DOI: 10.53469/jcmp.2025.07(08).01

Research Progress in the Prevention and Treatment of Diabetic Kidney Disease Using Traditional Chinese Medicine

Bo Ren[1], Jian Shi[1,2,*]

[1]Shaanxi University of Chinese Medicine, Xianyang 712046, Shaanxi, China
[2]Department of Nephrology, Shaanxi Provincial Hospital of Chinese Medicine, Xi'an 710003, Shaanxi, China
Correspondence Author

Abstract: ***The pathogenesis of diabetic nephropathy is complex and falls under the categories of "kidney deficiency," "lower deficiency," and "edema" in traditional Chinese medicine. In recent years, significant progress has been made in the prevention and treatment of diabetic nephropathy using traditional Chinese medicine. Traditional Chinese medicine has extensive experience and treatment methods for this condition. This study reviews the application of herbal decoctions, compound formulas, and acupuncture and massage in the treatment of diabetic nephropathy. These treatment methods complement each other and yield significant therapeutic effects. However, more high-quality clinical trials and basic research are needed to clarify the optimal treatment protocols and target mechanisms of TCM, thereby promoting its further development in the prevention and treatment of diabetic kidney disease.***

Keywords: Diabetic kidney disease, TCM therapy, Research progress, Review.

1. Introduction

Diabetic kidney disease (DKD) is one of the most severe complications of diabetes and is classified as a secondary kidney disease. It is characterized by impaired microcirculation in the renal microvasculature due to increased permeability of the glomerular basement membrane caused by diabetes [1]. With the rising incidence of diabetes, the prevalence of DKD has significantly increased, becoming the most common cause of end-stage kidney disease worldwide, posing a serious threat to human health. Currently, there are approximately 537 million people with diabetes worldwide, with 20%–40% of them also having DKD. Therefore, the prevention and treatment of this disease should be given high priority [2-4]. Currently, Western medical treatments for DKD primarily focus on lowering blood glucose, blood pressure, and lipids, as well as combating infections, but these approaches cannot effectively reverse the condition. Traditional Chinese medicine (TCM) has a long-standing theoretical understanding of diabetic kidney disease and has demonstrated notable therapeutic effects. Currently, various treatment regimens have achieved satisfactory outcomes. TCM therapies can intervene in the progression of DKD through multi-targeted and multi-pathway mechanisms, including regulating autophagy, antioxidant effects, and anti-inflammatory actions, thereby effectively improving renal function, slowing renal fibrosis, and delaying the progression of DKD, ultimately enhancing patients' quality of life.

In recent years, TCM has achieved significant in the treatment of diabetic kidney disease. The following is an overview of some research progress.

2. Exploration of the Origins of TCM Disease Names

Although there are no records of the disease name "diabetic kidney disease" in ancient TCM texts, based on its clinical symptoms such as polyuria, edema, fatigue, and proteinuria, as well as the progression and evolution of the condition, it can be categorized under diseases such as "kidney consumption," "lower xiao," "edema," and "urinary turbidity" [5]. The term "xiao ke" (thirst) was first proposed in the "Qi Bing Lun" section of the "Su Wen," where the causes and treatment methods of the disease were discussed. The text states: "Fatty foods cause internal heat, and sweet foods cause abdominal distension, leading to the upward overflow of qi, which transforms into xiao ke." This aligns with modern medical understanding of type 2 diabetes. During the Tang Dynasty, Wang Tao's "Wai Tai Mi Yao" explicitly proposed the term "kidney consumption," with the text recording: "Thirsty but unable to drink much water, with leg edema… Frequent urination indicates kidney consumption." In the Song Dynasty, Zhao Ji's *Sheng Ji Zong Lu* states: "It is said that kidney consumption is caused by excessive use of mineral medicines, excessive sexual activity, and depletion of essence and blood... hence the name kidney consumption." This identifies the causes of kidney consumption. We can infer that although ancient physicians explicitly proposed the concept of "blood glucose," they had already recognized that poor control and treatment of diabetes over time could lead to the development of diabetic kidney disease (DKD). The *San Xiao Lun* records: "Those with diabetes... all suffer from dry heat and stagnation in the intestines and stomach... or severe heat causing bladder stagnation, unable to excrete fluids, leading to fluid retention and facial swelling." The *Rumen Shiquan* records: "Their thirst manifests as excessive drinking and frequent urination, or if urination becomes infrequent and transforms into edema, these are all examples." The *Yizong Jijian* records: San Xiao, excessive thirst with inability to eat... If unable to eat, with excessive dampness and a white, slippery tongue, the disease may progress to edema and diarrhea over time." While these syndromes reflect certain pathological characteristics of diabetic nephropathy at specific stages, they cannot comprehensively summarize the clinical features and developmental changes of the condition. Modern Chinese medicine has continued to explore and conduct clinical practices on diabetic nephropathy based on

the work of previous generations.

3. TCM Etiology and Pathogenesis Research

TCM holds that diabetic nephropathy involves the five zang organs and six fu organs, with its etiology and pathogenesis summarized as follows: the fundamental cause is an imbalance and deficiency of yin and yang within the body, while pathological factors such as damp-heat, cold-dampness, and phlegm-stasis intertwine as important conditions for disease onset [6,7]. The onset and progression of the disease are a dynamic evolutionary process. Spleen qi deficiency leads to insufficient qi and blood generation, resulting in both qi and yin deficiency. Yin deficiency affects yang as the initial triggering factor. Prolonged illness affects the kidneys, causing kidney qi damage and impaired qi transformation, leading to fluid retention and edema. Additionally, insufficient yin fluids impair blood circulation, or qi deficiency impairs blood circulation, leading to blood stasis. For specific treatment methods, the primary focus should be on tonifying the kidneys and dispersing blood stasis to restore the kidneys' functions of regulating water metabolism and receiving qi.

