

Knowledge, Attitudes and Practices toward Diabetic Kidney Disease among Type 2 Diabetes patients in Southern Kyrgyzstan

Policy Brief

November 2025



Abstract

This policy brief presents results from a multicenter cross-sectional study conducted among 207 adult patients with type 2 diabetes mellitus (T2DM) in the southern region of Kyrgyzstan. The study aimed to assess the level of knowledge, attitudes, and practices (KAP) regarding diabetic kidney disease (DKD), and to identify factors associated with better KAP outcomes.

Women comprised 61.4% of the sample, and 65.2% were in the 50–69 age group. The distribution by place of residence was almost equal between urban and rural areas. About half of the participants had secondary education (high school) or lower.

The mean knowledge score was 7.18 out of 14, and only 22.2% of participants achieved a “good” level of knowledge ($\geq 70\%$ correct) about DKD. At the same time, 61.4% had positive attitudes and 52.7% performed protective practices. Regression analysis showed that higher knowledge and attitude levels were associated with urban residence, higher education, receiving information about DKD, and greater comorbidity (number of comorbidities).

The results indicate substantial gaps specifically in understanding the asymptomatic course of early-stage kidney damage, the role of antihypertensive therapy, and the potential harm of nonsteroidal anti-inflammatory drugs. At the same time, most participants expressed willingness to learn and trust healthcare workers as the main source of information. This creates a favorable window of opportunity to develop targeted educational programs and to integrate DKD counseling into routine T2DM care.

1 | Introduction

Diabetes is one of the most significant global public health challenges. In 2021, 537 million adults were living with diabetes, and the number is projected to rise to 1.31 billion by 2050. The highest burden falls on low- and middle-income countries (LMICs), which are home to 81% of people with diabetes and nearly 90% of undiagnosed cases.

Chronic kidney disease (CKD) is one of the most serious complications of diabetes, affecting up to 40% of patients with T2DM. Diabetes and hypertension together account for two thirds of all CKD cases. CKD, in turn, substantially increases mortality and healthcare costs in diabetes. Despite international recommendations to perform annual testing for albuminuria and estimated glomerular filtration rate (eGFR), early detection of CKD remains insufficient, especially in resource-limited settings.

In Kyrgyzstan, 85,142 patients with diabetes are officially registered, but the true number may be up to eight times higher. Screening studies indicate a T2DM prevalence of around 5.2%, while the International Diabetes Federation (IDF) estimates it at 6.6%. Monitoring for complications remains low: only 31% of patients undergo HbA1c testing, and testing rates in the southern part of the country are among the lowest.

Additionally, southern Kyrgyzstan faces pronounced barriers to healthcare access, including poverty, low health literacy, and limited availability of specialized nephrology services. Among patients with T2DM in the country, 7.4% have diabetic kidney disease, and one quarter of patients receiving hemodialysis are people with diabetes.

Patients’ knowledge, attitudes, and practices (KAP) play a critical role in preventing diabetes complications. Lack of awareness about DKD risk, the asymptomatic course of early stages, and the importance of regular screening is a common problem in resource-limited countries. Barriers include low health literacy, limited access to services, financial constraints, and weak communication between patients and healthcare providers.

To date, Kyrgyzstan has lacked studies that systematically examine KAP related to DKD among patients with T2DM. This makes it particularly important to assess the level of knowledge, attitudes, and practices in the southern regions of the country. The findings will make it possible to:

- identify gaps in awareness and common misconceptions;
- assess patients' attitudes toward screening and treatment;
- determine behavioral practices that influence the progression of DKD;
- develop culturally adapted educational programs and improve early diagnosis of DKD.

Thus, studying KAP among patients with T2DM is a key step toward improving the quality of healthcare, reducing the risk of late DKD detection, and strengthening the health system in southern Kyrgyzstan.

2 | Methods

The aim of the study was to examine the level of knowledge, attitudes, and practices related to DKD among T2DM adults living in southern Kyrgyzstan. Particular attention was paid to how well patients understood DKD risk factors and symptoms, their attitudes toward prevention and screening practices, the behavioral practices they applied in everyday life, and which demographic and clinical factors were associated with better, or, conversely, insufficient, KAP. In addition, the study explored potential pathways through which knowledge might influence behavioral change.

The study was conducted as a cross-sectional, multicenter survey from September 10 to October 10, 2025, at three large medical facilities in Osh that serve both urban and rural populations in southern Kyrgyzstan. This site selection enabled the inclusion of a broad range of patients from diverse socioeconomic and cultural backgrounds, making the findings more representative of the southern region.

Eligible participants were adults aged 18 years and older with a documented diagnosis of T2DM who were able to provide informed consent. Patients with type 1 diabetes, gestational diabetes, or significant cognitive impairment were excluded. Based on standard statistical calculations, a target sample size of approximately 200 participants was determined. Of 252 invited patients, 207 agreed to participate and completed the questionnaire, yielding a high response rate and sufficient statistical precision for analysis.

