

# Exploring the Research Progress of Traditional Chinese Medicine Therapy on Prediabetes based on “Preventive Treatment of Disease”

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**Abstract:** *In Chinese medicine, the idea of “preventive treatment of diseases” emphasizes “preventive treatment of diseases before they occur, preventive treatment of changes in existing diseases, and preventive treatment of recurrence after recovering from a disease”, as the law of prevention and treatment, reversing the initial stage of the disease. pre-diabetes is the excessive stage of diabetes development, and the use of Traditional Chinese medicine therapy in pre-diabetes is an effective means of preventing and controlling the development of diabetes. This article introduces the clinical progress of different forms of Chinese medicine therapy, such as Chinese herbal decoction, Chinese proprietary medicine, Chinese herbal diet therapy, Traditional Chinese medicine herbal infusion, and Traditional Chinese medicine therapy, from the etiology of pre-diabetes, in order to provide more theoretical bases and references for the prevention and treatment of pre-diabetes by Chinese medicine therapy.*

**Keywords:** Traditional Chinese medicine therapy, Pre-diabetes, Pi Dan, Preventive treatment of diseases, Research progress.

## 1. Introduction

The incidence of diabetes is increasing year by year, threatening human life and health, and is now one of the major challenges facing the world's health care organizations. Pre-diabetes is the embryonic stage of abnormal changes in blood glucose and the gradual development of diabetes mellitus. Pre-diabetes refers to the development of blood glucose from a normal state to impaired glucose regulation (IGR), abnormal blood glucose but not yet meet the diagnostic criteria for diabetes, including impaired fasting glucose (IFG), impaired glucose tolerance (IGT), and the combination of the two appear in the three middle states [1]. In recent years, a comprehensive analysis of several studies has shown that abnormal glycemic changes in pre-diabetes are strongly associated with the development of cardiovascular disease, coronary heart disease, stroke, heart failure, atrial fibrillation, chronic kidney disease and even cancer [17]. However, pre-diabetes is in the budding stage of reversible diabetes, so it is urgent to enhance people's awareness of pre-diabetes prevention and treatment. The traditional Chinese medical science of “preventive treatment of diseases” focuses on the prevention and treatment ideas of “preventive treatment of diseases before they occur, preventive treatment of changes in existing diseases, and preventive treatment of recurrence after recovering from a disease”, and “preventive treatment of diseases” refers to the incipient state of the disease between health and the existing disease, i. e., the disease does not have a specific typical symptom, but there is a manifestation of the symptom [2]. Using the idea of “preventive treatment of diseases” to prevent and treat the basic etiology and pathogenesis of diseases during the budding period, and to educate patients about their life and dietary habits, it is an effective means of preventing and treating diabetes in the early stage of the disease. China's traditional Chinese medical science for the treatment of pre-diabetes has a significant inherent advantage, in which traditional Chinese medical science, Chinese Proprietary Medicine, Chinese medicine, Therapeutic Daoyin in TCM, acupuncture, traditional

Therapeutic Daoyin in TCM and other means of prevention and control of pre-diabetes treatment have obvious effects. Now, we are going to summarize the relevant research progress of traditional Chinese medical science in the prevention and treatment of pre-diabetes in recent years.

## 2. “Preventive treatment of diseases” Theory to Prevent and Control Pre-diabetes

The idea of “preventive treatment of diseases” in Chinese medicine has great theoretical value in guiding the prevention and treatment of pre-diabetes. Chinese medicine as early as in the “Huangdi Neijing” (Yellow Emperor's Classic of Internal Medicine) period has put forward the idea of “treatment of diseases”, “Suwen - four qi and God's Great Theory” pointed out that: “the sages do not treatment of diseases and treatment of diseases, do not treatment of chaos and treatment of chaos..... f the disease has become after the medicine, chaos has been treated, such as thirst and penetrate the well, the bucket and casting cones, such as thirst and penetrate the well, the bucket and casting cones, the prevention and treatment of pre-diabetes has great theoretical value. Chaos has become after the treatment of, such as thirst and wear wells, bucket and cast cone, is not late”, both emphasizes the importance of preventive treatment of diseases, but also tells us to focus on prevention and treatment in the early stage of disease occurrence, will be resolved in the bud stage [3]. According to the theory of “preventive treatment of diseases before illness” in Chinese medicine, i. e. “prevention before illness, early intervention afterset, prevention of recovery maintenance”, focusing on early prevention, early treatment, using a variety of Chinese medicine prevention and treatment methods to intervene in the process of the disease, the center of gravity of diabetes mellitus will be greatly advanced, so that patients can return to normal as far as possible. It is also important to focus on early prevention, early treatment, and the use of a variety of Chinese medicine methods to intervene in the process of the disease, so that the focus of the treatment of diabetes can