Research on the etiology and pathogenesis of diabetic nephropathy from a traditional Chinese medicine perspective helps to better understand the disease's progression and provides a theoretical basis for clinical treatment. The Shengji Zonglu states: "In cases of prolonged diabetes, kidney qi is damaged. The kidneys govern water; when kidney qi is deficient and qi transformation is impaired, the opening and closing functions are disrupted, leading to the accumulation of fluid within the body and edema." This clearly highlights the relationship between edema in diabetes insipidus and kidney dysfunction, providing a theoretical basis for subsequent generations of physicians to treat DKD from a kidney-centric perspective [8].

In recent years, traditional medicine has experienced a resurgence of development by incorporating advancements in modern science and technology. Many renowned experts in traditional Chinese medicine have proposed unique perspectives on the pathogenesis of diabetic kidney disease based on inheritance and innovation. Among them, Master of Traditional Chinese Medicine Zhou Zhongying [9] believes that the primary pathogenesis of diabetic kidney disease lies in the deficiency of the liver and kidneys, with both qi and yin being injured, and stasis, heat, dampness, phlegm, and dryness being the main pathological factors. Master of Traditional Chinese Medicine Professor Lyu Renhe [10] advocates referring to diabetic kidney disease as "diabetes-related kidney disease" and proposed the "micro-mass" pathogenesis theory for diabetic kidney disease. He believes that the disease is difficult to cure, leading to the depletion of qi and yin, the mutual obstruction of phlegm-heat and stasis, and the formation of micro-masses. Over time, this damages the kidney, disrupts its water-regulating function, and results in symptoms such as cloudy urine and edema.

4. The Traditional Chinese Medicine Differentiation and Treatment

4.1 Differential Diagnosis and Treatment

Differential diagnosis and treatment is a core feature of traditional Chinese medicine, first developed by Zhang Zhongjing and refined by later generations of medical practitioners. Currently, there is no consensus among medical practitioners regarding the differential diagnosis and classification of DKD. Professor Nan Zheng [11] primarily divides diabetic nephropathy into three syndromes: (1) Liver and kidney yin deficiency with stasis and toxin syndrome: Use Yiguan Jian combined with Dihuang Shengjiang Jianwan as the primary formula with appropriate modifications. (2) Spleen-Kidney Yang Deficiency with Stagnant Toxin Syndrome: Use the Zhen Wu Decoction and Shi Pi Decoction with appropriate modifications. (3) Heart-Kidney Yang Deficiency with Stagnant Toxin Syndrome: For symptoms such as palpitations, chest tightness, fatigue, aversion to cold, cold limbs, or edema, with a deep, fine, and slow pulse, use the Wu Ling San combined with the Ting Li Da Zao Xie Fei Tang with appropriate modifications. It also emphasizes that regardless of the syndrome differentiation, the treatment principles should always adhere to the three key principles of preserving the kidneys, detoxifying, and unblocking the meridians. The 2023 edition of the "Expert Consensus on the Integrated Traditional and Western Medicine Prevention and Treatment of Diabetic Kidney Disease" [7] categorizes the condition into four syndromes and four types based on the primary pathogenesis: (1) Qi and Yin Deficiency Syndrome, (2) Spleen and Kidney Yang Deficiency Syndrome, (3) Yin and Yang Deficiency Syndrome, and (4) Kidney Deficiency with Stagnant Blood Syndrome, which have been widely recognized and accepted by peers.

Diabetic kidney disease is often accompanied by significant loss of albumin in the urine. This pathogenesis is attributed to kidney essence deficiency leading to impaired retention function, manifested as the leakage of essence. Therefore, tonifying the kidneys and consolidating essence is a key therapeutic strategy for DKD [12, 13]. The 2022 Edition of the Integrated Diagnosis and Treatment Guidelines for Diabetic Kidney Disease [14] emphasizes that combining quantitative data such as clinical symptoms and biochemical indicators of DKD with the syndrome characteristics of traditional Chinese medicine can improve the accuracy of syndrome differentiation and treatment. It is worth noting that traditional Chinese medicine treatment emphasizes the concept of holism and individualized treatment, and clinical treatment plans are adjusted flexibly according to the patient's condition. Additionally, TCM treatment often recommends that patients adopt dietary adjustments and lifestyle changes, such as moderate exercise, dietary control, and maintaining a positive mindset, to achieve optimal outcomes.

4.2 Staging and Differentiated Diagnosis and Treatment

TCM staging and treatment for diabetic kidney disease is based on the principle of differentiated diagnosis and treatment, combined with the different stages of development and clinical manifestations of diabetic kidney disease. The occurrence and progression of DKD is a dynamic process, with different pathomechanisms at different stages.

Master of Traditional Chinese Medicine Zheng Xin [15] believes that in the early stage, the pathological location is in the lungs and kidneys, and treatment should focus on

tonifying the lungs and kidneys, using the modified Shenqi Dihuang Decoction. In the middle stage, Shenling Baizhu Powder and Shenqi Dihuang Decoction are used to tonify the kidneys and strengthen the spleen. In the late stage, emphasis is placed on balancing yin and yang and harmonizing qi and blood, using Liuwei Dihuang Decoction and Danggui Bu Xue Decoction. Master of Traditional Chinese Medicine Lyu Renhe [16] classified DKD into early, middle, and late stages based on the basic theories of traditional Chinese medicine and Western medical classification principles, using a three-stage, nine-degree classification method. Each stage is further divided into mild, moderate, and severe degrees, with medications adjusted according to the specific symptoms of each stage. This provides a clinical basis for studying the onset, development, and progression of the disease, as well as for identifying new prevention and treatment methods.