The study used a structured KAP questionnaire developed from internationally validated tools and adapted to the local context with input from Kyrgyz researchers. The questionnaire was translated into Kyrgyz and Russian, underwent back-translation and pilot testing, and was then finalized. It included items on sociodemographic characteristics and clinical profile, 14 binary items assessing knowledge, Likert-scale measures of attitudes and practices, and several open-ended questions to better understand patients' motivations and information needs.

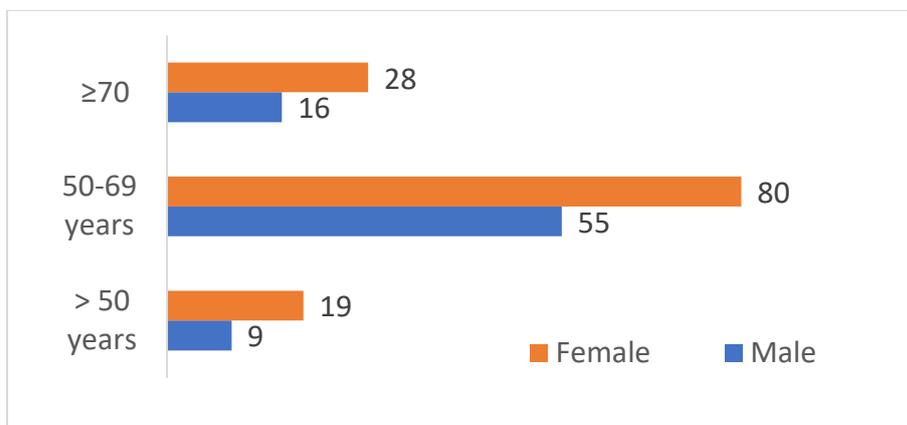
Data were collected by specially trained staff from the International Medical Faculty of Osh State University using Google Forms. Before completing the survey, participants reviewed and signed an electronic informed consent form, and all data were collected in de-identified form. The study was approved by the Ethics Committee of the International Medical Faculty of Osh State University and was conducted in accordance with the STROBE guidelines for cross-sectional studies.

3 | Results

A total of 207 respondents participated in the study. Most were women, who made up nearly two thirds of the sample (61.4%), while men accounted for 38.7%. The age distribution also showed a predominance of middle-aged and older adults: the majority of participants were 50–69 years old

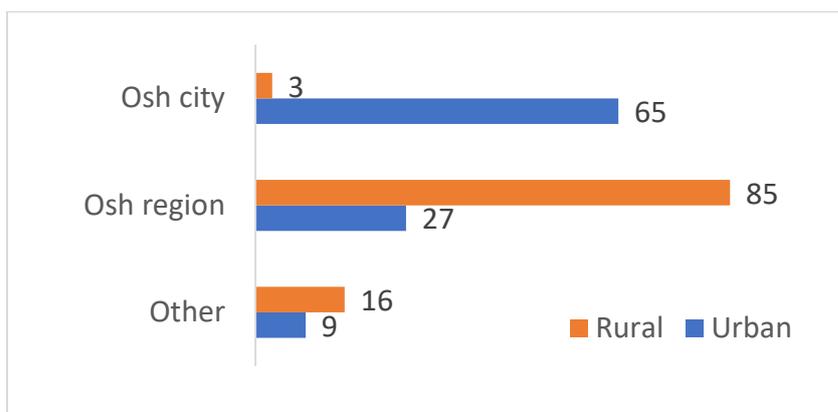
(65.2%). The younger group, participants under 50, represented a smaller proportion (13.5%), whereas older adults aged 70 years and above accounted for 21.3%. This distribution reflects the typical profile of a T2DM patient population (Figure 1).

Figure 1. Distribution of participants by age and sex, (n=207)



