

# *Progress of the General Medicine Management Model in Patients with Type II Diabetes Mellitus*

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**Abstract:** The incidence of type II diabetes mellitus in adults is high, and most of the diagnosis and treatment of diabetes mellitus are still based on the traditional "outpatient consultation and self-medication" model, which makes it difficult to achieve the best therapeutic effect. In recent years, more and more patients with type II diabetes are benefiting from the effectiveness of the general medicine management model in chronic disease management. General medicine is a comprehensive medical field integrated by multiple disciplines, and in the health management of type II diabetes patients, it involves case management, follow-up management and health behaviour intervention, and the effects of its application are mainly manifested in the improvement of disease awareness and treatment compliance, as well as the improvement of glycemic control. In this paper, we review the implementation of general medicine management model in patients with type II diabetes mellitus and its application effects.

## 1. Introduction

Diabetes is a metabolic disease in which glucose levels in the blood are chronically high, with type II diabetes being the most common, and type II diabetes accounting for about 90% of all diabetic patients [1]. It has been reported [2] that the prevalence of type II diabetes mellitus in adults in China has exceeded 10.4%, and the incidence is even higher in the obese population, which affects the quality of life of patients and brings great family burden. At present, the main clinical treatment of type II diabetes mellitus includes taking glucose-lowering drugs, supplementation of exogenous insulin, and health behavioural interventions [3], but it is difficult to achieve an effective treatment effect by simply relying on the outpatient treatment interventions in hospitals or self-management by the patients over a long period of time. Family medicine is a

community- and family-oriented comprehensive medicine that consists of biomedicine, preventive medicine, social medicine, and integrated clinical medicine [4]. The World Health Organization report suggests that patient-centred health education plays an important role in the effective management of chronic diseases. One such model, general medicine management, aims to help patients manage the treatment of chronic diseases and prevent complications, while maintaining or improving their quality of life. In recent years, general medicine management has played an important role in the disease management process of patients with type II diabetes. Some scholars have pointed out [5] that type II diabetes has a long disease duration, and traditional treatment interventions can no longer meet the needs of patients, and that general medicine management can play a role in the health management of type II diabetes by providing long-term follow-up, monitoring, and guidance services.

## **2. Pathogenesis of type II diabetes mellitus**

Studies have shown that type II diabetes mellitus has a certain genetic susceptibility, with a prevalence rate of 3.76% in first-degree relatives of patients, compared with only 1.10% in first-degree relatives of healthy people [6]. In addition to the patient's own factors, environmental factors are indispensable in the development of type II diabetes mellitus [7], and factors such as overweight, obesity, age, increase, occupational stress, dietary habits, and smoking and alcohol consumption can significantly contribute to the development of diabetes mellitus [8]. Therefore, individuals with a genetic background for type II diabetes who live in environments that predispose them to diabetes will have a significantly increased incidence of type II diabetes. Genetic and environmental factors have synergistic roles in the development of diabetes mellitus. If type II diabetes mellitus is present in the family, individuals should try to avoid the stimulation of type II diabetes mellitus-inducing undesirable factors in their life, with a view to reducing the occurrence of type II diabetes mellitus. Insulin resistance is an important pathological feature of type II diabetes mellitus, and it has been shown that defective insulin receptor function is the direct cause of insulin resistance. The insulin receptor is mainly expressed on the membrane of insulin target cells and belongs to the receptor tyrosine kinase family. It specifically binds to insulin, activates intracellular receptors, phosphorylates them, and transduces insulin signals, which leads to changes in the physiological structure and function of the target cells and promotes the transport of extracellular glucose into the target cells, while at the same time, glucose metabolism enzymes are activated to regulate glucose metabolism and to maintain dynamic balance of glucose in the blood. The dynamic balance of glucose in the blood is maintained. Defects in insulin receptor function result in the normal secretion of insulin not being able to effectively act on the insulin receptor to activate the target cells, resulting in the inability of glucose to enter the cells and be utilised, leading to an increase in the level of free glucose in the blood, and triggering type II diabetes mellitus.