be greatly advanced, and the patients can be restored to the normal level as far as possible, so that the development of diabetes can be blocked or slowed down [4].

### 3. Etiology of Pre-diabetes

Modern medicine generally believes that the treatment of diabetes should be based on the differentiation of symptoms and signs of Xiaoke (a traditional Chinese medicine term for diabetes). Therefore, many medical experts classify the pre-diabetes stage, which has many similarities with the traditional Chinese medicine concept of “Pi Dan”, as belonging to the category of Pi Dan. “Pi Dan” first appeared in the “Huangdi Neijing”. In the “Su Wen·Qi Bing Lun” (Plain Questions·On Exotic Diseases), it is written: “What is the name of the disease when the patient feels a sweet taste in the mouth? How does it occur? Qi Bo said: This is the overflow of the five qi, and it is called ‘Pi Dan’. When the five flavors enter the mouth, they are stored in the stomach, and the spleen transports their essence and qi. The body fluid is in the spleen, so it makes the patient feel a sweet taste in the mouth. This is caused by excessive consumption of rich and sweet foods. Such a person must have eaten sweet and rich foods frequently, which leads to obesity. Obesity causes internal heat, and sweet foods cause abdominal fullness. Therefore, their qi overflows and turns into diabetes. The treatment is with orchid, which eliminates stagnant qi. This elaborates that the clinical symptom of “Pi Dan” is a sweet taste in the mouth, and excessive consumption of rich and sweet foods is an important cause of “Pi Dan”. The pathogenesis of “Pi Dan” turning into diabetes is due to excessive consumption of rich and sweet foods causing internal heat and abdominal fullness, leading to qi overflow. The treatment method for diabetes is “to treat with orchid, which eliminates stagnant qi”, that is, to use aromatic and spleen-activating Chinese herbs to resolve turbidity and eliminate dampness [33]. “Sheng Ji Zong Su” (Compendium of Prescriptions for All Diseases) once recorded that indulging in rich and sweet foods causes internal heat and abdominal fullness, which over time leads to thirst. “Ling Shou·Wu Bian” (Spirit Pivot·Five Changes) records: “If all the five organs are weak and tender, one is prone to diseases of consumption and wasting.”

The concept of diagnosis and treatment of “Pi Dan” turning has been elaborated by various medical doctors, but it can not meet the needs of the diagnosis and treatment of pre-diabetes nowadays, therefore, nowadays, various medical doctors have gradually formed the diagnosis and treatment ideas of modern Chinese medicine for the treatment of pre-diabetes by the changes of pre-diabetes nowadays and their own views. For example, Prof. Liu Chunhua [5] pointed out that pre-diabetes belongs to the category of “Pi Dan” in Chinese medicine rather than “Xiaoke”, and its disease is located in the spleen, and the basic pathology of “Pi Dan” is the deficiency of the spleen, with the deficiency of the spleen and lack of transportation as the root cause, and a variety of evidence, such as phlegm, dampness-heat, blood stasis, stagnation of qi as the target, the co-existence of both the target and the root cause, the deficiency and the mixed reality. Professor Chen Qiu [6] believes that qi and yin deficiency with stasis is the core pathogenesis of pre-diabetes, and the disease is located in the spleen and kidneys, which is characterized by spleen and kidney deficiency, with qi