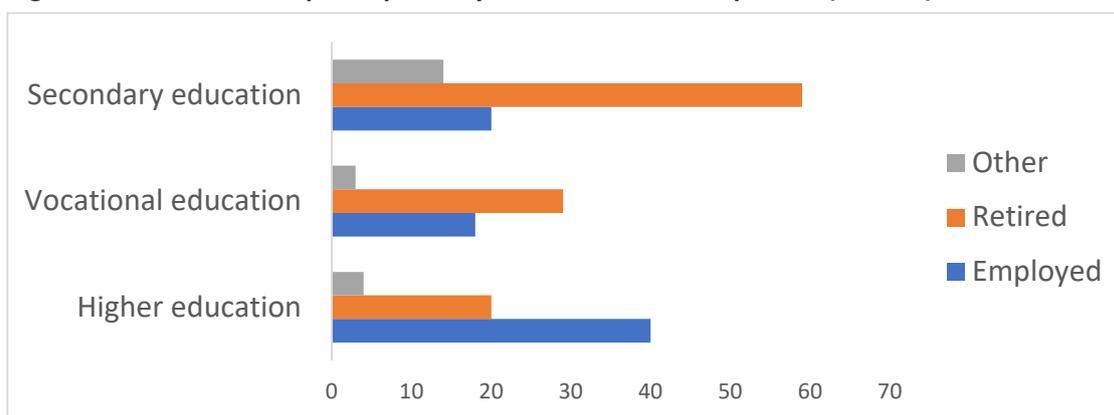
Participants' place of residence was distributed almost evenly: nearly half lived in urban areas (49.8%), while the other half resided in rural areas (50.2%). The participants' geographic origin reflected typical patient referral patterns to regional healthcare facilities in the south of the country: 32.9% were residents of the city of Osh, while more than half of the sample (54.1%) came from Osh region. Another 12.1% represented other southern regions, including Batken and Jalal-Abad (Figure 2).

Figure 2. Distribution of participants by region and place of residence, (n=207)



In terms of education, the largest share of participants had completed secondary school or less, nearly half of the sample (44.9%). About one quarter reported vocational education (24.2%), and 30.9% reported higher or incomplete higher education. More than one third of participants were employed (37.7%), but the predominant group consisted of retirees, who made up 52.2% of the sample. The remaining 10.1% fell into the "other" category, including temporarily unemployed individuals, homemakers, and others (Figure 3). This educational and occupational structure highlights the heterogeneity of the study participants' sociodemographic background.

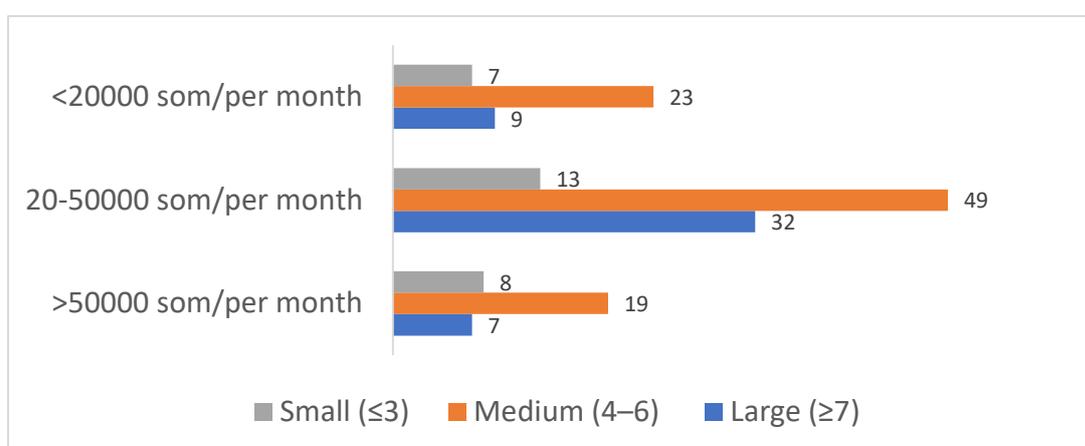
Figure 3. Distribution of participants by education and occupation, (n = 207)



Household structure varied among participants, but medium-sized families were the most common. Only 13.5% of respondents lived in small households of three people or fewer, while the majority (55.6%) belonged to medium-sized households with four to six family members. Nearly one third of participants (30.9%) reported living in large households of seven or more people.

Monthly household income showed substantial variability: 18.8% of respondents lived on less than 20,000 som per month, nearly half (45.4%) reported an income of 20,000–50,000 som, and 19.3% had an income above 50,000 som (Figure 4). More than half of participants (55.7%) also indicated that they incurred direct out-of-pocket expenses for medical care, while 44.4% reported no such expenditures. These findings reflect the broad socioeconomic range of the sample and suggest potential financial barriers to accessing treatment.

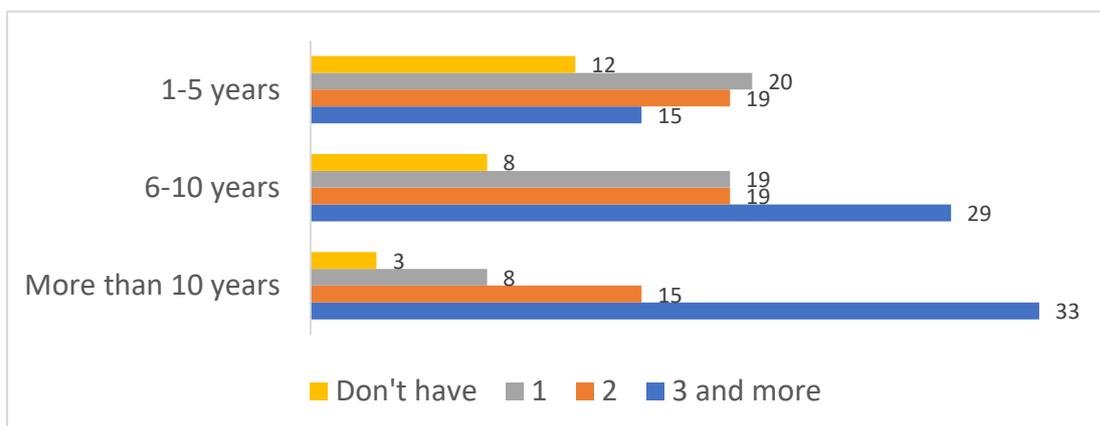
Figure 4. Distribution of participants by household size and income, (n = 207)