Academician Tong Xiaolin [17] divides DKD into three stages: "deficiency state," "damage state," and "decline state." The early stage of DKD corresponds to the "deficiency state" of diabetes. Characterized by kidney qi deficiency, kidney meridian stasis, and leakage of essence, the treatment focus is on tonifying qi and strengthening the spleen, consolidating and retaining essence, with the use of herbs such as Astragalus. At this stage, the deficiency is not severe, and Astragalus is typically used in doses of 15–30g, with a maximum of 45g. As the condition progresses, it may enter the "damaged state," where the condition further deteriorates, with kidney meridian stasis and obstruction, loss of essence regulation, and the appearance of massive proteinuria. At this stage, Astragalus can be used up to 90g, and additional herbs like Salvia miltiorrhiza are needed to promote blood circulation, resolve stasis, unblock meridians, and promote diuresis. The third stage is the "decline state," where the condition has progressed to a very severe stage, with depletion of kidney essence and accumulation of toxins such as water, dampness, and stasis in the body. Clinical manifestations include elevated blood urea nitrogen and creatinine levels, massive proteinuria, and severe hypertension, hypoalbuminemia, and edema. Symptoms such as edema and proteinuria may appear, ultimately leading to kidney failure. Treatment should focus on eliminating toxins, with an emphasis on purgative methods. Zhang Danning [18] pointed out that in the early stage of DKD, treatment should primarily aim to reduce proteinuria while also promoting diuresis and reducing edema; in the middle stage, the focus should be on promoting diuresis and reducing edema while also reducing proteinuria; in the late stage, the focus should be on harmonizing the stomach and stopping vomiting while also promoting diuresis and reducing edema.

The 2022 edition of the "Diabetes Nephropathy Diagnosis and Treatment Guidelines" [14] classifies DKD into early, middle, and late stages. Early stage: liver and kidney yin deficiency and spleen and kidney qi deficiency syndromes. Middle stage: qi and yin deficiency syndromes and spleen and kidney yang deficiency syndromes. Late stage: yin and yang deficiency syndromes, kidney yang deficiency syndromes, and turbid toxins and blood stasis syndromes.

5. Treatment with Chinese Herbal Formulas

Research has found that some Chinese herbal formulas, such as Jisheng Shenqi Wan, Youtouqing Granules, Keloxin Capsules, and Kunxian Capsules, have significant efficacy in treating diabetic kidney disease, reducing proteinuria, improving kidney function, and slowing disease progression. When combined with Western medicine, the efficacy is even better [19].

The "Shiyi Dexiaofang" records: "Kenshao Jiajian Bawei Wan is used to treat kidney water depletion and inability to moisten the upper body." Wang Kengtang's "Zhengzhi Zhunsheng" records: "After diabetes, water retention occurs. Although medical texts mention formulas such as Zisu Tang, Qumai Tang, and Tingli Wan, these are all purgative agents. It is more appropriate to use Wupi Yin with Jisheng Shenqi Wan, as well as Dongyuan Zhongman Fenshao formulas." Shu Jia-ming et al. [20] found that Jisheng Kidney Qi Pills can repair the damaged renal microvascular system in DKD through anti-inflammatory, anti-apoptotic, and anti-proliferative effects, thereby protecting renal function.

Tong Chengcheng [21] et al. conducted a clinical study to compare and analyze the levels of total cholesterol, triglycerides, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, 24-hour urine microalbumin, urine albumin-to-creatinine ratio, tumor necrosis factor-α, interleukin-1, interleukin-6, interferon-γ, intercellular adhesion molecule-1, and adverse reactions occurring in both groups of patients during the study. It was confirmed that the combination of compound dapagliflozin and uremia-clearing granules for the treatment of DKD can regulate lipid metabolism in patients, alleviate the microinflammatory state of diabetic nephropathy, protect renal function, and is safe. Uremia-clearing granules as an adjunctive therapy for early-stage DKD can reduce the levels of LncRNAKCNQ1OT1 and LncRNAMalat1 by regulating the oxidative/antioxidative balance, improve blood glucose levels and renal function, inhibit inflammatory responses, and enhance clinical efficacy [22].

Keluoxin Capsules are composed of Astragalus, Ligustrum, Hirudo, and Rheum. A meta-analysis showed that the combination of Keluoxin and ARB drugs for the treatment of diabetic nephropathy can enhance efficacy without significant adverse reactions [23].

Kunxian Capsules primarily function to tonify the kidneys, unblock meridians, dispel wind, and remove dampness. It is composed of Kunming Mountain Hibiscus, Epimedium, Lycium barbarum, and other ingredients. NOELP et al. [24] conducted a study on the clinical efficacy, adverse effects, and mechanisms of Kunxian Capsules in the treatment of diabetic nephropathy, finding that Tripterygium wilfordii homofuranone, the primary active component of the drug, possesses anti-inflammatory and immunosuppressive pharmacological activities. Multiple studies have also confirmed its ability to reduce proteinuria and delay renal function deterioration [25]. However, it also has adverse reactions such as gonadal suppression, bone marrow suppression, and liver function damage, so caution is needed when using it clinically [26, 27].