stagnation, phlegm and dampness, and blood stasis as the symptoms, and the disease is characterized by a deficiency of the root and the symptom, so it is necessary to take into account both qi tonification and qi regulation, and to take into account both blood activation and nourishment of yin and blood nourishment. Professor Guo Xiaoyan [7] believes that phlegm-dampness is the core pathogenesis affecting pre-diabetes, and the disease is located in the spleen and stomach, so the main focus should be on benefiting qi and strengthening the spleen, and resolving phlegm and removing dampness. Professor Zhang Fuli [8] believes that dampness and heat causing stasis is the main pathogenesis of pre-diabetes, and that dampness and heat, phlegm, and blood stasis are sequential and iterative, therefore, the upper and lower parts of the elimination of the same treatment of qi and blood, and clearing dampness and heat, phlegm and blood stasis, and cooling blood stasis to clear the channels and give equal emphasis to the main. Prof. Guo Junjie [9] believes that the basic pathogenesis is the deficiency of the spleen qi, and phlegm and blood stasis are the symptoms of the disease, and the disease is located in the spleen, which involves the heart, liver, lungs and kidneys, and attaches importance to the liver, and believes that if the liver is comfortable, the spleen will be healthy, and if the spleen is healthy, the disease will be eliminated, therefore, the treatment is based on the principle of liver nourishment and the method of healing and the method of “eliminating evils and consolidating the root cause of the disease, eliminating the evils and replenishing the root cause. Therefore, the treatment is based on liver-relaxing and liver-nourishing, “harmony method” and “eliminating the evil and consolidating the root, eliminating and tonifying at the same time. Professor Zhang Boli [10] believes that pre-diabetes is mainly damp-heat evidence, spleen deficiency is the root of the disease, damp-heat is the symptom, the disease is mainly in the spleen, the treatment in the pivot to regulate qi and blood is the main. Based on the theory of blood turbidity, Song Min [11] and others believe that spleen deficiency is the prerequisite for the occurrence of pre-diabetes; blood turbidity is the pathological product of pre-diabetes, and they are the first to put forward the basic therapeutic principle of strengthening the spleen and transforming turbidity in the prevention and treatment of pre-diabetes, and they adopt the Sang Ge Huo Turbid Drink to benefit the qi and strengthen the spleen, and to transform turbidity and promote blood circulation. The above medical doctors’ understanding of the etiology and pathogenesis of prediabetes can be summarized, and it can be concluded that this disease is mainly characterized by deficiency of the spleen, with deficiency of the spleen as the root cause, and dampness-heat, blood stasis, phlegm, and stagnation of qi as the target cause, and the main location of the disease is the spleen, and the pathological lesions involve many organs.

## 4. Traditional Chinese Medicine Therapy

### 4.1 Chinese Medicinal Decoction

The etiology and pathogenesis of pre-diabetes are complex and varied, and the identification and typing are also diverse, so the authoritative practice guidelines issued by domestic authorities play a good role in standardizing the prevention and treatment of pre-diabetes to a certain extent. The Optimized Program for Chinese Medicine Diagnosis and

Treatment of “Pi Dan” [12] (version 2023) classifies “Pi Dan” into six types: Spleen and stomach congestion is treated by moving qi and directing stagnation, and the representative formula is Houpaku Sanwu Tang with additions and subtractions; Dampness-heat accumulation is treated by clearing away heat and resolving dampness, and the representative formula is Semi-Xia Laxingxin Tang with Ge Ge Gen Scutellariae Lian Tang with additions and subtractions; Spleen deficiency and phlegm-dampness is treated by strengthening the spleen to eliminate dampness and resolving phlegm, and the representative formula is Liu Jun Zi Tang with additions and subtractions; and Liver depression and gastric heat is treated by clearing away liver and stomach heat, and the representative formula is Da Chai Hu Tang with subtractions. In the case of liver depression and stomach heat, the treatment is to clear the liver and stomach, and the representative formula is Da Chai Hu Tang with additions and subtractions; in the case of dampness, phlegm and stasis, the treatment is to promote dampness and reduce turbidity, and to resolve phlegm and activate blood circulation, and the representative formula is Xiao Xian-xiong Tang with additions and subtractions; in the case of deficiency of qi and yin, the treatment is to benefit the qi and nourish the yin, and the representative formula is Yu Yi Tang with additions and subtractions. modern medical doctors combined with their own clinical experience on pre-diabetes clinical evidence analysis, has a unique experience in the selection of prescriptions and medication.