The clinical characteristics of the participants reflected the chronic course of disease typical of a T2DM population. The largest category by diabetes duration was 6–10 years, reported by 36.2% of respondents. Another 31.9% had been living with diabetes for 1–5 years. Nearly one third of participants (28.5%) reported a duration of more than 10 years.

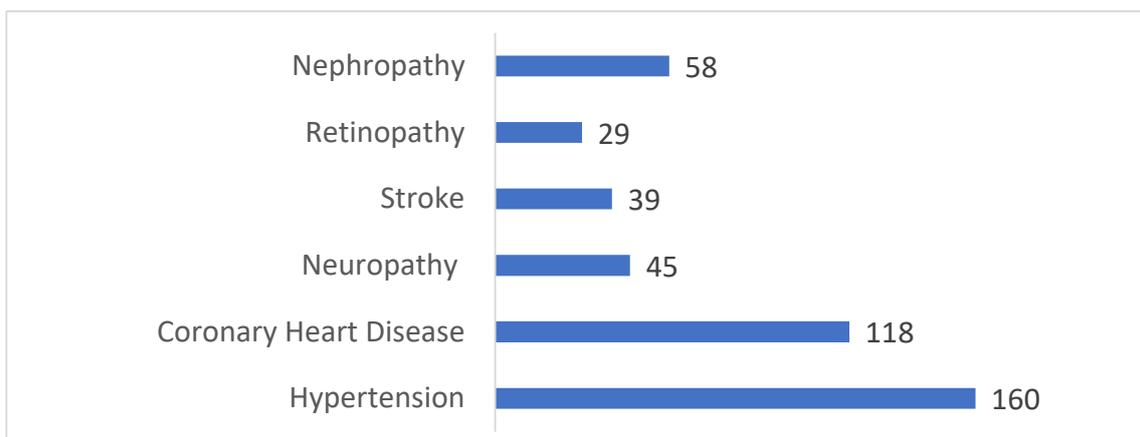
Only 12.6% of respondents reported no coexisting conditions. One comorbidity was reported by 23.7%, two by 26.6%, and the largest group consisted of patients with three or more comorbid conditions (37.2%). This indicates a high level of multimorbidity in the study population and underscores the need for a comprehensive, integrated approach to patient management (Figure 5).

Figure 5. Distribution of participants by diabetes duration and number of comorbidities, (n = 207)



Among comorbid conditions, arterial hypertension was the most prevalent, reported by the vast majority of respondents (77.3%). Coronary heart disease was also common, occurring in 57% of participants. Nearly one quarter of patients (21.7%) had diabetic neuropathy, and 18.8% reported a history of stroke, underscoring the high cardiovascular risk in this sample (Figure 6). Eye diseases, including likely manifestations of diabetic retinopathy, were reported by 14% of participants. Notably, signs of kidney disease were reported by 28% of respondents, indicating a substantial burden of renal complications among people with T2DM in southern Kyrgyzstan.

Figure 6. Distribution of participants by most frequently reported comorbidities, (n = 207)



The participants' behavioral characteristics also showed marked variation. Most respondents reported that they had never smoked (59.9%). Another 20.3% indicated that they had quit smoking in the past, while nearly one in five (18.8%) were current smokers at the time of the survey (Figure 7). A similar pattern was observed for alcohol consumption: 73.4% of respondents reported no alcohol use at all, whereas 26.6% reported drinking alcohol (Figure 8).

