



"PUBLIC HEALTH IMPACT OF CKD AWARENESS AMONG T2DM PATIENTS: INSIGHTS FROM A HEALTH EDUCATION INITIATIVE IN SOUTH INDIA"

Pharmaceutical Science

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ABSTRACT

Background: Chronic kidney disease (CKD) remains a silent yet devastating complication of type 2 diabetes mellitus (T2DM), with a substantial burden in low- and middle-income countries like India. Poor awareness among patients contributes to delayed diagnosis and suboptimal management. **Objective:** To assess the knowledge, attitudes, and practices (KAP) of T2DM patients regarding CKD and evaluate the impact of an awareness intervention. **Methods:** A cross-sectional survey was conducted among 83 adult T2DM patients attending outpatient clinics in a tertiary care hospital in South India. Participants completed a validated KAP questionnaire before and one week after an awareness camp that included educational pamphlets and visual counselling tools. Pre- and post-intervention responses were analysed using SPSS v25.0. **Results:** Pre-intervention, awareness of CKD was moderate (72.3%), but knowledge of early symptoms (36.1%) and diagnostic tests (54.2%) was limited. Post-intervention, significant improvements were observed across all knowledge domains ($p < 0.05$), with a 30–40% increase in correct responses. Positive shifts in attitudes and health practices were also noted, including increased CKD screening (from 24.1% to 60.2%) and lifestyle modifications. Additionally, participants reported spreading CKD awareness within their communities, creating a societal ripple effect. **Conclusion:** The findings underscored the effectiveness of brief, structured awareness interventions in enhancing CKD-related knowledge and promoting proactive health behaviour in patients with T2DM. Embedding patient education and regular kidney function screening into diabetes care protocols could significantly improve outcomes and reduce CKD-related morbidity.

KEYWORDS

Diabetes mellitus, chronic kidney disease, patient awareness, lifestyle modification, public health education

INTRODUCTION

Chronic kidney disease (CKD) is a serious but often overlooked complication of type 2 diabetes mellitus (T2DM), affecting millions worldwide.^[1-3] In India, late diagnosis, limited awareness, and poor healthcare access worsen the risk.^[4-6] Diabetic kidney disease (DKD) often progresses silently, making early detection through routine screening vital.^[7,8] Despite guidelines and newer therapies like SGLT2 inhibitors offering protection, many patients remain unaware of their CKD risk.^[9,10] This study explores what people with T2DM know, believe, and do about CKD. By assessing their knowledge, attitudes, and practices (KAP), we aim to uncover gaps and guide better education and prevention efforts.

MATERIALS AND METHODS

Study Design And Setting

The study was a cross-sectional, questionnaire-based survey conducted over a period of ten months in the outpatient departments (OPDs) of Endocrinology and Nephrology at a tertiary care teaching hospital in South India. The study was designed to assess the knowledge, attitude, and practice (KAP) of patients with type 2 diabetes mellitus (T2DM) regarding chronic kidney disease (CKD).

As part of the study, a structured awareness intervention was implemented. Educational activities were conducted through interactive methods including pamphlets, short, language-appropriate health education videos, role-play demonstrations, awareness speech, and one-on-one counselling sessions led by trained healthcare staff. Patients were also exposed to real-life testimonials and encouraged to participate in guided Q&A sessions to clarify misconceptions. These tools were chosen to actively engage participants, enhance knowledge retention, and promote behaviour change beyond conventional pamphlet-based education.

Study Population And Sampling

A total of 83 patients participated in the study. It included adult patients aged ≥ 30 years that had been diagnosed with T2DM for at least one year, with or without a confirmed diagnosis of CKD. Patients with cognitive impairments, those critically ill or unwilling to participate were excluded. A convenience sampling technique was used. Participants were approached in the waiting area of the OPD, and after

explaining the study objectives, written informed consent was obtained in the local language.

The KAP questionnaire was inducted prior to the awareness camp and subsequently repeated one week following the awareness session to evaluate changes in patients' knowledge and attitudes regarding CKD and diabetes.

