structural factors such as housing, working conditions, access to services, and provision of essential facilities [25]. According to the WHO constitution, all individuals have a right to the highest attainable standard of health, and governments have the overall responsibility to improve their populations' health by providing adequate health and social measures [27].

Different sociological and environmental factors affect the diabetic patient's food choice, and the most critical factor is socioeconomic status. A healthy diet is recommended, but its cost is prohibitively high in many settings. The cost of two servings of fruits and three servings of vegetables a day per individual (to complete five a day guidance) accounted for 52%, 18%, 16%, and 2% of household income is low, low to middle, middle to high, and high-income households, respectively [28]. The relationship between low socioeconomic status and poor health is complicated. In some countries like the UK, an extensive market of foods, especially for diabetes, also exists. However, these products are dearer to buy than regular grocery items; challenging such food items could be less healthy than the regular food [6]. After new European Union legislation, food regulations in some countries, including the UK, were updated in 2016 to ban misleading labels [6]. Low-income groups have a greater tendency to consume unbalanced diets and have a low intake of fruits and vegetables. According to a study, low fruit and vegetable consumption was higher among diabetic patients with lower socioeconomic groups [29]. Increasingly, ubiquitous fast-food chains have also affected people's dietary habits. Because supermarket food products tend to be highly processed and have long shelf lives, people buy them for economic and practical reasons. Food marketing and advertising companies also play an essential role in changing people's lifestyles [30].

Diabetes is related to social status and psychosocial factors. Recent studies have reported an increase in the prevalence of type II diabetes in deprived areas and described

a significant inverse relationship between impaired glucose tolerance and employment grade [31]. Adherence to a healthy diet in type II diabetes is associated with better social support. Some aspects related to families, such as the diet habits of the spouse, are also associated with compliance to diet and treatment, and it is crucial for the practicing physicians and for institutional programs to consider factors related to adherence to treatment [32]. Negative factors such as dietary restrictions, uncontrolled eating, and emotional eating are strongly associated with psychosocial factors. According to Mazur [33], there is a strong association between psychosocial factors and emotional eating. Thus, mood and stress can influence food choices and possibly short and long-term responses to diabetic dietary interventions. The knowledge of disordered eating predictors may become the basis for providing more effective intervention programs, aiming to make people aware of the mechanisms that lead to different metabolic disorders and potential consequences for health at present and in the future [33].

Psychological stress is a common feature of modern life and can modify health behaviours, such as physical activity, smoking, or food choice. The evidence supporting psychological determinants and food choice is limited and proposed mechanisms for the relationship are complex [34]. Stress is a psychological factor, and it triggers changes in human behaviours that affect health; the effect of stress on food choices is complex and individualistic. Some people eat more, and some eat more petite than average when experiencing stress [35]. It is believed that stress-induced changes, due to differences in motivation, physiological changes in eating opportunities, food availability, and meal preparation [36]. Studies also reveal that if work stress is prolonged or frequent, then adverse dietary changes could increase the possibility of weight gain, consequently increasing the risk for diabetes and cardiovascular risk [37].

Another psychological factor that affects the choice of food is mood. Hippocrates was the first to suggest the healing power of food. However, it was not until the middle ages that food was considered a tool that could change an individual's temperament and mood and leverage food choice. Individuals report food cravings. The relationship with food for dieters means that people may feel guilty after indulging in food or attempting to restrict food which could increase the desire for food intake [34]. Women more commonly report food cravings than men. A depressed mood appears to influence the severity of these cravings [38]. On the other side, studies have suggested that diet is linked with greater risk of depression such as refined grain, sugar and oily foods are associated with increased symptoms [39,40].

Depression is a psychological factor that is common among diabetic patients with complications. Depressive symptom severity is associated with poor diet and medication regimen adherence, functional impairment, and higher health care costs in diabetic patients in primary care [41]. Research shows that depression is associated with increased medical expenses due to a chronic medical illness and increased indirect costs (days off from work). The patient conducts about 95% of diabetes management; comorbid depression in diabetes may lead to poorer outcomes and increased risk of complications by lowering adherence to glucose monitoring, exercise, diet, and medication regimens [41]. In recent years, the relationship between nutrition and depressive disorders has increased interest in both observational and clinical studies. Depression directly interacts with diet management and food habits due to emotional disturbances are associated with depressive symptoms [42].