Figure 7. Distribution of participants by smoking, (n = 207)

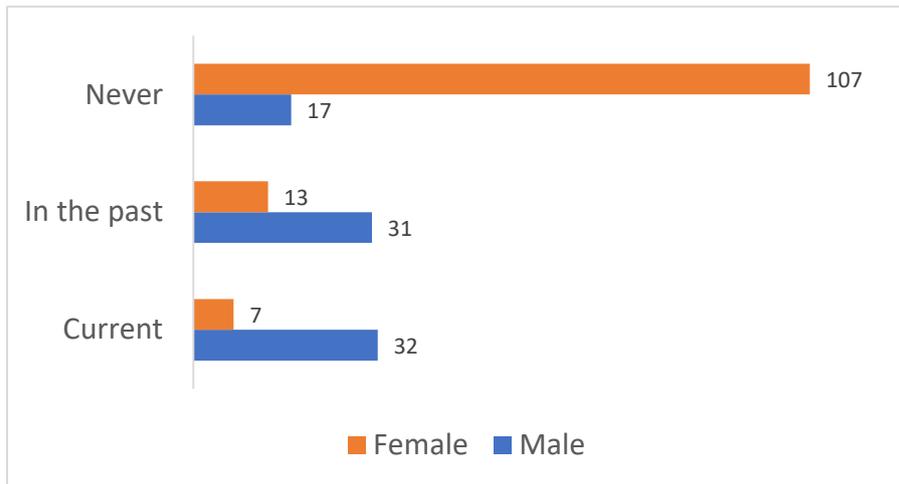
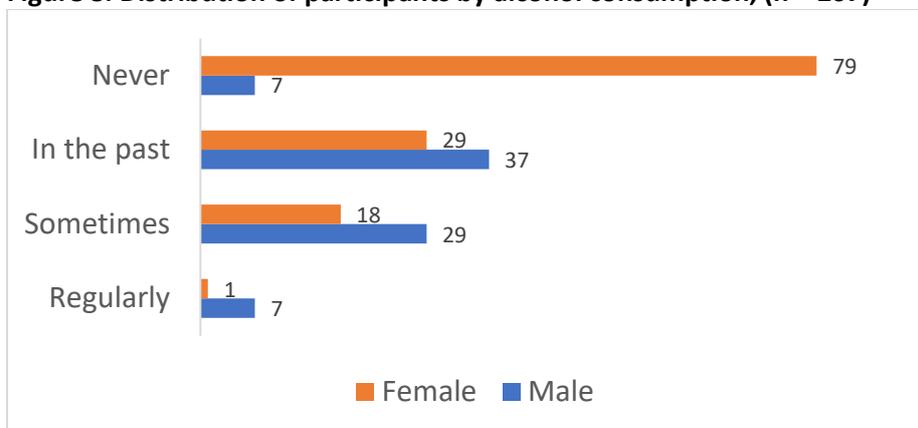


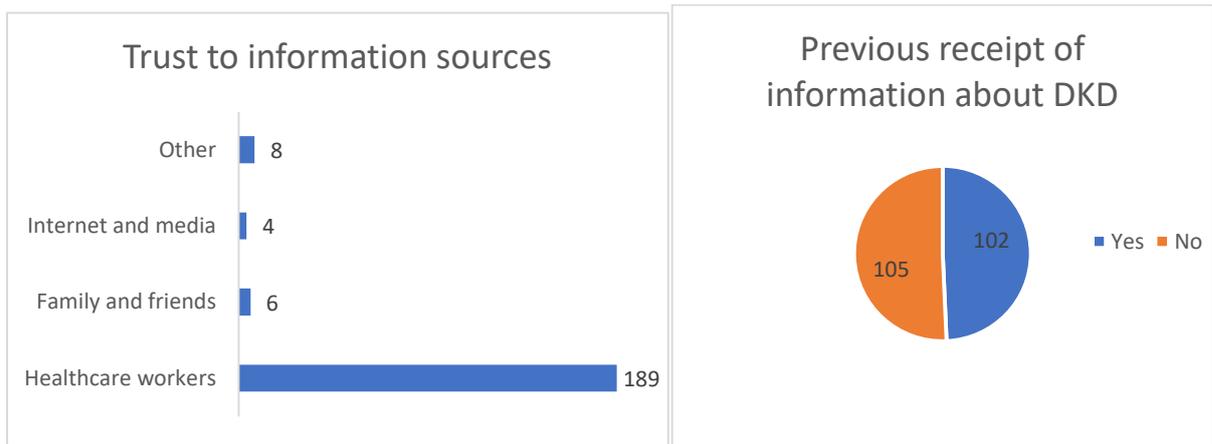
Figure 8. Distribution of participants by alcohol consumption, (n = 207)



The majority of participants (91.3%) identified healthcare professionals as their primary and most trusted source of information on diabetes, underscoring the central role of the health system in shaping patients' knowledge. Social channels such as friends or acquaintances were mentioned very rarely (2.9%), and even fewer respondents relied on digital media, including internet resources and social networks (1.9%). Other sources, such as printed materials or television programs, accounted for only 3.9% (Figure 9).

Nearly half of participants (49.3%) reported that they had previously received information about DKD, whereas just over half (50.7%) had never heard of DKD prior to taking part in this study. These findings highlight both the opportunity and the need for systematic patient education as part of routine clinical care (Figure 9).

