Prevalence and Management Status of Chronic Kidney Disease in Patients with Hypertension and Type 2 Diabetes: A Community-Based Cross-Sectional Study

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Abstract

Background Although the overall prevalence of chronic kidney disease (CKD) in China has shown a downward trend, patients with hypertension and type 2 diabetes mellitus (referred to as the "two diseases") are at higher risk of CKD, and the status of their standardized management in primary healthcare institutions remains unclear. Objective To investigate the prevalence and current management status of CKD among patients with the "two diseases" in community health service centers, and to provide data support for optimizing primary-level CKD management. Methods From January to December 2024, a two-stage random sampling method was used. Six of 12 community health service centers in Wuhou District, Chengdu were randomly selected, and then 600 eligible patients with the "two diseases" were randomly selected from these six centers, including 205 patients with hypertension alone, 213 patients with type 2 diabetes mellitus alone, and 182 patients with both diseases. The CKD prevalence and management status of patients with the "two diseases" were analyzed. Management status included outpatient management, metabolic control, pharmacological treatment, and comprehensive interventions. Data were entered using EpiData 3.1 software and statistically analyzed using SPSS 21.0 software. Results The detection rate of CKD among patients with the "two diseases" was 28.8% (173/600). Specifically, the CKD detection rate was 26.8% (55/205) among patients with hypertension alone, 24.4% (52/213) among patients with type 2 diabetes mellitus alone, and 36.3% (66/182) among patients with both diseases. Among patients with the "two diseases" complicated by CKD, 39 cases (22.5%) were in CKD stage 3, 5 cases (2.9%) in CKD stage 4, and 1 case (0.6%) in CKD stage 5. However, the registration rate for specialized outpatient services for chronic kidney disease was only 5.2% (9/173), the blood glucose target achievement rate was 59.3% (70/118), the blood pressure target achievement rate was 92.6% (112/121), the SGLT-2i/GLP-1RA use rate was 37.0% (64/173), and the ACEI/ARB use rate was 52.0% (90/173). Conclusion The incidence of CKD among patients with the "two diseases" in community health service centers in Wuhou District, Chengdu is relatively high, and standardized management of CKD patients is insufficient. These findings suggest that primary healthcare institutions should improve their capacity for early CKD screening and intervention, strengthen standardized management of CKD patients, and improve the control of patients' metabolic indicators, which is of great significance for effectively preventing and delaying disease progression.

Full Text

Original Article

Prevalence and Management Status of Chronic Kidney Disease in Patients with Hypertension and Type 2 Diabetes: A Community-Based Cross-Sectional Study

XUE Cuirong, WEI Wei*, WU Renyuan, XUE Yaqin, XU Huijiang, LYU Weijiang, JIANG Dandan

610041 Yulin Community Health Service Center, Wuhou District, Chengdu, Sichuan Province, China

* Corresponding author: WEI Wei, Associate chief physician; E-mail: 452613891@qq.com

Abstract Background Although the overall prevalence of chronic kidney disease (CKD) in China is declining, patients with hypertension and type 2 diabetes mellitus—hereinafter referred to as "the two diseases"—remain at relatively high risk of CKD, and their standardized management in primary medical and health institutions is still unclear. **Objective** To understand the prevalence and management status of CKD among patients with "the two diseases" in community health service centers, and to provide data support for optimizing CKD management at the primary-care level. **Methods** From January to December 2024, a two-stage random sampling method was used. Six of the 12 community health service centers in Wuhou District, Chengdu were randomly selected, and then 600 eligible patients with "the two diseases" were randomly selected from these 6 community health service centers, including 205 with hypertension alone, 213 with type 2 diabetes mellitus alone, and 182 with comorbidity of "the two diseases." The prevalence and management status of CKD among patients with "the two diseases" were analyzed. Management status included outpatient management, metabolic control, pharmacological treatment, and comprehensive intervention. Data were entered using EpiData 3.1 software and statistically analyzed using SPSS 21.0 software. **Results** The CKD detection rate among patients with "the two diseases" was 28.8% (173/600) . Among them, the CKD detection rate was 26.8% (55/205) in patients with hypertension alone, 24.4% (52/213) in patients with type 2 diabetes mellitus alone, and 36.3% (66/182) in patients with comorbidity of "the two diseases." Among patients with "the two diseases" complicated by CKD, there were 39 cases of CKD stage 3 (22.5%) , 5 cases of CKD stage 4 (2.9%) , and 1 case of CKD stage 5 (0.6%) . However, the rate of registration for special outpatient services for chronic kidney disease was only 5.2% (9/173) ; the glycemic target attainment rate was 59.3% (70/118) ; the blood pressure target attainment rate was 92.6% (112/121) ; the use rate of SGLT-2i/GLP-1RA was 37.0% (64/173) ; and