#### 4.2 Chinese Herbal Diet Therapy

The term “medicinal diet”, first seen in the “Hou Han Shu - Lian female biography”, is the product of the combination of drugs and food, is the expansion of dietary nutrition, food therapy, but also “medicine and food are the same source” theory of the most essential. The medicinal diet improves the effect of dietary therapy, dietary nourishment, expands its scope of action, and enriches the types of nutritional therapy [13]. Chinese medicine diet has a long history and remarkable therapeutic effect, and its role is to regulate the imbalance of qi, blood, yin and yang of the human body through the bias of drugs and food, and enhance the function of the five organs.

Many of the Chinese medicines are good products of the same origin as medicine and food, such as wolfberry, fungus, lotus heart, gardenia, coix seed, etc. The medicinal diet is to make up for the deficiency of the patient’s qi, blood, yin and yang through the use of its partiality, to achieve the secret of yin and yang, and the spirit and even the state [18]. Yang Bo [14] et al. studied the effect of spleen-healthy and dampness-expelling dietary formula on pre-diabetic patients with phlegm-dampness constitution. 200 patients were randomly divided into a control group and an experimental group, and both groups adopted conventional diabetes health education and calculated the total calories that the patients should consume per day; the control group was given antihypertensive and lipid-lowering medicines as appropriate, and the experimental group was given spleen-healthy and dampness-expelling dietary formula to replace some of the foods according to the food-exchange method on the basis of the control group. Food. After 12 months of follow-up, it was found that the fasting blood glucose and postprandial blood glucose of both groups were significantly lower than those

before the intervention, and the experimental group had a significantly better decrease than the control group. Huang Hui [15] et al. studied the intervention effect of Yiqi and spleen medicinal diet on pre-diabetic patients with qi deficiency. 60 pre-diabetic patients with qi deficiency were selected and randomly divided into the lifestyle intervention group (control group) and the medicinal diet combined with the lifestyle intervention group (treatment group). 6 months after the treatment, it was found that all the indexes of the treatment group were superior to those of the control group, which indicated that the medicine of Yiqi and spleen medicinal diet could improve the blood glucose level of the patients with qi deficiency effectively. This indicates that the medicines can effectively improve the blood glucose level of pre-diabetic patients with qi deficiency. In the study of Li Lei [16] and other research progress of medicinal and food herbs based on the intestinal microenvironment to intervene in pre-diabetes, it was shown that medicinal and food herbs used for “Pi Dan”, such as ginseng, Pueraria lobata, Hongquan, hawthorn, cassia seed, Laixianzi, Dendrobium, mulberry leaf, lotus leaf, Chinese yam, Semen Coix lacryma, and Poria, can both intervene in the intestinal microenvironment in order to alleviate the progression from obesity to Pi-dan to thirst and to avoid the toxic side-effects of human body damage to the human body by toxic side effects.

Therefore, the medicinal diet formed by using the partiality of medicine and food not only has relatively good therapeutic effect on improving the regression of blood glucose in pre-diabetes, but also has a small burden on the patient’s spleen and stomach, and the weak adverse reaction can also supplement the drug treatment, so that it can play the role of combination of medicine and food in the prevention and treatment of pre-diabetes.