## **3. Treatment measures for type II diabetes mellitus**

Currently, the treatment of type II diabetes mellitus is based on moderate exercise and dietary control in combination with two or more hypoglycaemic agents with different mechanisms of glucose-lowering action [9]. At present, drugs for the treatment of type II diabetes mellitus are clinically classified according to the mode of administration. At present, drugs for the treatment of type II diabetes mellitus are classified into oral hypoglycaemic drugs and insulin according to the mode of administration. The Chinese Diabetes Association of the Chinese Medical Association issued a medical guideline in 2013, "Chinese T2DM Treatment Guidelines" [10], stating that metformin is not used as a first-line drug, but as a preferred drug. For sulfonylurea glucose-lowering drugs, both the 2013 edition of the Chinese Guidelines for the Prevention and

Control of T2DM and the Global Guidelines for the Treatment of Type II Diabetes Mellitus, published by ID in 2014, state that metformin is to be used as a first-line alternative as well as a second-line preferred medication in patients with type II diabetes who are not suitable for metformin treatment [11]. In this regard, the American Association of Clinical Endocrinologists and the American Society of Endocrinology published guidelines in 2016 stating that sulfonylurea glucose-lowering drugs are used as first-line drugs for type II diabetes, but should be used with caution [12]. The American Diabetes Association recommended sulfonylurea hypoglycaemic agents as the second-line medication after metformin treatment in its guidelines released in 2016 [13]. In addition,  $\alpha$ -glucosidase inhibitor hypoglycaemic agents represented by acarbose, voglibose and miglitol can slow down the absorption of glucose in the intestine to lower blood glucose, especially postprandial glucose. In addition, because of the reduced glucose-lowering effect of glinides compared with sulfonylureas, glinides are often used in combination with other glucose-lowering drugs in the clinical control of blood glucose in patients with type II diabetes mellitus [14].

#### **4. The concept of general medicine management and its application in chronic disease management**

Family medicine is a comprehensive medicine integrated by biomedicine, social medicine, behavioural medicine and other related disciplines, also known as family medicine [15]. The field of general medicine in China started late, and in the early stage of development, general medicine was mainly transformed from community outpatient clinics or some physicians in first-class hospitals, and since 2010, specialised training or further training in general medicine has gradually spread, and it has become a systematic, scientific and standardised "biopsychosocial" medical model, which has been widely used in clinical practice. It is widely used in clinical practice. At present, the application of general medicine management model mainly focuses on the health management of non-communicable chronic diseases such as hypertension and diabetes. Some scholars have suggested [16] that the theory and service model of general medicine, from the point of view of symptomatology and health management, to conduct a comprehensive assessment of hypertensive patients in the community, and to provide patients with "private tailor-made" personalised treatment plans can significantly improve patients' adherence to treatment, promote the blood pressure standard, and reduce the incidence of hypertension-related complications. Sun Lan et al [17] investigated 5558 hypertensive patients receiving general medicine management in Shanghai and found that the blood pressure control compliance rate was 56.37%, and pointed out that women were better than men in terms of blood pressure control, and those who had been managed for <5 years were better than those who had been managed for  $\geq 5$  years. In the application of management of diabetes, the general medicine management model has a positive effect on glycaemic control of diabetic patients in the community. Zhang Rui [18] pointed out that compared with conventional treatment, blood glucose indicators and BMI were significantly reduced in type II diabetes patients after the intervention of the general medicine diagnosis and treatment model, and the quality of life scores of type II diabetes patients managed by general medicine were higher than those of patients managed by conventional management during the follow-up time.

#### **5. general medicine management for patients with type II diabetes mellitus**

##### **5.1 Behavioural intervention**

Behavioural intervention mainly involves medication guidance, dietary guidance and healthy exercise intervention, which is the main implementation link in the comprehensive management of type II diabetes mellitus patients in general medicine. At present, the development of medical

technology is still difficult to completely cure diabetic patients and achieve regression, mainly through taking hypoglycemic drugs or injecting insulin to control blood glucose, improve the patient's condition and inhibit the occurrence of diabetic complications at the same time. However, in the actual clinical work, some patients with type II diabetes mellitus often appear to miss the medication and stop taking the medication. Li Hongchao et al [19] investigated 2236 cases of type II diabetes mellitus patients and pointed out that patients with high monthly income were more likely to miss and stop taking medication than those with low monthly income, and the longer the patient's condition was, the more obvious the situation of missing and stopping medication was. The development of general medicine management mode is conducive to improving this situation. Through case management and follow-up management, we can clearly understand the medication status of patients and the influencing factors of poor medication compliance, and at the same time, we can provide effective interventions and medication guidance, so as to achieve the goal of improving the self-management ability of patients. Fu Jinhua et al [20] pointed out that giving patients with type II diabetes mellitus reasonable medication guidance can not only improve patients' knowledge of the disease and medication compliance, but also have a positive effect on improving patients' glycaemic control. Other studies have shown [21] that dietary guidance and healthy exercise interventions are effective in glycaemic management of type II diabetes mellitus patients and can effectively improve glucose metabolism and lipid metabolism, and reduce BMI and serum resistin levels in patients. Studies have shown [22] that diabetes mellitus generally requires lifelong treatment, and in addition to medication control, adherence to daily diet, exercise, work and rest, and other aspects of the adjustment is the key link in controlling blood glucose. Chen Gang et al [23] divided 100 cases of community type II diabetes mellitus patients into the control group and intervention group for research, respectively, to give the conventional drug therapy, drugs combined with dietary guidance and exercise management intervention, the results show that six months after the intervention, the intervention group of type II diabetes mellitus patients with FPG, 2 hPG, HbA1c level is significantly lower than that of the control group, and the degree of improvement of the various lipid indexes is significantly better than that of the control group, the results show that in the community type II diabetes mellitus patients with FPG, 2 hPG, HbA1c level is significantly lower than that of the control group. It is considered that intensive dietary exercise therapy plays an important role in the management of type II diabetes in the community. Dong Hongfeng [24] used general medicine to treat patients with type II diabetes mellitus, and the results of his study showed that the rate of adherence to treatment was significantly higher in patients treated with general medicine than in the control group, and that the incidence of hypoglycaemia and the levels of creatinine and urea nitrogen were significantly lower than those of patients treated with general medicine than in the control group.