the use rate of ACEI/ARB was 52.0% (90/173) . **Conclusion** The incidence of CKD among patients with "the two diseases" in community health service centers in Wuhou District, Chengdu is relatively high, and standardized management of CKD patients is insufficient. This suggests that primary medical and health institutions should improve their capacity for early CKD screening and intervention, strengthen standardized management of CKD patients, and improve control of patients' metabolic indicators, which is of great significance for effectively preventing and delaying disease progression.

[**Keywords**] Hypertension; diabetes mellitus, type 2; chronic kidney disease; community health service center; prevalence; chronic disease management

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Prevalence and Management Status of Chronic Kidney Disease in Hypertensive and Type 2 Diabetic Populations: a Community-Based Cross-Sectional Study

XUE Cuirong, WEI Wei*, WU Renyuan, XUE Yaqin, XU Huijiang, LYU Weijiang, JIANG Dandan

Yulin Community Health Service Center of Wuhou District, Chengdu 610041, China

* Corresponding author: WEI Wei, Associate chief physician; E-mail: 452613891@qq.com

Abstract Background Although the overall prevalence of chronic kidney disease (CKD) in China has decreased, patients with hypertension and type 2 diabetes mellitus (hereinafter referred to as "the two diseases") have a relatively high risk of developing CKD, and the status of their standardized management in primary medical institutions remains unclear. **Objective** To conduct a cross-sectional survey of patients with "the two diseases" in community health service centers regarding the prevalence and management status of CKD, so as to provide data support for optimizing the management of chronic kidney disease at the primary level. **Methods** From January to December 2024, a two-stage random sampling method was adopted. Taking 12 community health service centers in Wuhou District, Chengdu as the sampling frame, 6 institutions were randomly selected, and then 600 eligible patients with "the two diseases" were randomly extracted from these selected institutions (including 205 cases of isolated hypertension, 213 cases of isolated type 2 diabetes mellitus, and 182 cases of comorbidity of the two diseases) .

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The prevalence and management status of CKD in these patients were calculated, covering outpatient management, metabolic intervention, pharmacotherapy, and comprehensive intervention. Data were entered using EpiData 3.1 software, and statistical analysis was performed with SPSS 21.0 software. **Results** Among the included population with "the two diseases,"173 cases (28.83%) were diagnosed with CKD. Of these CKD patients, 55 cases (26.83%) were from the isolated hypertension group, 52 cases (24.41%) were from the isolated type 2 diabetes mellitus group, and 66 cases (36.26%) were from the comorbidity group of the two diseases. Among all CKD patients, 39 cases (22.54%) were at CKD stage 3, 5 cases (2.89%) at CKD stage 4, and 1 case (0.58%) at CKD stage 5. However, only 9 cases (5.2%) were registered for the special outpatient service for chronic kidney disease, 70 cases (59.32%) achieved the target of blood glucose control, 112 cases (92.56%) reached the standard of blood pressure control, 64 cases (36.99%) took SGLT-2i/GLP-1RA drugs, and 90 cases (52.02%) administered ACEI/ARB drugs. **Conclusion** At present, the prevalence of CKD in patients with the two diseases (diabetes/hypertension) in community health service centers of Wuhou District of Chengdu City is relatively high, and the standardized management of CKD patients remains inadequate. These findings indicate that primary medical institutions should improve the capacity for early screening and intervention of CKD, strengthen the standardized management of CKD patients, and enhance the control of patients'metabolic indicators, which is of great significance for effectively preventing and delaying disease progression.

