

Awareness Of Chronic Kidney Disease Among Diabetic Patients in Erbil City

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Abstract

Backgrounds and objectives: Chronic Kidney Disease (CKD) is a significant global health issue, impacting over 10% of the world's population. In many cases, CKD remains asymptomatic during its early stages due to a lack of awareness among patients regarding kidney diseases, chronic conditions, and associated risk factors. Diabetes mellitus and hypertension are the leading causes of chronic kidney disease (CKD) in both developed and developing countries worldwide. Within this context, diabetic nephropathy is recognized as the most prevalent cause of CKD. This study explores the comprehension and awareness of CKD among diabetic individuals, aiming to identify gaps that could inform future educational and preventive strategies.

Methods: A quantitative, descriptive study design conducted in Layla Qasm center in Erbil City, Iraq. The sample size of the study was 397 diabetic patients. The data was gathered by asking questions to the participants during interviews. Containing: Sociodemographic characteristic of the patient, medical information and assessment of awareness of CKD among Diabetic patients. Data analysis was done using SPSS version 27.

Results: 397 diabetic patient respondents to our research (58.1% female participants outnumber 41.9% males). The study population is mostly middle-aged to elderly with average age 55.34 ± 14.465 years, urban-dwelling (62.6%), married (87.1%) Muslim (99.0%) women with low education levels (48.2%). Patients who were diagnosed with type 2 diabetes were 52.3% and mean diabetes duration of 11.35 ± 7.847 years. The majority (42.4%) demonstrated low awareness. Meanwhile, 27.5% showed moderate awareness, and only (24.2%) were highly aware of CKD. A statistically significant association ($p < 0.05$) between awareness levels and all sociodemographic variables achieved except for gender, which did not demonstrate a significant relationship.

Conclusion: The awareness of chronic kidney disease (CKD) was generally limited, with about one quarter demonstrating high awareness, while nearly half of diabetic individuals had low awareness. A notable relationship ($p < 0.05$) was identified between the levels of CKD awareness and various sociodemographic factors; however, gender did not exhibit a significant association. These findings highlight the need for targeted educational interventions to improve CKD awareness, particularly among diabetic patients with lower education levels and older age groups, to facilitate early detection and management of CKD complications.

Keywords: Awareness , chronic kidney disease. diabetic patient

Introduction

The kidneys are very important organs that perform essential functions, some of which are filtering waste, excess water, and acids from the body's cells' waste products. They also regulate the body's balance of water, salts, and essential minerals such as sodium, potassium, phosphorus, and calcium. Given the kidney's intricate structure and function, kidney-related diseases are equally complex. Kidney dysfunction can lead to various disorders, primarily categorized into two types: acute kidney injury (AKI), a sudden but often reversible loss of kidney function, and chronic kidney disease. Although AKI is reversible with appropriate treatment, it can potentially increase the risk of progression to CKD in later life (Digital, n.d.). Chronic Kidney Disease (CKD) is a major worldwide health concern affecting more than 10% of the global population (Ibitoba et al., 2022). As defined by current international standards, chronic kidney disease (CKD) is diagnosed when the Glomerular Filtration Rate (GFR) remains below 60 mL/min per 1.73 m² for a period exceeding three months (Vaidya & Aeddula, 2025). Chronic kidney disease (CKD) is categorized into five progressive stages based on Glomerular Filtration Rate (GFR). Stage 1 indicates mild kidney dysfunction, whereas Stage 5, referred to as End-Stage Renal Disease (ESRD) represents the most advanced and critical stage of chronic kidney disease (CKD). At this critical stage, kidney function declines to less than 10% of normal capacity, marking an irreversible loss of renal function (Asmelash et al., 2020). Progression of chronic kidney disease can be initiated by various risk factors that result in permanent renal harm. Key contributors include advanced age, genetic predisposition, diabetes mellitus, hypertension, uncontrolled blood sugar levels, and tobacco use (Asmelash et al., 2020). Data on global health from 2017 places chronic kidney disease (CKD) as the 12th foremost cause of death across the globe. Epidemiological research indicates that around 9.1% of the worldwide population experienced CKD in 2017, resulting in 1.2 million deaths that year. Current projections indicate a concerning upward trend, with CKD-related deaths expected to reach 2-4 million annually by 2040 (Alobaidi, 2021). A recent study carried out in Bangladesh revealed significant gaps in public awareness about chronic kidney disease (CKD). The findings showed that merely 11% of participants demonstrated adequate knowledge about CKD, while a substantial majority (60%) possessed very limited understanding of the condition (Ghimire et al., 2021). Diabetes mellitus and hypertension remain the primary etiological

factors for chronic kidney disease (CKD) across both developed and developing nations globally (Asmelash et al., 2020). Among these, diabetic nephropathy stands out as the most common cause of CKD. Both conditions exhibit considerable mortality and morbidity rates resulting from their advancing decline in kidney function. Worldwide, kidney replacement therapy continues to be the main treatment option for advanced CKD cases caused by diabetes (Banerjee et al., 2022). For individuals with end-stage renal disease (ESRD), the main treatment options consist of kidney transplantation or hemodialysis (Tegegne et al., 2020).

Prompt recognition and prompt treatment of chronic kidney disease (CKD) can greatly reduce or lessen complications associated with the illness. CKD cases frequently stay asymptomatic during the initial stages, mainly because patients have limited awareness about kidney diseases, chronic illnesses, and their related risk factors (Kumela Goro et al., 2019). This research examines the understanding and awareness of CKD within diabetic groups, seeking to uncover gaps that could guide future educational and preventive measures.