Study Tool: KAP Questionnaire

A **structured, pre-validated questionnaire** was adapted from Zibran MA et al., consisted of four sections:^[11]

- **Section A:** Socio-demographic and clinical information (age, gender, education, income, duration of diabetes/CKD, treatment regimen)
- **Section B:** Knowledge (10 items) – focused on awareness of CKD, causes, symptoms, risk factors, and tests
- **Section C:** Attitude (5 items) – assessed beliefs about CKD preventability, screening, and education
- **Section D:** Practice (5 items) – covered patient behaviors like regular testing, lifestyle, and consultation practices

Responses to the KAP items were recorded as “Yes,” “No,” or “Not sure”. The questionnaire was developed using KDIGO and ADA guidelines (4,5) and adapted from validated tools used in previous studies^[8,10].

Scoring And Data Analysis

Each correct or positive response was scored as 1, while negative or unsure responses were scored as 0. Scores were summed up separately for knowledge, attitude, and practice domains. Higher scores indicated better awareness and health behavior.

Data were entered into Microsoft Excel and analyzed using **SPSS version 25.0**. Descriptive statistics (frequencies, percentages, mean $\pm$ SD) were used to summarize demographic variables and KAP scores. Associations between demographic variables and KAP scores were tested using **chi-square** tests for categorical variables and **independent t-tests** or **ANOVA** for continuous variables. A **p-value < 0.05** was considered statistically significant.

RESULTS

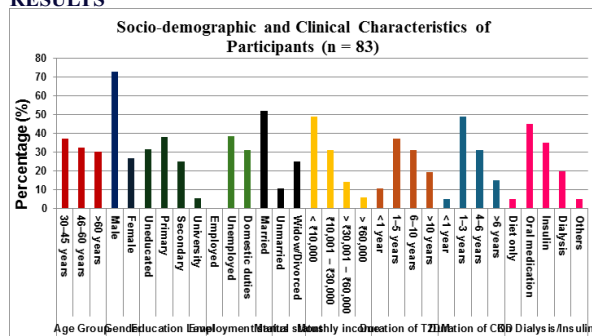


Figure 1: Socio-demographic and Clinical Characteristics of Participants (N = 83)

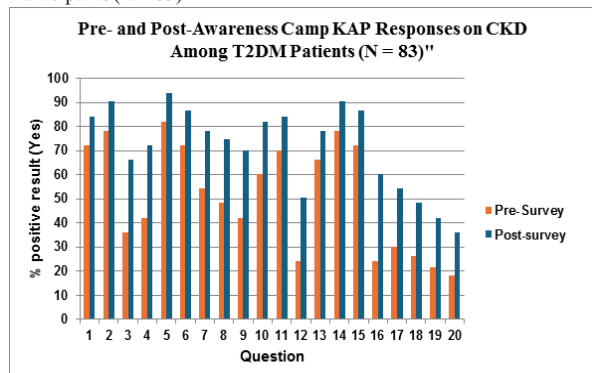


Figure 2: Distribution Of Knowledge, Attitude, And Practice Responses Regarding Chronic Kidney Disease Among Patients With Type2 DM (Pre- and Post-Awareness) (N = 83)

DISCUSSION

This study offered valuable insights into the knowledge, attitudes, and practices (KAP) of patients with type 2 diabetes mellitus (T2DM) regarding chronic kidney disease (CKD) in a tertiary care hospital in South India. As CKD remained a prevalent yet often underdiagnosed complication of diabetes, particularly in low- and middle-income countries like India, this research filled a critical gap in understanding how patients perceived and responded to the risk of kidney complications associated with diabetes.^[12,13]

Before the awareness intervention, many participants (72.3%) were aware that diabetes could affect the kidneys, and 78.3% understood that poor glycaemic control could lead to kidney damage. However, awareness about the stages of CKD, its early warning signs, and the importance of routine monitoring remained low. Only 36.1% of participants could identify the stages of CKD, and a mere 42.2% recognized early symptoms.^[14,15] These findings aligned with earlier studies conducted in similar socio-economic settings, which also reported that patients with T2DM often lacked comprehensive disease-specific knowledge.^[16]