6. Single Herbs and Extracts

Single herb extracts can reduce proteinuria and improve kidney function in patients with diabetic kidney disease (DKD). For example, single herbs such as Astragalus, Angelica, Hibiscus, Hirudo, Ligusticum, Cordyceps, and their extracts have been found to have antioxidant, anti-inflammatory, and kidney cell protective effects [14, 28, 29]. The Classic of Herbal Medicine records that Astragalus "can replenish kidney qi and is a medicine for the upper, middle, and lower jiao." Astragalus is a commonly used herb in traditional Chinese medicine for treating kidney diseases. Pharmacological studies have found that Astragalus contains multiple active components such as Astragalus polysaccharides, Astragalus saponins, and Astragalus flavonoids, which can regulate immune function through multiple targets, inhibit inflammatory responses and fibrosis, thereby exerting kidney-protective effects [30]. Animal experiments have shown that astragaloside IV in Astragalus can significantly reduce proteinuria in diabetic nephropathy rats, protect renal podocytes and tubular damage, inhibit renal interstitial fibrosis, and improve mitochondrial regulatory networks. This effect is associated with astragaloside IV regulating the IRE-1α signaling pathway, alleviating endoplasmic reticulum stress, improving podocyte damage in diabetic nephropathy, significantly inhibiting endoplasmic reticulum stress in renal tissue, and alleviating CHOP-mediated excessive apoptosis of renal tissue cells [31, 32, 33].

There is also a close relationship between kidney disease and blood stasis. The Suwen·Tiao Jing Lun states: "If blood stasis is not resolved, fluid retention will occur," and the Jin Gui Yao Lue states: "If blood does not flow smoothly, it becomes fluid retention," and fluid retention can also lead to blood stasis over time [34]. Blood stasis plays a significant role in the pathogenesis of DKD, and blood-activating and stasis-resolving drugs can treat kidney disease through multiple pathways [35]. Hirudo nipponia has the effects of breaking blood stasis, unblocking meridians, expelling stasis, and resolving masses, and can be used to treat blood stasis in kidney disease. The Shen Nong Ben Cao Jing states that it has a salty taste and is neutral in nature, primarily used to expel evil blood, stasis, and menstrual obstruction. It has the effects of breaking up blood stasis, eliminating masses, treating infertility, and promoting urination. Zhu Liangchun [36] believes that the Chinese medicine Hirudo nipponia is a potent agent for promoting blood circulation and removing blood stasis, and its therapeutic effect on proteinuria in kidney disease is significant. Modern pharmacological studies have shown that the decoction of Hirudo nipponia has strong anticoagulant effects and provides significant protection against renal ischemia. Zhong Guangyu [37] added leech powder to conventional treatment for patients with chronic kidney disease and found that it significantly improved markers of kidney function damage, such as serum creatinine levels. Research has found that the active component Angelica sinensis polysaccharide in Angelica sinensis can lower blood glucose levels in rats, reduce proteinuria, and regulate inflammatory factors such as nuclear factor-κB (NF-κB) expression [38].

The Classic of Materia Medica records that hibiscus flowers have the efficacy of treating dysuria. A study from the Affiliated Hospital of Shanxi University of Traditional Chinese Medicine confirmed that the active component total flavonoids in hibiscus flowers can protect renal tubular epithelial cells, reduce urinary type III collagen, promote the repair of damaged renal tubular epithelial cells, reduce renal tubular reabsorption of sodium, regulate interleukin-8 levels, improve vascular endothelial function, prevent renal tubular lesions, alleviate glomerular fibrosis, and delay renal function damage. The quercetin and isoquercetin in hibiscus flowers have the effects of inhibiting lactate dehydrogenase release, scavenging free radicals, and reducing malondialdehyde (MDA) levels, thereby protecting renal tubular epithelial cells [39]. Clinical application of hibiscus flower preparations — Hibiscus Capsules—effectively inhibits the progression of diabetic kidney disease (DKD), reduces proteinuria, and has a protective effect on glomeruli, making it worthy of promotion for clinical use.

Cordyceps sinensis, as recorded in the Supplement to the Compendium of Materia Medica, is sweet and neutral in nature, with effects of nourishing the lungs and kidneys, and replenishing essence and marrow. The *Comprehensive Dictionary of Traditional Chinese Medicine* states: "It is an excellent remedy for various deficiencies and debilities." Modern research indicates that Cordyceps sinensis has immune-modulating effects, inhibits cellular lipid oxidation, and promotes stable glucose and lipid metabolism in patients. Additionally, it possesses anti-inflammatory and antibacterial properties, enhances cellular immunity, improves local microcirculation, and scavenges oxidative free radicals [40, 41]. Furthermore, multiple studies have confirmed that Cordyceps preparations can repair renal tubular cell function, reduce proteinuria, inhibit renal tubular fibrosis, and effectively improve renal function, demonstrating significant therapeutic efficacy for diabetic nephropathy [42]. The mechanism may be related to inhibiting inflammatory responses and reducing NLRP3 inflammasome levels [43].

In clinical practice, many DKD patients exhibit proteinuria and hematuria. Professor Zhang Danning proposed that tonifying the kidneys, promoting blood circulation, consolidating and lifting the qi are the fundamental treatment principles for renal proteinuria and hematuria, and recommended Cimicifuga as a specific medication for kidney disease due to its potent ability to lift yang and raise qi [44]. However, other physicians have conducted limited research on the application of Cimicifuga in kidney disease, leaving room for further exploration by future scholars. Recently, scholars have published international papers indicating that epimedium glycoside can upregulate the activity of androgen receptors, activate Raf kinase inhibitory protein, thereby inhibiting the MEK/ERK pathway, and ultimately reduce renal endothelial-mesenchymal transition and renal fibrosis in T2DKD, providing an important foundation for the future development of epimedium glycoside as a potential therapeutic drug for T2DKD [45].