【Key words】 Hypertension; Diabetes mellitus, type 2; Chronic kidney disease; Community health centers; Prevalence; Chronic disease management

Chronic kidney disease (CKD) is a progressive renal functional impairment caused by multiple etiologies. Decline in renal function may occur in the early stage of the disease even when there are no obvious symptoms; without timely intervention, it may ultimately progress to end-stage renal disease, severely affecting patients' quality of survival and increasing the burden on social medical resources. Hypertension and type 2 diabetes mellitus (collectively referred to

as the "two diseases") are major risk factors for CKD. Among people with the "two diseases" in China, the risk of CKD is significantly higher than in the general population[1-2]. With the acceleration of population aging and changes in the spectrum of chronic diseases, the number of community patients with the "two diseases" continues to increase, placing higher demands on kidney-health management[3-4]. Although analyses based on national survey data show that the prevalence of CKD among Chinese adults decreased from 10.8% in 2012 to 8.2% in 2023[5-6], its detection rate among people with the "two diseases" is markedly higher, and most patients remain undiagnosed in the early stage[7-9]. As the "main front" of chronic disease management, community health service centers undertake important responsibilities for follow-up, health education, and referral of patients with the "two diseases." However, at the community level, there remain shortcomings in the early identification, standardized screening, and effective management of CKD; the implementation rate of CKD-related examinations and the referral rate are relatively low, and the risk of delayed treatment is relatively high[10-12]. This study conducted a cross-sectional survey among the population managed for the "two diseases" in six community health service centers in Wuhou District, Chengdu, aiming to clarify the prevalence and management status of CKD in this population, provide a scientific basis for primary-level CKD intervention, and promote early detection and standardized treatment of CKD.

1 Materials and Methods

1.1 Study Population

This was a cross-sectional study using a two-stage random sampling method. From January to December 2024, 6 of the 12 community health service centers in Wuhou District, Chengdu were first randomly selected, and then patients under management for the "two diseases" who had established health records with complete data were randomly selected from these 6 community health service centers as study participants. Inclusion criteria were as follows: (1) a chronic disease management record had been established at the community health service center, with a management duration $ $1 year; (2) a definite diagnosis of type 2 diabetes mellitus and/or hypertension; (3) informed consent to participate in the study and cooperation with study-related examinations and data collection; (4) availability of two measurements of renal function or urinary albumin-to-creatinine ratio (UACR) taken at an interval of $ $3 months.

Exclusion criteria were as follows: (1) acute kidney injury, as defined by the Kidney Disease: Improving Global Outcomes (KDIGO) diagnostic criteria for acute kidney injury, namely an increase in serum creatinine (Scr) by $ $0.3 mg/dL within 48 h or an increase by $ $50% from baseline, or urine output <0.5 $ml \cdot kg{-}1 \cdot h{-}1$ lasting for 6 h, or patients with other serious kidney diseases with definite renal parenchymal lesions, such as lupus nephritis or hereditary kidney disease; (2) comorbid malignant tumors, infectious diseases, or severe cardiac or pulmonary insufficiency; (3) pregnant or lactating women; (4) those

who had previously undergone kidney transplantation or were receiving renal replacement therapy; (5) incomplete data or refusal to participate in the survey.