### *3.3. Effective Interventions, Policies, and Public Health Approaches*

Having critically evaluated some of the specific sociological and psychological issues of type II diabetes, the discussion includes the current effective interventions, policies, and public health approaches. The essay also highlights the challenges that need to be addressed regarding diabetes. Over recent years, the quality of NHS services for people with or at risk of diabetes has improved. The NHS Diabetes Prevention Programme (NHS DPP) was established in April 2018 by Diabetes UK, working together with NHS England and Public Health England. The program helps people lose weight and get more active over nine

months, to reduce their risk of type II diabetes. NHS health check program was launched in 2009; it offers a five-yearly check-up to everyone aged 40 to 74 with the aim of early diagnosis of diabetes, dementia, and other chronic diseases [4]. The Diabetes Treatment and Care transformation funding and CCG Improvement and Assessment Framework together provide the focus for improving the care, support, and treatment available for diabetic patients [43]. The National Service Framework (NSF) for Diabetes includes standards, rationales, key interventions, and analysis of planning services' implications. The critical interventions underpinning the standards in the NSF are based on research evidence. It is a 10-year program that intends to enable more people to live free of diabetes and live free from the complications of diabetes and its consequences [44]. While there has been progression against the standards outlined in NSF for Diabetes, there is still a significant amount of work to do before the NSF vision of high-quality diabetes services for all is achieved due to the increasing prevalence of diabetes [45].

Diabetes does not just affect a person physically. Changes in mood due to varying blood sugar levels and the relentless need to manage the condition affect people's mental health. Interventions related to emotional and psychological support are required [4]. National Institute for Health and Care Excellence and Diabetes UK recommend nine care processes for people living with diabetes. These are checks for blood sugar levels, blood pressure, cholesterol, serum creatinine, BMI, and other specific body screening [4]. The Complications and Mortality Audit showed that, over seven years, people with type II diabetes who received all their annual healthcare checks had better outcomes, including lower mortality and reduced progression to heart failure. Over the last five years, significant improvements through successful approaches have been seen: more people with diabetes accessing high-quality care closer to home. Quality improvement processes that use clinical audit data to identify what is working well have been implemented [46].

It is evident from the discussion that significant advances have been made to improve diabetes care for all the people living with diabetes and advancements in the prevention of type II diabetes. Investment through the transformation fund and the NHS Diabetes Prevention Programme and support to extend the reach of diabetes education are starting to show results. However, nationally and locally, a sustained commitment from the government and the NHS is needed to ensure that this progress continues and is stepped up where needed to address the diabetes crisis [4]. Besides all government efforts, limited interventions focus on increasing the knowledge to prevent diabetes through lifestyle modifications. Effective lifestyle modifications include counselling on weight loss, adopting a healthy dietary pattern, and physical activity. People with type II diabetes should be encouraged to adopt a healthy living. Type II diabetic patients require reinforcement of diabetes education, including dietary management through stakeholders (healthcare providers, health-facilitators) to better understand the disease management for improved self-care and better quality of life [22]. The success of dietary management requires the health professionals to orient the patients' cultural beliefs, thoughts, family, and communal networks. As diabetes is a chronic disease, proper therapy interventions with particular emphasis on a diet should be given by the healthcare providers to control the disease, reduce the symptoms, and prevent complications [22].

#### 4. Conclusions

In conclusion, this review has described the critical role of diet in controlling and managing type II diabetes. Additionally, it has evaluated the psychological and sociological issues responsible for unhealthy food choices in type II diabetes. It is imperative that active and effective dietary education continues be provided to the diabetes patients to prevent the onset of diabetes and its complications. Furthermore, there is a need to empower individuals to make better dietary choices, healthy eating patterns, and weight management.

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