

Current Status and Research Progress of Dietary Intervention for Type 2 Diabetes Mellitus Patients

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ABSTRACT

With the development of China's economy and the improvement of people's living standards, as well as the acceleration of population aging, the prevalence of type 2 diabetes mellitus has shown a gradual upward trend, and dietary intervention is as one of the most important measures for the treatment of diabetes mellitus. The purpose of this paper is to discuss the current situation and research progress of dietary intervention for type 2 diabetes mellitus patients. Through combing and analysing the relevant literature at home and abroad, it is found that the current dietary intervention for type 2 diabetes mellitus patients has achieved certain results in the formulation of personalized programs, the implementation of nutritional education, and the exploration of new dietary modes, etc., but there are still problems such as low compliance and insufficient persistence of the intervention effect. In the future, it is necessary to further optimise the dietary intervention strategy to enhance the intervention effect and improve the patients' quality of life and glycaemic control.

KEYWORDS

Type 2 diabetes mellitus; Dietary intervention; Research progress

1 Introduction

Diabetes mellitus, as a global chronic metabolic disease, has become a major public health problem that seriously threatens human health. Data from the International Diabetes Federation (IDF) show that the number of diabetic patients around the world continues to climb, placing a heavy burden on the socio-economic and personal quality of life. Among the many types of diabetes, type 2 diabetes accounts for more than 90 per cent and is the most common type. In recent years, with the change in lifestyle, people eat high-calorie, high-fat and high-sugar foods to meet their personal needs, coupled with a lack of exercise in daily life, the incidence of type 2 diabetes is on a rapid rise, and the age of onset of the disease is gradually becoming younger. Diet is one of the key environmental factors in the development of type 2 diabetes mellitus, and irrational dietary structure is not only an important causative factor in the development of the disease, but also a core factor that affects the control of the disease. Scientific and reasonable dietary interventions can effectively regulate blood glucose levels, improve insulin sensitivity and reduce insulin resistance, thereby delaying the progression of diabetes and reducing the risk of complications. Therefore, an in-depth understanding of the current situation and research progress of dietary intervention for type 2 diabetes mellitus patients is of great significance for optimising clinical treatment protocols, improving patients' quality of life, and reducing the burden of social healthcare.

2 Overview of dietary intervention for patients with type 2 diabetes mellitus

2.1 Definition of dietary intervention for type 2 diabetes mellitus

Dietary behavioural intervention, as a deepening practice of dietary treatment, involves the development and application of dietary measurement and assessment tools, and the strengthening of health education, aiming at guiding patients to accurately grasp their dietary structure. Among them, the appropriate design of individualised dietary regimens is the core element of successful intervention, and the precise formulation of dietary regimens directly determines the ultimate effectiveness of dietary treatment^[1]. Only by tailoring a scientific and feasible dietary plan according to the metabolic characteristics, lifestyle, and stage of disease progression of individual patients can we effectively regulate blood glucose fluctuations, improve insulin sensitivity, delay the occurrence and development of complications, and effectively improve the quality of life and disease management of patients.

2.2 Analysis of the current situation of dietary intervention in type 2 diabetes mellitus

Relevant studies have shown that most people have limited knowledge of the disease, patients and their families have a low level of literacy and insufficient knowledge of its importance, especially elderly patients with type 2 diabetes mellitus due to the decline in body functions, poor dietary compliance, and thus low willingness to dietary management; there are also patients who are not able to scientifically adjust their dietary structure due to a lack of understanding of the composition of the food^[2]. Clinical observation reveals that a certain proportion of patients mistakenly regard the refusal of staple foods, fruits, fine grains, or excessive dieting as an effective way of glycaemic control, which is in fact

unsatisfactory^[3]. The essence of scientific dietary management for type 2 diabetes mellitus patients is to maintain dietary balance, while inappropriate dietary intervention strategies carry the risk of malnutrition and impaired functioning in daily life.

3 Advances in dietary interventions for type 2 diabetes mellitus

3.1 Personalised dietary intervention programmes

Many studies have shown that personalised dietary intervention programmes are effective in glycaemic control in patients with type 2 diabetes mellitus^[4], and the development of a meal plan that meets the health needs of patients with type 2 diabetes mellitus is a prerequisite for dietary management. Currently, there is a lack of suitable diabetic dietary measurement tools in the field of dietary intervention in China, although the improved diabetic food exchange method based on the traditional food exchange portion method has been widely used in recent years, and the Food Exchange Table recommended by the Japanese Diabetes Association^[5] is based on the traditional food exchange portion method, but with significant improvements. The Food Exchange Table combines different foods with similar nutrient compositions in the same table, which uses the simplest graphic method to simplify complex calculations, making it easier for patients to grasp and acceptability. The prevalence of communal dietary patterns in our country leads to challenges in the accurate estimation of individual food intake, making the promotion of this tool a natural limitation^[6].

For patients with diabetes, a targeted dietary plan is needed for food selection, such as choosing to consume more vegetable oils, consuming more coarse grains, and trying to choose fruits with low sugar content if they are to be eaten. For patients with abnormal liver function, protein intake needs to be reduced. As well as patients should have a more regular meal time every day, each meal needs to be quantitative, to ensure that meat and vegetable mix, in order to slow down the rate of increase in blood glucose as well as the magnitude. In order to control blood glucose, try not to eat fried food, and eat high protein and high fibre food.