The sample size was calculated using the prevalence estimation formula for cross-sectional studies: $n = Z^2 \times P \times (1 - P)/d^2$. Referring to previous studies, the expected prevalence (P) of CKD among the target population with hypertension and/or type 2 diabetes mellitus was set at 25%[5,13], with a 95% confidence level ($Z = 1.96$) and an allowable error (d) of 4%. The calculated minimum sample size was 451; considering the characteristics of the sampling design and the possibility of approximately 10% missing data[14-15], the planned sample size was increased by 10% to at least 497 cases. Therefore, the target sample size was set at 500, and ultimately 600 valid patients were actually included. This study was reviewed and approved by the Ethics Committee of Wuhou District People' s Hospital (approval No.: WHLL2024 [K] 002), and all included patients signed informed consent forms.

1.2 Study Methods

1.2.1 Data Collection Methods Through the Wuhou family-doctor system, patients' sex, age, smoking and drinking status, past history, disease course, comorbidities, family history, previous treatment status, and other information were collected. Among these, smoking status was recorded as "yes" for current smoking and "no"for current non-smoking; drinking status was defined as alcohol consumption $ $1 time per week and ethanol intake

an amount $\geq$ 15 g was recorded as "yes" ; otherwise, it was recorded as "no." Clinical examinations included measurement of routine indicators such as blood pressure, height, and body mass, all performed by medical staff at community health service centers in accordance with standardized operating procedures. Laboratory examination data were obtained from the laboratory departments of the community health service centers, mainly including blood glucose, blood lipids, serum creatinine, UACR, and other indicators.

1.2.2 Diagnosis and staging of CKD

According to the KDIGO *Guideline for Early Identification and Intervention in CKD*, this study defined adult patients with any one of the following high-risk factors as a high-risk population for CKD: diabetes, hypertension, cardiovascular disease, obesity, older age > 60 years, previous history of acute kidney injury, family history of kidney disease, and history of kidney stones [16]. Among these, cardiovascular disease included coronary heart disease, myocardial infarction, and heart failure.

Diagnostic criteria for CKD: (1) kidney damage persisting for $\geq$ 3 months; (2) two consecutive estimated glomerular filtration rate (estimated glomerular filtration rate, eGFR) $<$ 60 mL $\cdot$ min^{-1} $\cdot$ (1.73 m^2)$^{-1}$, with a duration of $\geq$ 3 months; or two consecutive urine microalbumin values $\geq$ 30 mg/g, with a duration of $\geq$ 3 months [16]. Here, eGFR was calculated using the CKD-EPI creatinine

correction equation (applicable to adults tested for Scr, unit: mg/dL): $\text{eGFR} = 141 \times \min(\text{Scr}/\kappa, 1)^{\alpha} \times \max(\text{Scr}/\kappa, 1)^{-0.601} \times 0.993^{\text{age}}$. Here, for women $\kappa = 0.7$, and for men $\kappa = 0.9$; for women $\alpha = -0.329$, and for men $\alpha = -0.411$; min denotes the minimum value, and max denotes the maximum value. Unit conversion: if the Scr measurement unit was μmol/L, it first had to be converted to mg/dL (1 mg/dL = 88.4 μmol/L). The conversion formula was: Scr (mg/dL) = Scr (μmol/L) $\div$ 88.4.

CKD staging criteria: according to KDIGO criteria, eGFR (calculated using the CKD-EPI formula), UACR, or urine microalbumin results were combined to determine CKD status and stage (stages 1-5). The specific staging criteria were as follows: eGFR ≥ 90 mL $\cdot$ min^{-1} $\cdot$ (1.73 m^2)$^{-1}$ was CKD stage 1; $60 \sim 89$ mL $\cdot$ min^{-1} $\cdot$ (1.73 m^2)$^{-1}$ was CKD stage 2; $30 \sim 59$ mL $\cdot$ min^{-1} $\cdot$ (1.73 m^2)$^{-1}$ was CKD stage 3; $15 \sim 29$ mL $\cdot$ min^{-1} $\cdot$ (1.73 m^2)$^{-1}$ was CKD stage 4; and < 15 mL $\cdot$ min^{-1} $\cdot$ (1.73 m^2)$^{-1}$ was CKD stage 5 [16].