7. Traditional Chinese Medicine External Therapies

Traditional Chinese Medicine external therapies include acupuncture, cupping, and topical applications. Research has

shown that acupuncture treatment for diabetic nephropathy can improve blood circulation, regulate endocrine function, and reduce inflammatory responses, thereby helping to improve clinical symptoms and renal function. These methods stimulate acupoints and meridians on the body surface to regulate qi and blood, balance yin and yang, and improve renal function. Acupuncture stimulates meridians to exert therapeutic effects, while moxibustion converts light and heat stimulation into physical signals to regulate immune function [46]. Acupoint plaster application regulates endocrine function through physical and chemical stimulation, synergistically enhancing drug efficacy [47,48].

Tang Ming et al. [49] applied warm acupuncture therapy to patients with diabetic nephropathy of the spleen-kidney yang deficiency type for three months. The treatment results showed an efficacy rate of 94.12%, significantly higher than the 76.47% in the conventional Western medicine treatment group, with a statistically significant difference ($P<0.05$). Markers such as cystatin C, serum creatinine, and blood urea nitrogen also showed significant improvements. The mechanism may involve acupuncture increasing the expression levels of PCX, CD2AP, and nephrin genes in renal podocytes, thereby reducing podocyte damage [50]. Acupoint application can reduce tumor necrosis factor and interleukin-6 levels [51].

Fei Ai-hua et al. [52] used kidney-tonifying and blood-activating moxibustion therapy for early diabetic kidney disease and found it to have good clinical efficacy, reducing urinary albumin excretion rate and nitric oxide levels. Yu Guo-jun et al. [53] applied ear acupoint pressure combined with moxibustion therapy for type 2 diabetic kidney disease, resulting in significant improvement in edema and renal function indicators. Combining ear acupuncture with Chinese herbal medicine or moxibustion significantly reduces the urine albumin-to-creatinine ratio and urine microalbumin in patients with early-stage DKD, demonstrating significant clinical efficacy. This approach can slow disease progression, reduce the incidence of end-stage renal disease, improve quality of life, and lower medical costs [54].

Yue Weiwei et al. [55] confirmed through clinical research that a traditional Chinese medicine enema formula composed of raw rhubarb, scutellaria, calcined oyster shell, alisma, sophora flower, salvia, and aconite has the effect of reducing urinary microalbumin and blood glucose in patients with stage III diabetic nephropathy. This may be related to the inhibition of protein degradation in the intestine and the reduction of toxic substance production in the intestine [56].

8. Other Therapies

Currently, common adjunctive methods for treating diabetic nephropathy in China include qigong exercises and music therapy, which, when used in combination with traditional Chinese medicine and Western medicine, can exert synergistic effects and improve treatment outcomes. Common traditional qigong exercises include Yijinjing, Baduanjin, Tai Chi, and Wuguxing. These exercise methods are all aerobic exercises. Long-term aerobic exercise training can enhance glucose phosphorolysis and muscle glycogen synthesis, thereby improving glucose metabolism, reducing glucose consumption, alleviating the burden on pancreatic cells, improving insulin sensitivity, and ultimately lowering blood glucose levels. It also improves lipid metabolism levels in the body [57,58]. Professor Zhao Jixi's team found through clinical observations that regular qigong exercises can effectively control patients' blood glucose and weight levels. Additionally, by improving patients' physiological symptoms, psychological stress, social relationships, and treatment outcomes, it comprehensively enhances patients' quality of life [59]. Yan Shaoxiao et al. [60] studied the effects of the Eight Brocades on patients' blood glucose and lipid metabolism. After 12 weeks of practice, the observation group showed decreases in hemoglobin A1c, fasting blood glucose, total cholesterol, triglycerides, and low-density lipoprotein levels. Some studies have shown that music therapy can assist in lowering blood glucose and improving lipid levels, and it also has the advantages of being simple, practical, and unrestricted by conditions [61].

9. Discussion

Traditional Chinese medicine has accumulated a rich theoretical foundation and practical experience in the treatment of diabetic nephropathy. It has made significant progress and demonstrated certain potential and advantages. Many clinical studies have proven the positive effects of traditional Chinese medicine in reducing proteinuria, improving kidney function, and alleviating symptoms.

However, there are still some issues in the treatment of diabetic nephropathy with TCM. For example, there are diverse opinions among medical experts, clinical drug use lacks standardization, and research samples are small. Further exploration and research are needed in the future to enhance the scientific rigor of efficacy evaluations, provide more reliable scientific evidence for the prevention and treatment of diabetic nephropathy with TCM, contribute TCM treatment protocols to the management of diabetic nephropathy, and improve clinical treatment outcomes.

References

[1] Navaneethan SD, Zoungas S, Caramori ML, et al. Diabetes Management in Chronic Kidney Disease: Synopsis of the KDIGO 2022 Clinical Practice Guideline Update. Ann Intern Med. 2023 Mar; 176(3): 381-387.

[2] Umanath K, Lewis JB. Update on diabetic nephropathy: core curriculum 2018[J]. Am J Kidney Dis, 2018, 71(6): 884-895.