Figure 9. Distribution of participants by the most trusted sources of information and previous receipt of information about DKD, (n = 207)



Study participants demonstrated a moderate overall level of knowledge about DKD. However, only one in five reached the “good” knowledge ($\geq 70\%$ correct) threshold (Figure 10). The most important gaps were related to understanding the asymptomatic course of early-stage DKD, the role of NSAIDs, the impact of blood glucose levels on the kidneys, and the kidney-protective effects of antihypertensive medications. This highlights the need to strengthen educational interventions, as critically important information about symptoms and prevention remains insufficiently understood (Figure 11).

Figure 10. Participants’ KAP levels, % (n=207)

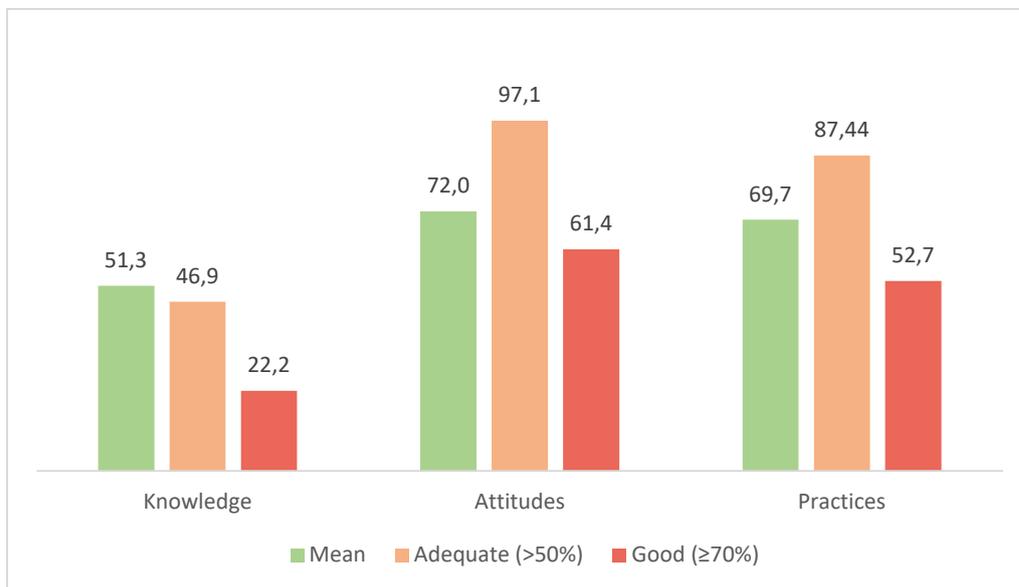
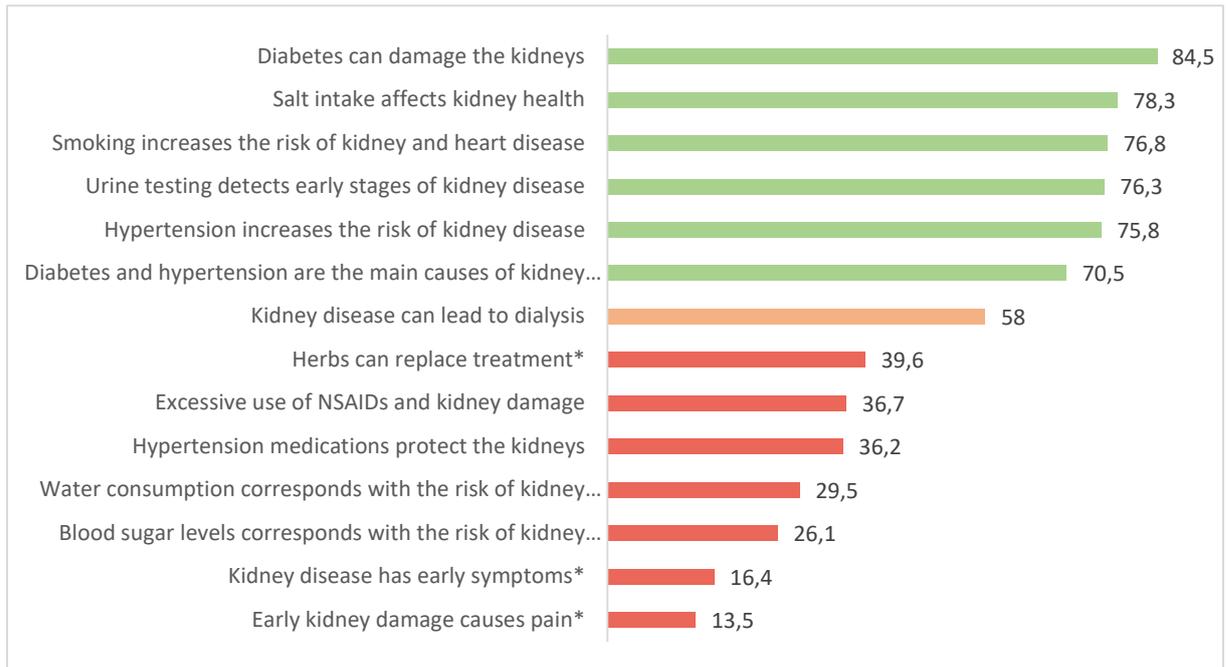