1.2.3 Assessment of CKD management status

With reference to previous literature [2, 17], the evaluation indicators established included: (1) outpatient management status, such as the rate of enrollment in the special outpatient program for chronic kidney disease; (2) metabolic control status, such as the blood glucose target-achievement rate [glycated hemoglobin (HbA_{1c}) $< 7.0\%$ was considered target achievement], blood pressure target-achievement rate [systolic blood pressure < 130 mmHg (1 mmHg = 0.133 kPa) and diastolic blood pressure < 80 mmHg were considered target achievement], blood lipid target-achievement rate (total cholesterol < 4.5 mmol/L, low-density lipoprotein cholesterol < 2.6 mmol/L were considered target achievement), and uric acid target-achievement rate (male serum uric acid < 420 μmol/L, female serum uric acid < 360 μmol/L were considered target achievement); (3) medication treatment status, such as the utilization rates of sodium–glucose cotransporter 2 inhibitors (SGLT-2i)/glucagon-like peptide-1 receptor agonists (GLP-1RA), angiotensin-converting enzyme inhibitors (ACEI)/angiotensin II receptor blockers (ARB), lipid-lowering drugs, and uric-acid-lowering drugs; (4) comprehensive intervention status, including the lifestyle-intervention guidance rate (assessing whether patients had received guidance on diet, exercise, smoking cessation, alcohol restriction, and other lifestyle interventions in the past year) and the completion rate of kidney-function-related examinations (assessing whether Scr, eGFR, and UACR testing had been performed at least once during the assessment year).

1.2.4 Quality control methods

To ensure sample representativeness and data reliability, the medical staff participating in the survey received uniform training before the start of the study. The training covered the study protocol, data-collection methods, diagnostic criteria for CKD, and relevant examination procedures. During training, medical staff also studied in depth the definition of CKD, clarifying that CKD refers

to eGFR < 60 mL $\cdot$ min^{-1} $\cdot$ (1.73 m^2)$^{-1}$ persisting for at least 3 months, or UACR > 30 mg/g persisting for more than 3 months. During the sampling process, medical staff randomly selected eligible patients from the patient health records of community health service centers. The sampling method used a computer random-number generator to ensure that each eligible patient had the same probability of being selected. This process was designed to avoid bias caused by human factors and to improve the scientific validity and credibility of the study results. All collected data were entered using EpiData 3.1 software. During data entry, data-entry standards were strictly followed to ensure the accuracy and completeness of the data.

1.3 Statistical methods

After data were entered using EpiData 3.1 software, they were imported into SPSS 21.0 software for statistical analysis. Normally distributed measurement data were expressed as $(\bar{x} \pm s)$, and count data were expressed as relative numbers. Comparisons of count data between groups were performed using the χ^2 test, with the significance level set at $\alpha = 0.05$.

2 Results

2.1 Clinical characteristics of patients with the "two diseases"

Among 600 managed patients with the "two diseases," 308 were men (51.3%) and 292 were women (48.7%); their ages ranged from 30 to 96 years, with a mean age of (68.3 ± 10.5) years. There were 380 patients with BMI ≥ 24.0 kg/m^2 (63.3%); 120 smokers (20.0%); and 183 drinkers (30.5%). There were 205 patients with hypertension alone (34.2%), 213 with type 2 diabetes mellitus alone (35.5%), and 182 with both "two diseases" (30.3%); 109 patients had concomitant hyperlipidemia (63.0%), and 29 had concomitant hyperuricemia (16.8%); 64 patients used SGLT-2i/GLP-1RA (37.0%), and 90 used ACEI/ARB (52.0%).