[3] American Diabetes Association Professional Practice Committee. 2. Diagnosis and Classification of Diabetes: Standards of Care in Diabetes-2024. Diabetes Care. 2024 Jan 1; 47(Suppl 1): S20-S42.

[4] Li Y, Teng D, Shi X, et al. Prevalence of diabetes recorded in mainland China using 2018 diagnostic criteria from the American Diabetes Association: national cross-sectional study [J]. BMJ, 2020, 369:997.

[5] Zhang L, Liu X. Exploratory study on the origin of traditional Chinese medicine names for diabetic nephropathy [J]. Liaoning Journal of Traditional Chinese Medicine, 2012, 39(01):52-54.

[6] Fan T, Yang X, Li Y, et al. Advances in clinical research on diabetic nephropathy in traditional Chinese medicine [J]. Beijing Journal of Traditional Chinese Medicine, 2019, 38(10): 1036-1041.
[7] Expert Committee on Diabetes Nephropathy of the Endocrinology Professional Committee of the Chinese Society of Integrated Traditional and Western Medicine, and the Traditional Chinese Medicine and Microcirculation Professional Committee of the Chinese Society of Microcirculation. Expert Consensus on the Integrated Traditional and Western Medicine Prevention and Treatment of Diabetes Nephropathy (2023 Edition) [J]. Chinese Journal of Diabetes, 2023, 15(8): 690-702.
[8] Wang Xiaoqiang, Yu Jiajia, Wang Xiaolei, et al. Exploring the Treatment of Proteinuria in Diabetic Nephropathy from the Perspective of the "Ascending, Descending, Entering, and Exiting" Theory [J]. Shaanxi Journal of Traditional Chinese Medicine, 2020, 41(03): 368-370+386.
[9] Su Kelei, Zhu Yao, Guo Lizhong. Experience of Master of Traditional Chinese Medicine Zhou Zhongying in the Treatment of Diabetic Nephropathy [J]. Chinese Journal of Traditional Chinese Medicine, 2012, 27(11): 2854-2857.
[10] Wang Shiyao, Wang Shidong, Fu Qiang, et al. The Origins and Development of the "Micro-Mass" Pathological Hypothesis by Master of Traditional Chinese Medicine Lyu Renhe [J]. Chinese Journal of Traditional Chinese Medicine, 2022, 37(08): 4555-4559.
[11] Wang Tan, Nan Zheng. Professor Nan Zheng's Experience in Treating Diabetes Nephropathy [J]. Journal of Traditional Chinese Medicine of Jilin, 2011, 31(12): 1152-1153.
[12] Hu Jinqing, Ba Yuanming, Zhou Yu, et al. Ba Yuanming's Experience in Treating Diabetic Nephropathy with His Self-Formulated Kidney-Clearing Decoction [J]. Chinese Journal of Traditional Chinese Medicine, 2020, 35(02): 742-745.
[13] Tian Ruina, Zhou Yuexin, Zhu Lin, et al. Research Progress on the Treatment of Clinical Proteinuria and Kidney Damage in Type 2 Diabetic Nephropathy Using Traditional Chinese Medicine Methods of Diuresis, Blood Stasis Resolution, and Meridian Unblocking [J]. Liaoning Journal of Traditional Chinese Medicine, 2021, 48(08): 246-249.
[14] Li Xiaohui, Chen Luming, Tan Yingying. Interpretation of the 2022 Edition of the Integrated Diagnosis and Treatment Guidelines for Diabetic Nephropathy [J]. Modern Traditional Chinese Medicine, 2022, 42(05): 6-10.
[15] Liu Hong, Xiong Weijian, Zheng Xin. Academic Thoughts and Clinical Experience of Master of Traditional Chinese Medicine Zheng Xin in the Treatment of Diabetic Nephropathy [J]. Chinese Journal of Traditional Chinese Medicine, 2016, 31(11): 4547-4549.
[16] Lyu Renhe, Wang Yue, Zhang Ziyè. Clinical Analysis of the Staging and Treatment of 568 Cases of Diabetic Nephropathy [J]. Chinese Journal of Medicine, 1994, (04): 5-8+63.
[17] Hao Rui, Li Min, Gou Xiaowen, et al. Tong Xiaolin's Experience in the Treatment of Diabetic Kidney Disease Based on the Theory of Constitutional Targeting [J]. Journal of Traditional Chinese Medicine of Jilin, 2023, 43(07): 767-770.
[18] Zhang Mianzhi, Zhang Danning. Zhang Danning's Clinical Experience in the Treatment of Diabetic Nephropathy [J]. Chinese Journal of Traditional and Western Medicine, 2016, 31(08): 3141-3143.
[19] Song Xin, Li Ming. An Overview of Integrated Traditional and Western Medicine Treatment for Elderly Diabetic Nephropathy [J]. Chinese Journal of Clinical Health Care, 2023, 26(05): 610-613.
[20] Su Jiaming, Peng Jing, Wang Lin, et al. Mechanism Study of Jisheng Shenqi Pill in the Treatment of Diabetic Nephropathy Based on Network Pharmacology [J]. Chinese Journal of Integrated Traditional and Western Medicine in Nephrology, 2023, 24(12): 1094-1096+1143.
[21] Tong Chengcheng, Chen Haichao, Cong Zhongying, et al. Efficacy of Dapagliflozin Combined with Urea Clear Granules in the Treatment of Diabetic Nephropathy and Its Effects on Related Factors [J]. Journal of Modern Integrated Traditional and Western Medicine, 2022, 31(23): 3310-3314.
[22] Yu Hua, Liang Congdie, Hu Xiaohua, et al. Effects of Youtouqing Granules as an Adjuvant Therapy for Early-Stage Diabetic Nephropathy on the Body's Oxidative/Antioxidant Balance and Serum LncRNA KCNQ1OT1 and LncRNA Malat1 [J]. Journal of Laboratory Medicine and Clinical, 2022, 19(24): 3334-3338.
[23] Zhao Yumei, Wu Yubin, Song Dianping. Systematic Review of the Efficacy and Safety of Keluo Xin Capsules Combined with ARB Drugs in the Treatment of Diabetic Nephropathy [J]. Chinese Journal of Integrated Traditional and Western Medicine in Nephrology, 2017, 18(07):610-613.
[24] Noelp, Vonhoffdd, Salujaak, et al. Triptolide and its derivatives as cancer therapies [J]. Trends Pharmacol Sci, 2019, 40(5): 327-341.
[25] Tan Ying, Li Nan, Yan Qianhua, et al. Mechanisms and Clinical Application Progress of Three Traditional Chinese Medicines Containing Triptole in the Treatment of Diabetic Nephropathy [J]. Traditional Chinese Medicines, 2023, 45(12): 4049-4056.
[26] Qiu Yangmei, Yan Xiaoyong. Mechanisms and Research Progress of Triptole and Its Extracts in the Treatment of Diabetic Nephropathy [J]. Hainan Medicine, 2021, 32(06): 774-777.
[27] Chen Qianan, Zhang Min, Xing Haiyan. Research Progress on the Treatment of Kidney Diseases with Kunxian Capsules [J]. Journal of Practical Traditional Chinese Internal Medicine.
[28] Meng Yuan, Zhao Wenjing, Wang Yu, et al. Interpretation of the "Diabetes Nephropathy Syndrome-Based Diagnosis and Treatment Guidelines" [J]. Modern Traditional Chinese Medicine, 2023, 43(01): 19-23.
[29] Shi Ruoyu, Zhang Linqi, Zhang Kexin, et al. Network Meta-Analysis of the Efficacy of Traditional Chinese Medicines in Treating Inflammatory Responses in Diabetic Nephropathy [J]. Chinese Journal of Traditional Chinese Medicine, 2023, 48(13):3633-3649.
[30] Huang Yishan, Zhang Shuaoxing, Liu Weijing, et al. Application and Adverse Reactions of Astragalus in