Following the awareness camp, a noticeable improvement in knowledge levels was observed. For instance, understanding of early CKD symptoms rose from 36.1% to 66.3%, and awareness of diagnostic tests increased from 54.2% to 78.3%. These improvements reflected the effectiveness of structured, targeted education sessions even when conducted briefly. Nevertheless, sustaining these knowledge gains over the long term would likely require on-going reinforcement through follow-up counselling or digital tools.^[17,18]

In terms of attitude, participants generally exhibited a positive outlook toward CKD prevention. Prior to the intervention, 69.9% believed that CKD could be prevented through proper diabetes management; this increased to 84.3% post-camp. Similarly, belief in the value of routine screening rose from 78.3% to 90.4%. However, fewer participants felt confident enough to educate or counsel others on CKD, with only 24.1% expressing such confidence before the camp and 50.6% after. This suggested that although the intervention improved factual understanding, it had a limited impact on patient self-efficacy. Prior research had similarly shown that increased awareness did not always translate into proactive health behaviour or confidence in knowledge-

sharing.^[19]

Practice scores remained the weakest component, both pre- and post-intervention. Initially, only 24.1% of respondents reported ever undergoing screening for CKD, and just 18.1% claimed to be familiar with current CKD treatment recommendations. These figures improved to 60.2% and 36.1%, respectively, after the awareness camp. However, despite these gains, many participants still did not engage in regular health monitoring or lifestyle modifications-actions critical to slowing the progression of CKD.^[20,21] This disconnect between knowledge and practice echoed findings from global studies, where barriers such as healthcare access, time constraints, and low health literacy hindered behavioral change.

Socio-demographic factors appeared to have had a substantial influence on KAP outcomes. A majority of participants were either uneducated or had only completed primary education, and nearly half reported a monthly income below ₹10,000. These socioeconomic challenges likely contributed to poor baseline awareness and limited healthcare engagement. Previous literature had confirmed that lower educational attainment and income levels were closely associated with poorer chronic disease outcomes and reduced health-seeking behaviour.^[14-16]

In addition to increased awareness, patients demonstrated meaningful improvements in lifestyle modifications, glycaemic control, adherence to therapy, and timely follow-up after attending the camp. These changes were noted during subsequent clinical visits, where many participants reported actively implementing dietary adjustments, medication compliance, and regular check-ups. Importantly, the impact extended beyond individual behavior-several patients shared that they had educated their families and peers about CKD, leading to increased awareness within their communities. Some individuals influenced by these participants subsequently returned to the hospital for screening and counselling, informing the clinical team that their decision was prompted by the advice and example of a camp attendee. This suggested that the intervention not only empowered individuals but also sparked a positive ripple effect at the societal level.

Clinically, the study underscored the need to integrate guideline-recommended screening and monitoring protocols into routine diabetes management. Both the KDIGO and American Diabetes Association (ADA) guidelines advocated annual testing for kidney function using eGFR and UACR assessments.^[15,16] Furthermore, newer pharmacological options such as SGLT2 inhibitors and RAAS blockers had shown efficacy in preserving renal function, even in patients with advanced disease.^[17,18] Despite their proven benefits, awareness and usage of these therapies remained minimal in the study population, suggesting a need for improved provider-patient communication and affordability strategies.

CONCLUSION

This study revealed a significant disparity between patients' awareness of diabetic kidney disease and their actual health practices. While most participants understood the risk CKD posed in the context of diabetes, deeper knowledge about progression and prevention strategies remained limited. Encouragingly, the educational intervention successfully improved knowledge and attitudes, but failed to fully translate into consistent health practices.

To effectively tackle the rising burden of CKD among patients with T2DM, sustained, tailored educational efforts must be embedded into primary care systems. Alongside these efforts, healthcare providers should be empowered to implement routine screening and discuss treatment options grounded in clinical guidelines. Bridging the gap between what patients know and what they do is essential to improving health outcomes and reducing the dual burden of diabetes and kidney disease in resource-constrained settings.

ACKNOWLEDGEMENT

We sincerely thank the nurses and doctors of JSS Medical College and Hospital, Mysore, India, for their involvement in the study.

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