2.2 CKD detection rate and staging among patients with the "two diseases"

The CKD detection rate among managed patients with the "two diseases" was 28.8% (173/600). CKD stages were mainly stages 1–3 [96.5% (167/173)]; see Table 1. The CKD detection rate among patients with hypertension alone was 26.83% (55/205), that among patients with type 2 diabetes mellitus alone was 24.41% (52/213), and that among patients with both "two diseases" was 36.26% (66/182).

2.3 Comparison of clinical characteristics of patients with the "two diseases" according to whether CKD was present

The age of patients with the "two diseases" with and without CKD, and the "two diseases" disease status

Table 1. CKD staging in patients managed for "hypertension/type 2 diabetes" ($n = 173$)

CKD stage	Number of patients	Percentage (%)
CKD stage 1	42	24.3
CKD stage 2	86	49.7
CKD stage 3	39	22.5
CKD stage 4	5	2.9
CKD stage 5	1	0.6

There were statistically significant differences in comorbid hyperlipidemia, comorbid hyperuricemia, use of SGLT2/GLP-1, and use of ACEI/ARB ($P < 0.05$), as shown in Table 2.

Table 2. Comparison of clinical characteristics between patients with hypertension/type 2 diabetes complicated with CKD and those without CKD [n (

Basic information	Without CKD ($n = 427$)	With CKD ($n = 173$)	χ^2 value	P value
Sex			2.748	0.097
Male	210 (49.2)	98 (56.6)		
Female	217 (50.8)	75 (43.4)		
Age			4.620	0.032
40–59 years	89 (20.8)	23 (13.3)		
$ 60*years*|338(79.2||150(86.7)||||*BMI*||(30.07||0.935|| < 24.0*kg*/*m*^{2}$				
$ 24.0*kg*/*m*^{2}$	270 (63.2)	110 (63.6)		
Smoking			2.780	0.095
No	349 (81.7)	131 (75.7)		
Yes	78 (18.3)	42 (24.3)		
Alcohol consumption			0.022	0.881
No	296 (69.3)	121 (69.9)		
Yes	131 (30.7)	52 (30.1)		
"Two diseases" morbidity status			7.326	0.026
Hypertension only	150 (35.1)	55 (31.8)		

Basic information	Without CKD ($n = 427$)	With CKD ($n = 173$)	χ^2 value	P value
Type 2 diabetes only	161 (37.7)	52 (30.1)		
Comorbid "two diseases"	116 (27.2)	66 (38.1)		
Comorbid hyperlipidemia	269 (57.0)	109 (63.0)	4.320	0.038
Comorbid hyperuricemia	60 (15.0)	29 (16.8)	8.910	0.003
Use of SGLT2/GLP-1	264 (61.8)	64 (37.0)	10.230	0.001
Use of ACEI/ARB	349 (81.7)	90 (52.0)	12.340	<0.001

Note: CKD = chronic kidney disease; SGLT-2i/GLP-1RA = sodium-glucose cotransporter 2 inhibitor/glucagon-like peptide-1 receptor agonist; ACEI/ARB = angiotensin-converting enzyme inhibitor/angiotensin II receptor blocker.

2.4 Current Management Status of CKD in Patients with "Hypertension/Type 2 Diabetes"

In terms of outpatient management, the registration rate for special chronic kidney disease outpatient services among patients with "hypertension/type 2 diabetes" was only 5.20% (9/173). In terms of metabolic control, except for the blood pressure target attainment rate of 92.6% (112/121), the attainment rates for all other indicators were <60.0%. In terms of pharmacological treatment, the use rates of SGLT-2i/GLP-1RA, ACEI/ARB, lipid-regulating drugs, and uric-acid-lowering drugs were all <60.0%. In terms of comprehensive intervention, the rate of lifestyle intervention guidance was only 30.1% (52/173), and the completion rate of kidney-function-related examinations was even <30.0%, as shown in Table 3.