#### 4.3 Chinese Proprietary Medicine

Chinese Proprietary Medicine is made from Chinese herbal medicines, which are processed into certain dosage forms through the prescribed prescription and preparation process, and has the advantages of wide scope of application, economic applicability, flexible prescription and easy portability. Hong Guocan [19] et al. studied the intervention effect of Wai Tai Fu Ling Drink on Qi deficiency, phlegm-dampness type pre-diabetes. 120 cases of Qi deficiency, phlegm-dampness type pre-diabetes patients were divided into the observation group and the control group by randomized numerical table method, and the two groups were given Wai Tai Fu Ling Drink in the observation group, and metformin extended-release tablets in the control group on the basis of the basic intervention. After two months of treatment, compared with the control group, the total clinical effectiveness rate of the observation group was 81. 7%, which was higher than that of the control group (13. 3%). Wang Binyan [20] et al. studied the clinical observation of Zinlida granules combined with acarbose intervention in patients with impaired glucose tolerance, 60 cases of IGT patients were randomly double-blindly divided into the treatment group and the control group, with lifestyle intervention as the baseline, and the control group was treated with oral acarbose on the baseline treatment, while the treatment group was treated with Zinlida granules added to the treatment regimen of the control group, and the treatment was carried out for 12 weeks, and it

was found that 50% of the patients in the treatment group Glucose tolerance reversed to normal level, much higher than 25.9% in the control group. Meanwhile, compared with the control group, the treatment group was more effective in reducing FPG, 2hPG and TC levels in IGT patients. Guo Xiaofei [21] et al. studied the clinical observation of Yiqi Huaifu capsule in delaying the progression of diabetes mellitus. 200 patients with IGT were selected and randomly divided into the control group and the treatment group, the control group was given the lifestyle intervention, and the treatment group was given Yiqi Huaifu capsule on top of it. After 3 months of treatment, it was found that the blood glucose indexes, Chinese medicine symptom scores and TG and TC levels of the two groups were lower than those before treatment, and the total effective rate of the treatment group was 95.0%, higher than that of the control group (78.0%), and the incidence of diabetes mellitus in the treatment group (1.0%) was much lower than that of the control group (7.0%). Zhang et al [22] conducted a randomized prospective placebo-controlled double-blind trial in which 183 patients were randomly divided into three groups of Live Blood and Reduce Glucose Soup Formula Granules plus lifestyle intervention, Live Blood and Reduce Glucose Soup Chinese Herbal Decoction plus lifestyle intervention and placebo plus lifestyle intervention after 84 days of treatment and observation. The clinical efficacy and possible mechanism of action of Live Blood Reducing Sugar Soup in the treatment of pre-diabetes were verified, and the consistency of clinical efficacy between Live Blood Reducing Sugar Granules and Live Blood Reducing Sugar Soup was also verified.

#### 4.4 Traditional Chinese medicine Herbal Infusion

traditional Chinese medicine Herbal Infusion is a traditional dosage form in China, which belongs to one of the characteristic therapies of traditional Chinese medicine (TCM). It is guided by the theory of TCM diagnosis and treatment, and based on the characteristics of the patient's condition, the diagnosis of the formula is organized, and it is flexible to add and subtract to form a unique tea substitute formula, so as to achieve the effects of health care, conditioning and treatment. Ren Jianbing et al [23] studied the clinical efficacy of TCM Herbal Infusion intervention in prediabetes. Eighty-two patients with pre-diabetes were selected and divided into 40 cases in the control group and 42 cases in the observation group according to the method of randomized numerical table. The control group was given dietary and exercise interventions, and the observation group was given the flavored "Ze Xie Tang" tea drink on the basis of the control group. After 6 months of intervention, both methods were effective in intervening pre-diabetes, but the total effective rate of the observation group reached 80.9%, which was significantly better than that of the control group (54.7%), and the incidence of diabetes was only 16.7%, which was much lower than that of the control group. 16.7%, much lower than the control group (37.5%), and the reversal rate of pre-diabetes reached 32.8%, much higher than the control group (15.2%). Wu Liuyong et al [24] studied the clinical efficacy of TCM Herbal Infusion combined with diet and exercise therapy in the treatment of pre-diabetes with spleen deficiency and phlegm dampness. Seventy-six patients with pre-diabetic spleen deficiency and phlegm-dampness syndrome were selected and randomly divided into the control