## 5.2 Case management

Case management is the foundation of comprehensive management in general medicine. Under the principle of "voluntary and informed", individualised management files and intervention schedules are formulated according to the patient's own condition, clinical characteristics, personal background and other information, and detailed records are kept on the subsequent development of the condition, the effect of blood glucose control and the use of medication, which has a significant guiding role in the smooth implementation of the prevention and treatment of type II diabetes mellitus and the adjustment of the work. guiding role. Cai Ying et al [25] pointed out that after 6 months of case management mode intervention, the medication adherence of patients with type II diabetes mellitus was significantly higher than that of patients with type II diabetes mellitus who had received the conventional management mode, and thanks to the improvement of medication

adherence, the improvement of the glycaemic index BMI of this group of patients was more obvious. In the study of Zhang Yan et al [26], their 135 cases of type II diabetes mellitus patients to establish a personal health file, individualized education, in the implementation of multidisciplinary integrated management, enrolled 135 cases of type II diabetes mellitus patients compared with 135 cases of type II diabetes mellitus patients under routine outpatient management, self-management behaviour scores, glucose attainment rate have been significantly improved.

### 5.3 Follow-up management

Follow-up management is the core of comprehensive management in general medicine. In the past, the treatment of type II diabetes mellitus was mainly carried out by endocrine specialists, and patients took medication on their own after discharge from the hospital, and most specialists did not have the time and energy to carry out follow-up health education and follow up work for patients. During the long-term medication treatment, patients with type II diabetes mellitus are prone to lose confidence in the treatment due to the long course of treatment and slow improvement of their condition, leading to unauthorised withdrawal of medication, coupled with the fact that some of the patients are older, with low knowledge of type II diabetes mellitus and weak self-management ability, which further results in poor treatment compliance and affects the therapeutic efficacy. Zhang Chao [27] pointed out that the implementation of follow-up management for patients with type II diabetes mellitus can help to grasp the potential factors of poor glycaemic control and low adherence, and then take targeted measures to intervene, thus optimising the effect of disease control. In general, the management of type II diabetes mellitus patients' follow-up mainly involves health education, blood glucose monitoring, condition assessment, and adjustment of treatment programmes, which is mainly dependent on the assessment of the patient's condition by general practitioners and the patient's needs. Shi Fuxiang et al. [28] selected 40 patients with type II diabetes mellitus as the follow-up object, and carried out follow-up work twice a week, and the follow-up content included dietary guidance, exercise plan, blood glucose monitoring, psychological assessment, medication guidance, etc., and the follow-up time was 6 months, and the results of the study found that the patients' fasting blood glucose (FPG), postprandial blood glucose (2 hPG), and glycated haemoglobin (HbA1c) were significantly reduced after follow-up. decreased.

## 6. Effectiveness of the application of general medicine management to patients with type II diabetes mellitus

As stated in the "Guidelines on Type II Diabetes Management Process and Graded Diagnosis and Treatment for Community Physicians (Shenzhen Expert Consensus)" [29], the goal of the general medicine team is to formulate a standardised management process to guide patients to seek medical treatment reasonably, to improve patients' adherence to treatment and glycaemic control, and to reduce the rate of disability and fatality. At present, the evaluation indexes of the application effect of general medicine management on type II diabetes mellitus at home and abroad mainly include the disease awareness rate, treatment adherence and glycaemic control effect.