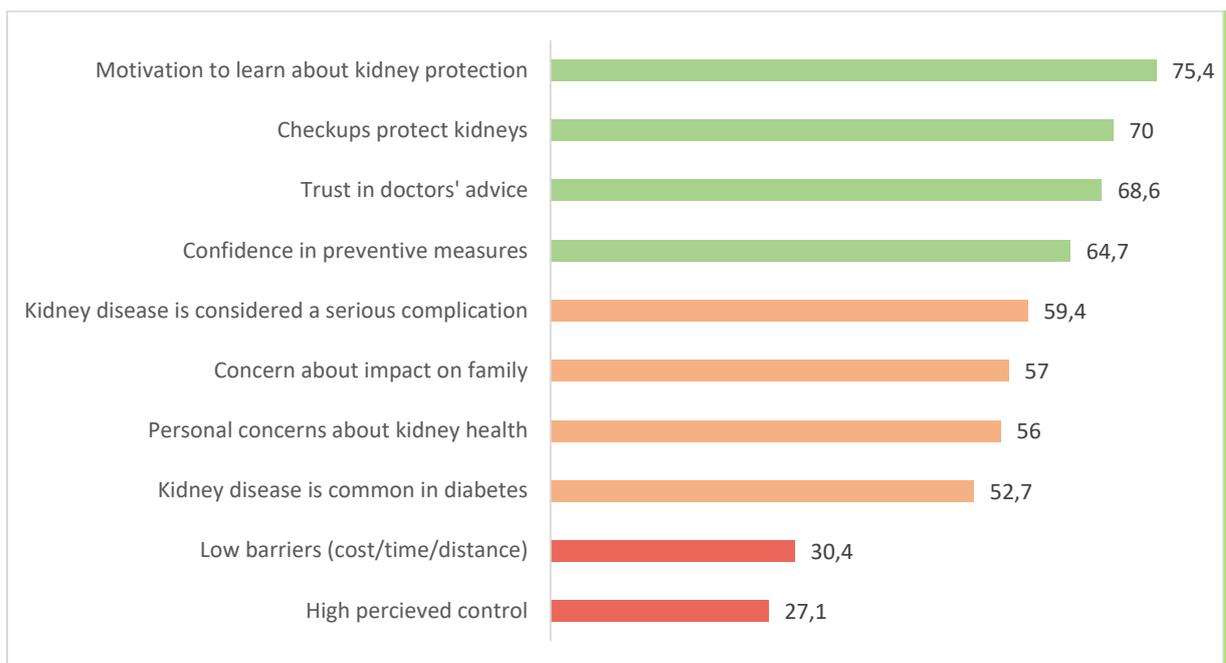
Figure 11. Participants' knowledge about DKD and diabetes, % (n=207)



Note: * reverse questions

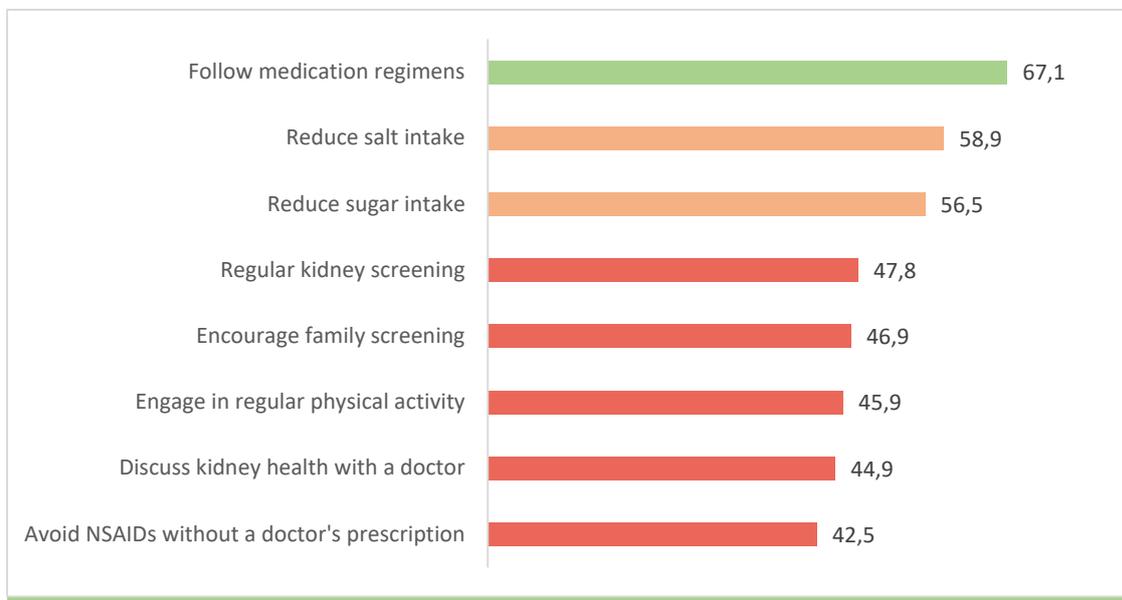
Despite limited knowledge, patients' attitudes were predominantly positive: most expressed trust in healthcare professionals, recognized the importance of medical examinations, and showed motivation for prevention of DKD. However, a substantial proportion of participants still held low perceived control over their health and perceived their risk of DKD as only moderate, which may reduce readiness to adopt behavior changes (Figure 12).