group and the treatment group; the control group was treated with diet and exercise therapy, and the treatment group was treated with TCM Herbal Infusion combined with the control group. After 9 months of intervention, it was found that FPG, 2hPG, HbA1c, TG, TC, LDL-C levels and TCM evidence points of both groups were lower than those before treatment, and at the same time, the treatment group was lower than the control group; HDL-C levels of both groups were higher than those before treatment. HDL-C levels of both groups were higher than those of the control group. Li Lifan et al. [25] studied the clinical efficacy of TCM Herbal Infusion combined with Jinqi Glucose-lowering Tablets in the treatment of pre-diabetes mellitus of type 2 diabetes mellitus combined with obesity in the spleen-deficient, phlegm-damp type, and 70 patients were selected, and were divided into the observation group and the control group according to the method of randomized numerical table. The control group was divided into two groups: the observation group and the control group. The control group adopted the lifestyle of diet control and reasonable exercise, and psychological interventions were given at the same time; the observation group was treated with Jinqi hypoglycemic tablets and TCM Herbal Infusion on the basis of the control group. After 6 months of intervention, the weight, body mass index, abdominal circumference, total cholesterol, triglyceride, low-density lipoprotein, fasting blood glucose, postprandial blood glucose, glycated hemoglobin, fasting insulin and insulin resistance index of the observation group were lower than those of the control group, and the clinical efficiency was higher than that of the control group. The above data show that TCM Herbal Infusion is effective in the treatment of pre-diabetes, and it has the advantages of easy to drink, fine and small amount of medicine, widely used in the disease, and low price [26]. The patient acceptance is high and easy to take for a long time, which is worthy of clinical promotion.

#### 4.5 Non-pharmacological Therapy

Specialized therapies in TCM such as Acupuncture, Therapeutic Daoyin in TCM, etc. all have their own unique advantages in preventing and treating diseases. Li, Yang et al [27] investigated the efficacy and safety of Zuo's Winyang Acupuncture in treating patients with pre-diabetes. Fifty-five patients with pre-diabetes, were randomly divided into two groups. The control group was treated with lifestyle interventions, while the acupuncture group received Zuo's Winyang Acupuncture treatment for 50 minutes twice a week, on the basis of the same lifestyle interventions. After 12 weeks of treatment, FPG and 2hPG were significantly reduced in both the acupuncture and control groups, and the reduction in FPG and 2hPG was significantly higher in the acupuncture group than in the control group. Li Qin et al [28] studied the intervention effect of Baduanjin on community pre-diabetes patients, 80 cases of pre-diabetes patients were randomly divided into treatment group and control group, the control group was given conventional lifestyle intervention plus walking exercise, and the treatment group was given conventional lifestyle intervention plus practicing Baduanjin. After 24 weeks of intervention, it was found that the patients in the treatment group had body mass, body mass index (BMI), waist-hip ratio (WHR), fasting glucose (FPG), 2h postprandial glucose (2hPG), glycosylated hemoglobin (HbA1c), fasting insulin (FINS), 2h postprandial insulin,

insulin resistance index (HOMA-IR), total cholesterol (TC), triacylglycerol (TG), Low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C) and SF-36 scale score improved significantly better than the control group.

## 5. Summary

Nowadays, the incidence of diabetes is increasing, so it is significant to intervene in the pre-diabetes period. Western medicine has not yet had a clear medication for pre-diabetes, but Chinese medicine treatment of pre-diabetes has the advantages of significant efficacy and small side effects. Under the guidance of the theory of “preventive treatments of diseases” in Chinese medicine, early intervention in pre-diabetes, based on the identification of evidence in Chinese medicine, Traditional Chinese medicine therapy, TCM Herbal Infusion, etc., not only demonstrates the remarkable efficacy of Chinese Herbal Diet Therapy of diseases in pre-diabetes, but also embodies the Chinese Herbal Diet Therapy. It also reflects the idea of “preventive treatment of diseases”, and fully demonstrates the characteristics of traditional medicine in the treatment of pre-diabetes with various therapies and remarkable efficacy. However, the future task is still arduous, traditional medicine in the research there are obvious shortcomings, due to the difficulty of establishing TCM pre-diabetes identification norms, making it difficult for the theoretical study of simple elaboration, and treatment of pre-diabetic Traditional Chinese medicine therapy of clinical research of the treatment cycle, the number of samples, the follow-up time is limited, so at present we need to carry out a multi-center, large samples, long cycle of evidence-based research, closer to the Therefore, we need to conduct multi-center, large-sample, and long-cycle evidence-based studies to get closer to in-depth research on Traditional Chinese medicine, to improve the scientific research ability of Traditional Chinese medicine researchers, and to discover more convincing research data to prove the efficacy of Traditional Chinese medicine therapy for the treatment of pre-diabetes.