3.2 Nutrition Education and Dietary Intervention

Nutrition education is an important part of dietary intervention. Through various forms of nutrition education activities, such as health talks, one-on-one counselling and distribution of pamphlets, patients are educated about diabetic diet, including the glycemic index of foods, nutrient composition, and reasonable dietary combinations, which can enhance their understanding of the importance of dietary interventions and improve their ability of self-management. Nowadays, researchers are trying more diversified forms of education, with more emphasis on interactivity and stimulation of patients' interest on the original basis. For example, thematic training, group demonstration teaching and experience sharing sessions among patients have shown better results. This direction is also supported by the research of scholars such as Wang Hong^[7], who suggested that the use of health knowledge forums, publicity columns, brochures and other carriers for the popularisation of diabetic diet can be more effective in helping patients to stabilise their blood glucose levels. On the other hand, the innovation of missionary tools is also crucial. A good example is provided by the study of Zhou Qinyuan^[8], who used food modelling to guide patients to learn the principles of food selection and combinations. It was found that this approach not only enhanced patients' understanding, but also improved glycaemic control. Therefore, enhancing patients' knowledge can help them understand the complications of diabetes and make them more aware of the crisis, and at the same time, help them understand the indispensability of dietary interventions and ultimately take them seriously.

3.3 Novel dietary patterns

In recent years, some novel dietary patterns have been explored and applied in dietary intervention for patients with type 2 diabetes. For example, low-carbohydrate diet, by limiting the intake of carbohydrates and increasing the intake of proteins and healthy fats, can effectively reduce patients' blood glucose and insulin levels. Studies have shown that a low-carbohydrate diet can regulate blood glucose, reduce weight and decrease the chance of cardiovascular occurrence in type 2 diabetes patients in the short term^[9]. Zhong Dongci^[10] et al. demonstrated the effectiveness of KD in treating diabetic patients both at home and abroad, and after Meta-analysis, KD is a dietary therapy that can effectively reduce glycated haemoglobin levels, weight loss and triglyceride levels in diabetic patients.

The Mediterranean diet is based on vegetables, fruits, whole grains, legumes, nuts, olive oil, moderate intake of fish and poultry, and restriction of red meat and processed foods; this dietary pattern is rich in antioxidants and dietary fibre, which helps to improve insulin sensitivity and control blood glucose and lipid levels^[11].

Intermittent fasting is also an emerging dietary therapy^[12] that has been shown to be effective in glycaemic control and weight management in type 2 diabetes by regulating the body's metabolism through controlling the timing and periodicity of food intake. Some research suggest that intermittent fasting (IF) shows the potential to outperform standard pharmacological treatments under certain conditions. The study observed that IF not only helps to reduce the insulin dose used by patients, but also improves the level of glycaemic control more effectively. Based on this, the researchers

propose that a therapeutic fasting programme under strict medical supervision may offer a way to reverse the disease process in some patients with type 2 diabetes. If successfully applied, this strategy would significantly reduce the need for patients to rely on glucose-lowering medications and may reduce the need to undergo surgical intervention in the future.

3.4 Dietary interventions with community and family support

Communities and families play an important role in dietary interventions for people with type 2 diabetes. Establishing a health education group based on a community platform is an effective strategy. Core members of this group should be selected from doctors and nurses with rich clinical experience and good teaching skills. At the same time, a diabetes specialist clinic should be set up in the community to provide physical support for the group's work. Under this framework, the role of doctors focuses on knowledge transfer and professional guidance, and they are mainly responsible for teaching the courses as well as providing individualised counselling and supervision. Nurses take on the coordination and support functions, including distribution of promotional materials, collection, organisation and filing of relevant information during the activity period, and implementation of outcome assessment, as well as participating in some of the teaching content. The in-depth participation of nurses helps to bring them closer to patients and enhance their sense of trust. In addition, the integration of the family doctor service mechanism enables continuity of health education for patients by signing a family doctor service agreement with them. This continuity of care model has been shown to help improve patient compliance with dietary therapy, which in turn supports the achievement of effective disease control.

4 Conclusion

This article discusses the current situation and research progress of dietary intervention for patients with type 2 diabetes. Currently, the prevalence of type 2 diabetes mellitus in China is on the rise with economic development and lifestyle changes. Dietary intervention is an important therapeutic measure, and its core lies in the development of personalised programmes, enhanced nutritional education, exploration of new dietary patterns, and reliance on community and family support.

Studies have shown that personalised dietary plans are effective but limited by the shortage of medical resources; nutrition education can improve patients' self-management ability through diversified forms and innovative tools; new models such as low-carbohydrate diets, Mediterranean diets, and intermittent fasting have shown potential for glycemic control and metabolic improvement; and dietary adherence can be enhanced by the collaborative support of the community and the family. However, there are still problems such as low adherence to interventions, lack of sustainability, and the long-term safety of the new modalities to be verified.

In the future, it is necessary to optimise the intervention programme with the help of technology, expand long-term nutritional education, and improve the community and family support system, so as to enhance the effect of intervention and improve the health of patients.

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