Table 3. The current management status of CKD in patients with "Hypertension/Type 2 diabetes"

Management indicator	Number of patients	Number achieving target	Target attainment rate (%)
Outpatient management			
Registration rate for special chronic kidney disease outpatient services	173	9	5.2
Metabolic control			
Blood glucose target attainment rate	118	70	59.3
Blood pressure target attainment rate	121	112	92.6
Blood lipid target attainment rate	109	53	48.6
Uric acid target attainment rate	29	11	37.9
Pharmacological treatment			
SGLT-2i/GLP-1RA use rate	173	64	37.0
ACEI/ARB use rate	173	90	52.0
Lipid-regulating drug use rate	173	53	30.6
Uric-acid-lowering drug use rate	173	15	8.7

Management indicator	Number of patients	Number achieving target	Target attainment rate (%)
Comprehensive intervention Lifestyle intervention guidance rate	173	52	30.1
Completion rate of kidney-function-related examinations	173	45	26.0

3 Discussion

This study focused on the community population with "hypertension/type 2 diabetes"in Wuhou District, Chengdu, and found that the prevalence of CKD was as high as 28.83%, significantly higher than the 8.2% prevalence of CKD in the general population reported in a recent study[ˆ6]. In addition, this study found that patients with both hypertension and type 2 diabetes had a significantly higher prevalence of CKD than patients with a single disease. Specifically, the prevalence of CKD among patients with hypertension alone was 26.83% (55/205), that among patients with type 2 diabetes alone was 24.41% (52/213), whereas the prevalence of CKD among patients with comorbid "hypertension/type 2 diabetes" was as high as 36.26% (66/182); moreover, the proportion of this group among CKD patients (38.15%) was higher than that in the non-CKD group (27.17%). Internationally, Satoa et al.[ˆ18] also found that patients with both hypertension and diabetes had a significantly higher risk of developing CKD than patients with diabetes alone. It is worth noting that in this study, the use rate of SGLT-2i/GLP-1RA among patients with "hypertension/type 2 diabetes" complicated with CKD was 36.99%, suggesting that primary care settings have already applied novel kidney-protective drugs to some extent, but 63.01% of patients still had not used such drugs.

Compared with previous studies, the CKD detection rate in this study was slightly higher than that in other community-based studies[ˆ6], which may be related to the characteristics of the study population. The patients included in this study were all "hypertension/type 2 diabetes" patients aged over 30 years, with a mean age of 68.3 ± 10.5 years, and the incidence of CKD is inherently higher in older populations. In addition, the proportion of patients with BMI $ 24.0kg/mˆ{2}$ in this study was 63.3%, and obesity is also an important risk factor for CKD. Together, these factors contributed to the relatively high CKD detection rate.

The research results indicate that community health service centers have obvious deficiencies in CKD management. The registration rate for chronic kidney dis-

ease chronic-disease outpatient services was only 5.2%, far lower than expected, suggesting that primary healthcare institutions still have considerable room for improvement in standardized CKD management. According to the study by Alidrisi et al. [19], among newly diagnosed patients with type 2 diabetes, the incidental detection rate of CKD was relatively high and was associated with multiple factors. This indicates that primary healthcare institutions need to strengthen their capacity for CKD screening and identification so that CKD patients can be detected and managed earlier. In addition, Cunillera-Puértolas et al. [20] also proposed that CKD progression is relatively common among patients with a history of type 2 diabetes and/or hypertension, further emphasizing the importance of primary healthcare institutions in CKD management. The study by Cao et al. [21] further showed an association between dietary patterns and the incidence of CKD among older patients with type 2 diabetes, suggesting that community health service centers should attach importance to lifestyle interventions—especially dietary guidance—when managing CKD.