## References

- [1] Tong Nanwei. Expert consensus on the prevention of type 2 diabetes mellitus in Chinese adults[J]. Chinese Journal of Endocrinology and Metabolism, 2014, 30(04):277-283.
- [2] PAN Qiu, ZHOU Libo, TONG Xiaolin. A discussion on preventive treatment of pre-diabetes mellitus in traditional Chinese medicine[J]. China Journal of Traditional Chinese Medicine and Pharmacy, 2008, (03):191-193.
- [3] Jiang Liangduo. Discussion on concepts of the health, subhealth, before sickness and prevention[J]. China Journal of Traditional Chinese Medicine and Pharmacy, 2010, 25(02):167-170.
- [4] SONG Yu-Zhen, SHANG Hong-Cai, GUO Li-Ping. Value and application of TCM treating before disease thought in diabetes prevention[J]. China Journal of Traditional Chinese Medicine and Pharmacy, 2011, 26(02):215-219.
- [5] Zeng You, Liu Chunhua, He Hongwei. Professor LIU Chunhua Differentiates and Treats Type-2 Pre-diabetes from the Perspective of “Spleen Governing Transport” [J]. Journal of Zhejiang Chinese Medical University, 2023, 47(05):504-506+515.
- [6] ZHAO Zhi-Hua, ZHANG Xiao-Ran, CHEN Qiu. Analysis on the Thinking of Prestigious Doctor of Traditional Chinese Medicine Professor Chen Qiu in Treating Prediabetes[J]. Guangming Traditional Chinese Medicine, 2023, 38(09):1663-1666.
- [7] Jing Li, Xiaoyan Guo. Guo Xiaoyan's experience in treating prediabetes from phlegm-dampness[J]. Inner Mongolia Journal of Traditional Chinese Medicine, 2022, 41(08):81-82.
- [8] Su Jinfeng, Li Fuzhen, Zhang Fuli. Zhang Fuli's Experience in Treating Pi Dan with “Dampness-Heat Induced Blood Stasis”[J]. Acta Chinese Medicine, 2022, 37(04):789-793.
- [9] Song Chao. The experience of Guo Junjie in the treatment of peridiabetes and patterns of Chinese herbs[D]. Shanxi University of Chinese Medicine, 2020.
- [10] FENG Rui, ZHANG Lishuang, ZAN Shujie, et al. Analysis of Professor ZHANG Boli's clinical thoughts in the treatment on prediabetes[J]. Tianjin Journal of Traditional Chinese Medicine, 2020, 37(02):141-143.
- [11] SONG Min, XU Anqi, LIU Yang, et al. Exploring the prevention and treatment of pre-diabetes based on blood turbidity theory[J]. Tianjin Journal of Traditional Chinese Medicine, 2022, 39(10):1249-1254.
- [12] China Collaborative Innovation Platform for Metabolic Disease Prevention and Treatment, Gao Yanbin, Ni Qing, et al. Optimization of Traditional Chinese Medicine (TCM) Diagnosis and Treatment Protocol for Prediabetes of Spleen Heat Syndrome (2023 Edition) [J]. World Journal of Integrated Traditional and Western Medicine, 2023, 18(05):1046-1050.
- [13] Zhu Jianping, Deng Wenxiang, Wu Bincai, et al. Theoretical Origination of Medicine and Food Homology [J]. Journal of Hunan University of Chinese Medicine, 2015, 35(12):27-30.
- [14] Yang Bo, Dai Na, Wu Yuan. Effect of Jianpi Qushi Diet recipe on pre-diabetes patients with phlegm-dampness constitution[J]. Clinical Journal of Chinese Medicine, 2021, 13(15):31-33.
- [15] HUANG Hui, ZHANG Yuxiu, ZHANG Minmin. Medicinal Diet in the Intervention of Qi Deficiency Prediabetes for 60 Cases[J]. Chinese Medicine Modern Distance Education of China, 2018, 16(08):105-106.
- [16] LI Lei, LU Bijun, WANG Yue, et al. Research Progress on Intestinal Microenvironment-Based Interventions for Pre-Diabetes in Medicinal Food Herbs[J]. Journal of Yunnan University of Chinese Medicine, 2023, 46(01):83-88.
- [17] Schlesinger Sabrina, Neuenschwander Manuela, Barbaresco Janett, et al. Prediabetes and risk of mortality, diabetes-related complications and comorbidities: umbrella review of meta-analyses of prospective studies. [J]. Diabetologia, 2021, 65(2):1-11.
- [18] Gao Riyang. Study on the Chinese Medicined Diet Theory and its the Research Progresses [D]. Guangzhou University of Chinese Medicine, 2007.
- [19] Hong Guocan, Shi Jinbao, Cai Zhenzhen, et al. Interventional effect of Fuling Yin (a traditional Chinese medicine) on prediabetes of qi deficiency and