Kidney Diseases [J]. Chinese Journal of Integrated Traditional and Western Medicine in Nephrology, 2020, 21(06): 550-552.
[31] You Liangzhen, Lin Yixuan, Fang Zhaohui, et al. Progress in Pharmacological Studies on the Therapeutic Effects of Astragaloside IV in Diabetes and Its Complications [J]. Chinese Journal of Traditional Chinese Medicine, 2017, 42(24):4700-4706.
[32] Liu Hong, Wang Zengsi, Gao Wen, et al. Effects of Astragaloside IV on Endoplasmic Reticulum Stress and the CHOP Signaling Pathway in Kidney Tissue of STZ-Induced Diabetic Rats [J]. Chinese Journal of Hospital Pharmacy, 2021, 41(13): 1318-1322.
[33] Wang Ruihua, Sun Dalin, Wang Jinjing, et al. Astragaloside IV regulates the IRE-1α signaling pathway to improve endoplasmic reticulum stress in podocytes of diabetic nephropathy [J]. Chinese Journal of Integrated Traditional and Western Medicine in Nephrology, 2023, 24(11): 957-960+1035.
[34] Yang Chunkun, Zhu Qinwei, Pan Qingquan, et al. Mechanistic exploration and clinical application of "blood stasis leads to water retention" [J]. Journal of Integrated Traditional and Western Medicine, 2023, 18(02): 213-216.
[35] Shi Wei, Xie Yongxiang, Meng Lifeng. Research and application of leeches in chronic kidney disease [J]. Clinical Nephrology Journal, 2018, 18(06): 324-327.
[36] Zhu Liangchun. Application of Insect-Based Medicines by Zhu Liangchun [M]. Beijing: People's Medical Publishing House, 2011: 194.
[37] Zhong Guangyu, Wang Yalan. Clinical Efficacy Observation of Leeches Powder in the Treatment of Chronic Kidney Disease [J]. Chinese Journal of Continuing Medical Education, 2019, 11(19): 130-132.
[38] Wang Yifan, Gu Yue, Shen Yuhang, et al. Effects of Modified Angelica Sinensis Blood-Nourishing Decoction on miRNA-155 and SOCS1 in Kidney Tissue of Rats with Diabetic Nephropathy [J]. Journal of Hainan Medical University, 2023, 29(1): 23-29, 35.
[39] Chen Ping, Wan Yigang, Wang Chaojun, et al. Mechanism and efficacy of Hibiscus flower preparations in the treatment of chronic kidney disease [J]. Chinese Journal of Traditional Chinese Medicine, 2012, 37(15): 2252-2256.
[40] Hu Xi, Wei Feng, Meng Yujie, et al. New advances in traditional Chinese medicine treatment for diabetic nephropathy [J]. Clinical Rational Drug Use, 2023, 16(24): 177-181.
[41] Luo Chengxun, You Juan, Zeng Jianyong, et al. Efficacy of Bailing Capsules Combined with Metformin in the Treatment of Diabetic Nephropathy and Its Effects on Serum ACA, IL-6, and NGAL Levels [J]. Hebei Medicine, 2023, 29(10): 1734-1739.
[42] Fang Cao, Fu Maoxiong, Ju Feng. Effects of Bailing Capsules Combined with Enalapril Tablets on Blood Glucose Levels and Renal Function in Elderly Patients with Diabetic Nephropathy [J]. Chinese Journal of Traditional Medicine, 2019, 37(2): 446-450.
[43] Wang Mei, Bao Jiazhen, Shou Yanni. Efficacy of Bailing Capsules Combined with Dapagliflozin in the Treatment of Diabetic Nephropathy and Their Effects on Caspase-1 mRNA and NLRP3 Inflammasome Levels [J]. Chinese Journal of Integrated Traditional and Western Medicine in Nephrology, 2023, 24(08):731-734.
[44] Shang Hongyan, Xu Ying, Xue Danfeng, et al. Professor Zhang Danning's use of Cimicifuga for the treatment of renal proteinuria and hematuria [J]. Journal of Traditional Chinese Medicine of Jilin Province, 2013, 33(11): 1093–1095.
[45] Yao W, Tao R, Xu Y, et al. The AR/RKIP pathway mediates the inhibitory effects of icariin on renal fibrosis and endothelial-to-mesenchymal transition in type 2 diabetic nephropathy. Journal of Ethnopharmacology. 2024 Feb 10; 320: 117414.
[46] Hu Jing, Yang Huayuan. The transmission pathways and effects of physical signals induced by moxibustion stimulation [J]. Chinese Acupuncture, 2021, 41(5): 577–581.
[47] Yu Minfeng, Lei Bing. Clinical analysis of the combined use of Yiqu Peiyuan Gushen Decoction and ear acupoint plaster application in the treatment of proteinuria in diabetic nephropathy [J]. Journal of Jiangxi University of Traditional Chinese Medicine, 2021, 33(6): 52–54.
[48] Xue Qing, Cong Zhufeng, Xiang Zedong, et al. A Review of Research on Traditional Chinese Medicine Acupoint Plaster Formulations Over the Past Decade [J]. Chinese Journal of Basic Medicine in Traditional Chinese Medicine, 2022, 28(5): 785–791.
[49] Tang Ming, Xu Jinsen. Analysis of the Efficacy of Warm Acupuncture in Treating Diabetes Nephropathy of Spleen-Kidney Yang Deficiency Type [J]. Diabetes World, 2022, 25 (05):165–167+175.
[50] Liu Liang, Dong Chongyang, Hao Hua, et al. Effects of the "Spleen and Stomach Regulation Acupuncture Method" on the Expression of PCX, CD2AP, Nephrin, and Desmin in Podocytes of Rats with Type 2 Diabetic Nephropathy [J]. Journal of Changchun University of Traditional Chinese Medicine, 2023, 39(02):152–155.
[51] Wu Xiaoyun, Dong Bicheng, Liu Liting, et al. Meta-analysis of Chinese herbal medicine acupoint application as an adjunct therapy for diabetic nephropathy stages III-IV [J]. Bulletin of Traditional Chinese Medicine, 2020, 19(06): 59-63.
[52] Fei Aihua. Effects of kidney-tonifying and blood-activating moxibustion on the efficacy and NO levels in early diabetic nephropathy [J]. Shanghai Journal of Acupuncture, 2012, 31(12): 891-892.
[53] Yu Guojun, Cheng Xin, Tang Suqin, et al. Evaluation of the efficacy of ear acupoint pressure combined with moxibustion in the treatment of edema in type 2 diabetic nephropathy [J]. Clinical Research, 2019, 27(02): 118-119.
[54] Pu Linli, Fu Fang. Effects of ear acupoint pressure combined with Ginseng and Rehmannia Decoction on early diabetic nephropathy [J]. Guangming Traditional Chinese Medicine, 2023, 38(13): 2469-2472.
[55] Yue Weiwei, Ma Li. Randomized controlled trial of the clinical efficacy of the Sugar Kidney Enema Formula [J]. Xinjiang Traditional Chinese Medicine, 2016, 34(01): 10-12.
[56] Liu Mingyue, Wang Sumei. Research progress on traditional Chinese medicine external treatment methods for diabetic nephropathy [J]. Chinese Traditional Medicine Modern Distance Education, 2023, 21(20): 206-208.