In terms of metabolic control, this study found that the glycemic target-achievement rate was 59.3%, the blood-pressure target-achievement rate was 92.6%, whereas the target-achievement rates for blood lipids and uric acid were relatively low, at 48.6% and 37.9%, respectively. This indicates that, with respect to metabolic control, primary healthcare institutions manage blood pressure relatively well, but comprehensive management of blood glucose, blood lipids, and uric acid still needs to be strengthened. Wake et al. [22] found that among patients with type 2 diabetes in Ethiopia, attitudes and practices regarding CKD prevention were inadequate, which may be related to poor metabolic control. In addition, the study by Shi et al. [23] also found that among Chinese patients with type 2 diabetes, the prevalence of CKD was relatively high and was associated with multiple risk factors, further underscoring the importance of comprehensive metabolic control.

In terms of pharmacotherapy, this study found that the utilization rate of SGLT-2i/GLP-1RA was 37.0%, and that of ACEI/ARB was 52.0%. This indicates that some patients had received relatively advanced treatment regimens, but some patients still had not received adequate drug intervention. According to a prospective, multicenter study published in 2024 that pooled data from 45 hospitals in China, the utilization rate of SGLT-2i/GLP-1RA among patients with type 2 diabetes complicated by CKD was 44.66%–62.63% [23]. In addition, a Danish nationwide cohort study published in 2025 analyzed 102,216 patients with type 2 diabetes complicated by CKD and found that their SGLT-2i/GLP-1RA utilization rate was 18.8%–36.6% [24]. It can be seen that although the SGLT-2i/GLP-1RA utilization rate in this study was relatively close to the international level, it still differed substantially from the mainstream level in China. This may be related to insufficient assessment of patient indications by primary healthcare institutions—such as whether diabetes is present and the level of urinary protein—as well as medical-insurance reimbursement policies or lack of medication education. The above suggests that future primary healthcare work should address these shortcomings and further analyze the clinical

characteristics of non-medication users—such as eGFR level and whether proteinuria is present—in order to optimize drug-intervention strategies. On the other hand, Ostrominski et al. [25] found that finerenone has good efficacy and safety in patients with type 2 diabetes, providing a new option for CKD treatment. However, Zhu Shan [26] considered that among community-dwelling older patients with hypertension and type 2 diabetes, the implementation effect of interventions still needs to be improved. This indicates that primary healthcare institutions need to further optimize pharmacotherapy regimens to improve treatment outcomes for CKD patients.

This study also has certain limitations. (1) It used only a cross-sectional design, so causal relationships cannot be inferred; (2) CKD diagnosis relied on two test results separated by an interval of $ $3 months, but some patients may have been missed because of insufficient follow-up; (3) renal pathological examination was not included, which may underestimate early CKD; (4) the sample was limited to Wuhou District, Chengdu, and regional representativeness may have some bias; (5) patients complicated by acute kidney injury or other severe kidney diseases were excluded, and such populations may themselves belong to high-risk groups for CKD; their exclusion may have led to an underestimation of CKD prevalence in the study population and cannot fully represent all CKD morbidity among the "two-disease"population; (6) the specific reasons for nonuse of SGLT-2i/GLP-1RA drugs—such as patient willingness, physicians' prescribing habits, and drug accessibility—were not evaluated in detail.

4 Summary

This study revealed the high prevalence of CKD and inadequacies in the current state of management among community patients with hypertension and type 2 diabetes in Wuhou District, Chengdu. These findings emphasize the importance of strengthening early CKD screening, standardized management, and referral in primary healthcare institutions. By increasing the registration rate for specialized chronic kidney disease outpatient services, optimizing pharmacotherapy regimens, and strengthening lifestyle interventions, it is expected that patient prognosis can be improved and the occurrence of end-stage renal disease reduced.

Author contributions: Xue Cuirong was responsible for the study conception, design, and manuscript writing, and participated in data collection and organization; Wu Renyuan, Xue Yaqin, Xu Huijiang, Lü Weijiang, and Jiang Dandan participated in study data collection and manuscript revision; Wei Wei guided manuscript writing, revision, and quality control, and was responsible for the article as a whole as well as supervision and management.

There are no conflicts of interest in this article.

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