Figure 12. Participants' attitudes towards DKD and diabetes, % (n=207)



Preventive and self-management practices were heterogeneous. Adherence to prescribed medications appeared high, but lifestyle changes and regular actions aimed at monitoring kidney health were implemented less consistently. Fewer than half of participants routinely discussed kidney health with their physician, monitored kidney function, or avoided NSAIDs without a prescription, indicating that recommended behaviors are not yet fully integrated into everyday life (Figure 13).

Figure 13. Participants' practices towards DKD and diabetes, % (n=207)



Regression analysis showed that the only consistent factor associated with both better knowledge and practices was prior exposure to information about DKD. Urban residence and higher educational attainment were also linked to better knowledge, but these associations weakened after adjustment. This underscores the central importance of accessible, systematic, and high-quality patient education resources.

Correlation analysis revealed a meaningful pattern of relationships: knowledge was moderately positively associated with attitudes, and attitudes were associated with practices. However, the “knowledge → practice” link was weaker, suggesting the presence of barriers that prevent knowledge from translating into behavior.

Qualitative data highlighted the role of family as a key driver of treatment adherence, a strong need for clearer explanations regarding diet and medications, and the widespread use of herbal remedies. Financial, transportation, and system-level barriers remained major constraints on access to prevention, especially for rural residents.

Overall, the findings demonstrate a combination of high motivation and trust in healthcare professionals alongside insufficient awareness and limited practical preventive skills. This creates a significant window of opportunity to implement patient- and family-centered educational interventions aimed at improving knowledge and reducing barriers to preventive behaviors.

4 | Conclusion and recommendations

The study identified a marked knowledge deficit regarding diabetic kidney disease among patients with type 2 diabetes in southern Kyrgyzstan, particularly in understanding the asymptomatic course of early stages, the nephrotoxicity of NSAIDs, and the renoprotective role of antihypertensive therapy. Despite a high level of trust in healthcare professionals, most respondents face barriers, which reduces the regularity of screening and adherence to recommendations.

Our analysis indicated that the key factor associated with better knowledge, attitudes, and practices was access to DKD-specific information. Higher educational attainment, an urban context, and older age strengthened the association with knowledge levels, while comorbidity burden influenced attitudes. However, none of these factors showed stable associations with practices after adjustment, information exposure remained the only consistent predictor.

The pattern of relationships between KAP components suggests a “stepwise” process of change: knowledge shapes attitudes, and attitudes shape practices. The weak direct “knowledge → practice” relationship highlights the need not only to provide information, but also to address self-efficacy, fatalistic beliefs, and barriers to access.

Qualitative analysis underscored the central role of family in supporting treatment adherence, a strong demand for dietary and medication guidance, and a moderate prevalence of herbal remedy use. Participants also described substantial obstacles related to accessing medical care and obtaining annual screening.

Overall, the findings indicate that improving KAP levels in southern Kyrgyzstan depends primarily on strengthening the informational environment and expanding accessible educational channels. Given limited infrastructure (only one “diabetes school” operates in the region), the likelihood of receiving accurate information becomes a decisive factor shaping preventive behavior. This underscores the need to scale up education programs, improve clinician–patient communication, and address structural barriers that hinder the translation of knowledge into action.

Based on these results, the following practical steps are recommended:

1. Develop and implement brief, culturally adapted DKD educational modules for patients with T2DM at both inpatient facilities and the primary healthcare level.
2. Strengthen the role of physicians and nurses as proactive initiators of kidney-health discussions, including explaining the asymptomatic nature of early-stage disease and the need for regular screening.
3. Integrate counseling on the safe use of pain medications and traditional remedies into routine visits.
4. Prioritize educational efforts for rural residents and patients with lower levels of education.
5. Consider establishing or expanding “diabetes schools” in southern regions with a mandatory DKD component.

Institutionalizing these approaches may help reduce late detection of DKD, slow the progression to kidney failure, and decrease the burden on the healthcare system, especially given the high costs of kidney replacement therapy.

6 | References

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