### 6.1 Impact of general medicine management on treatment adherence in patients with type II diabetes mellitus

According to the literature [30], the vast majority of patients with type II diabetes who have poor glycaemic control have poor treatment adherence. A widely used tool for assessing treatment adherence in diabetic patients is the Revised Morisky Medication Adherence Scale, which consists of eight items, with a score of 8 indicating good adherence, a score of 6-7 indicating fair adherence,

and a score of less than 6 indicating poor adherence. In a study by Ye Biao [31], 45 patients with type II diabetes mellitus were given a general medicine treatment model, and after the intervention, the revised version of the Morisky Medication Adherence Scale was used to assess the adherence of the two groups of patients, and the results of which showed that the total adherence rate of the patients in the general medicine group was up to more than 90%, which was significantly higher than that of the conventional group, which was 79.55%. The family resources of patients with type II diabetes are very important and are the basis of medical resources in the management model of general medicine, and in the long-term, accessible, and continuous follow-up of patients by general practitioners, the family is the target unit of follow-up, so that general practitioners can fully understand information about the family backgrounds of patients with type II diabetes, factors affecting adherence to treatment, and lifestyles, and provide appropriate interventions to improve patient adherence. On the other hand, it has been pointed out [32] that under the management model of general medicine, patients with type II diabetes have positive improvement effects in terms of emotional support, family member cohesion, economic support, and psychological dependence, which can help to improve patients' adherence to treatment.

### **6.2 Effectiveness of general medicine management on glycaemic control of type II diabetes mellitus patients**

The main pathological factor of diabetes mellitus lies in the defective secretion of insulin or its impaired biological action. Long-term high blood glucose levels in the human body are prone to cause dysfunction of various tissues, such as the eyes, kidneys, heart, blood vessels, etc., which triggers the development of diabetic retinopathy, diabetic nephropathy, diabetic foot, cardiovascular complications, etc., and leads to a poor prognosis. The general medicine management model is not a mere combination of clinical treatment and continuity of care, but involves the implementation of multidisciplinary integrated interventions such as health promotion interventions, dietary guidance interventions, exercise behavioural interventions, medication interventions, blood glucose monitoring interventions, psychological guidance interventions, etc., which is now internationally recognised as an effective method of treating diabetes mellitus [33]. Zhong Maofan et al [34] pointed out that compared with conventional outpatient treatment, patients' glycaemic control was better after comprehensive intervention by general practitioners, and the FPG and HbA1c of patients after trying general medicine intervention were significantly lower than that of patients who underwent conventional treatment, which is in line with the findings of Wang Xiaodan [35] and Dong Hongfeng [24]. Wang Yingying [36] selected 463 patients with type II diabetes mellitus as the research object, according to the patient's willingness to be divided into general medicine management is divided into contracted and unsigned group, after the intervention found that the contracted group of patients with glycaemic control rate was significantly higher than that of the unsigned group, and pointed out that the main factors leading to this result is that the contracted group of patients with the rate of knowledge of the disease and treatment compliance is higher than that of patients of the unsigned group.

### **6.3 Impact of general medicine management on disease knowledge of patients with type II diabetes mellitus**

Knowledge of diabetes mellitus includes pathogenesis, pathogenic factors, clinical manifestations and diagnosis, treatment modalities, adverse reactions and precautions, diabetic complications, and self-monitoring of blood glucose, etc., and patients' disease knowledge was assessed through the development of a disease knowledge questionnaire. In a domestic study, Feng Huafei et al [37] used multi-stage random sampling to investigate 18772 diabetes patients and found

that the disease knowledge rate, treatment rate, and control rate of diabetes patients were 35.3%, 26.7%, and 10.0%, respectively, and pointed out that the disease knowledge rate of urban diabetic patients was higher than that of rural patients, and with the increase of age, the disease knowledge rate of patients increased. and that with increasing age, the disease knowledge rate of patients rises with increasing age. Improving the disease knowledge rate of patients with type II diabetes mellitus is an important assessment index in the management of general medicine, and it is important to develop personalised health education and disease knowledge communication methods through the patients' individual cognitive level and literacy level in the case management stage. A study [38] showed that when carrying out diabetes prevention and treatment, the implementation of health education and follow-up visits under the guidance of the theory of general medicine can significantly increase the rate of patients' knowledge of diabetes, which in turn improves patients' adherence to medication and improves the effect of treatment.

## 7. Summary

With the improvement of people's living standards and changes in dietary structure, the incidence of type II diabetes mellitus has been increasing worldwide, and the complications brought by high blood glucose include heart disease, stroke, retinopathy, renal failure, and poor blood flow in the limbs, which seriously endanger the physical and mental health of patients. The emergence of the general medicine management model and its application in recent years have achieved ideal results in the prevention and treatment of type II diabetes mellitus, which can provide patients with individualised and continuous primary health care services, and should be supported by appropriate policies and social support to strengthen the health management of type II diabetes mellitus in the community. The experience gained and the objective basis of the general medicine management model in chronic diseases such as diabetes mellitus and hypertension will help to further deepen the reform and improvement of the model, while the application of the model in other diseases such as stroke, myocardial infarction, coronary heart disease, chronic hepatitis and so on is worth exploring.

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