[57] Zhou Zhongyuan, Shi Yuanyuan, Wang Meng, et al. Aerobic Exercise Inhibits NLRP3 Inflammasome Activation and Reduces Kidney Damage in Type 2 Diabetic Mice [J]. Chinese Journal of Sports Medicine, 2021, 40(12): 962-969.
[58] Ruan Fang, Gui Chun, Yu Qin, et al. The effects of aerobic and resistance exercise on glucose and lipid metabolism in different populations with impaired glucose metabolism [J]. Evidence-Based Nursing, 2023, 9(11): 2004-2008.
[59] Huang Weijun, Cheng Na, Zhang Ying, et al. Observation of the Effect of "Eighteen Sections Brocade" on Type 2 Diabetes Patients Based on Quality of Life [J]. Modern Chinese Medicine Clinical, 2018, 25(5): 31-34.
[60] Yan Shaoxiao, Song Yanying, Lang Junlian, et al. The Effect of Eight Sections Brocade Exercise on Blood Glucose and Lipid Metabolism in Male Inpatients with Schizophrenia [J]. Journal of Traditional Chinese Medicine, 2012, 18(05): 116-117.
[61] Li Meixin, Zheng Xin, Zhang Xiaoying, et al. Effects of Music Therapy Assisted Anagliptin on Glycolipid Metabolism in Patients with Type 2 Diabetes[J]. Chinese General Practice, 2022, 25(26): 3275-3280.