- phlegm-dampness type in “Wai Tai” [J]. Forum on Traditional Chinese Medicine, 2023, 38(03): 31-33.
- [20] Wang Binyan. Clinical Observation of Jinlida Granule Combined with Acarbose on Patients with Impaired Glucose Tolerance [D]. Shandong University of Traditional Chinese Medicine, 2021.
- [21] GUO Xiaofei, GUO Junjie, YAN Dongxue. Clinical observation of Yiqi Huazhuo capsule in delaying the progress of diabetes[J]. China's Naturopathy, 2021, 29(21):67-70.
- [22] Zhang Peng Xiang, Zeng Lin, Meng Lu, et al. Observation on clinical effect of Huoxue-Jiangtang decoction formula granules in treating prediabetes: a randomized prospective placebo-controlled double-blind trial protocol [J]. BMC Complementary Medicine and Therapies, 2022, 22(1):274-274.
- [23] REN Jianbing, LI Nengfang. Clinical Observation on 42 Cases of Obese Pre diabetes Treated by Modified “Zexie Decoction” Instead of Tea[J]. Chinese Journal of Ethnomedicine and Ethnopharmacy, 2023, 32(04): 107-109+114.
- [24] WU Liu-Rong, LIU Qian, TONG Jie. TCM Herbal Infusion combined with diet and exercise therapy in the treatment of 38 cases of pre-diabetes with spleen deficiency and phlegm-dampness[J]. China's Naturopathy, 2022, 30(12):73-75+79.
- [25] LI Li-Fen, WU Yu-Hong. Clinical Efficacy of Chinese Medicine Tea Combined with Jinqi Jiangtang Tablets in the Treatment of Pre-type 2 Diabetes Mellitus of Spleen Deficiency and Phlegm-Dampness Syndrome Complicated with Obesity[J]. Basic Traditional Chinese Medicine, 2023, 2(06):63-68.
- [26] Liu Longtao. Tea replacement drinks in Qing Palace medical archives[J]. Chinese Journal of Integrated Traditional and Western Medicine, 2017, 37(11): 1290-1291.
- [27] Li, Yang et al. “Effect of Zuo’s warming Yang acupuncture therapy combined with lifestyle interventions on prediabetes: A randomized controlled trial.” Complementary therapies in medicine vol. 78 (2023): 102985.
- [28] LI Qin, WU Rui, WANG Fan, et al. Clinical observation on intervention effect of Baduanjin on pre-diabetic patients in the community[J]. Shanghai Journal of Traditional Chinese Medicine, 2022, 56(05):49-53.