Methods

A quantitative, descriptive study design was conducted to assess the awareness of chronic kidney disease among diabetic patients at Layla Qasm center in Erbil City, Iraq. The sample size of the study was 397 diabetic patients. The population is $N = 49340$ patients according to data from Directorate of Health-Erbil (DOH Erbil) in 2024. The sample size was calculated using the following statistical Yamane formula (Yamane, 1967). $n = \frac{N}{1 + N(e)^2}$ where the n = sample size, N = population size and e = level of precision or sampling error = 0.05. The study included all patients who have diabetic mellitus (type I & type II), both gender, all age categories and patients who accept to participate in the study. A non-probability purposive sampling technique was used to select the samples.

The data was gathered by asking questions to the participants during interviews. Containing three parts: part 1: Sociodemographic characteristic of the patient, part 2: Medical information and part 3: Assessment of awareness of CKD among Diabetic patients attending Layla Qasm center at Erbil city. A semi-structured questionnaire was employed as the study's instrument to collect medical and demographic data. A total of eleven structured yes-or-no questions were used to evaluate the awareness of chronic kidney disease in patients with diabetes. Each of the patient's correct answer

was given a score of 1 and therefore the maximum total score was 11. Awareness scoring was leveled as; no awareness = 0 score, low awareness = 1 - 5, moderate awareness = 6 - 9 and high awareness = 9 - 11 score. Individuals who correctly answered 5 or fewer questions were deemed to have low awareness of chronic kidney disease, while those who got 6 to 8 questions right were classified as having moderate awareness. Those who answered between 9 and 11 questions correctly were regarded as having high awareness of CKD. The tool was validated by two nephrologist, two internalist and three medical and dialysis nursing experts. The reliability of the awareness tool was checked using the test-retest method. The reliability score was 0.83.

Institutional ethical committee approval was obtained. After obtaining informed consent from the patients, data were collected by the researcher. It took approximately 30 minutes to collect the data from each sample. Anonymity was maintained.

The data was analyzed by using Statical Package for Social Sciences (SPSS version 27). Results were presented as the frequencies and percentage to assess the level of awareness. Paired t-test was used to test statistical significance of some sociodemographic variables with awareness of CKD.

Results

Table 1 Sociodemographic characteristics of patients with Diabetes Mellitus.

Sociodemographic characteristic		Frequency	Percentage %
Age groups	7-17	13	3.3%
	18-28	13	3.3%
	29-39	17	4.3%
	40-50	65	16.4%
	51-61	133	33.6%
	62-72	136	34.3%
	73+	19	4.8%
	M ± SD	55.34 ±14.465	
Gender	Male	166	41.9%
	Female	230	58.1%
Area of residence	Urban	248	62.6%

	Sub rural	66	16.7%
	Rural	82	20.7%
Educational level	Illiterate	191	48.2%
	Able to read and write	13	3.3%
	Primary school	58	14.6%
	Secondary school	33	8.3%
	High school	14	3.5%
	Institute	37	9.3%
	College	40	10.1%
	Post graduate	10	2.5%
Marital state	Single	48	12.1%
	Married	345	87.1%
	Widowed	0	0.0%
	Separated	3	0.8%
	Divorced	0	0.0%
Religion	Muslim	392	99.0%
	Christian	4	1.0%
	Yezidi	0	0.0%
	Others	0	0.0%
Occupation	Governmental employee	81	20.5%
	Private employee	23	5.8%
	Student	10	2.5%
	Out of work	99	25.0%
	House wife	176	44.4%
	Retired	3	0.8%
	Daily wages	4	1.0%

The table 1 shows that the majority of participants are in the 62-72 (34.3%) age groups with average age is 55.34 years, with a standard deviation of ± 14.465 . Few participants are in the youngest (7-17 and 18-28, each 3.3%) categories. Female (58.1%) participants outnumber males (41.9%). In addition, residents from urban areas make up the majority at 62.6%, while those from rural areas account for 20.7%, and sub-rural residents represent 16.7%. Nearly half (48.2%) are illiterate. Only 10.1% have a college degree, and 2.5% have postgraduate education. A majority of participants are married (87.1%), with only small portion of single (12.1%) individuals. The diabetic individuals is predominantly Muslim, with 99% identifying as such, while only 1% belongs to the Christian faith. The largest demographics are housewives at 44.4% followed by unemployed at 25%. The highest percentage of housewives aligns with the female predominance in the sample.

Table 2 Medical information of patients with Diabetes Mellitus

Medical information of participants		Frequency	Percentage %
Duration of diagnosed diabetes Meletus	M \pm SD	11.35 \pm 7.847	
Which type of diabetes do you have	Type one	48	12.1%
	Type two	207	52.3%
	Not know	141	35.6%
Which treatment ways do you perform to manage your disease	Medication	290	73.2%
	Only diet and exercise	0	0.0%
	Both	106	26.8%
Do you have any other chronic diseases	Yes	267	67.4%
	No	129	32.6%
If yes, which chronic disease, do you have	Hypertension	135	49.8%
	Cardiac problem	85	31.4%
	Hyperthyroidism	24	8.9%
	Hypothyroidism	0	0.0%
	Others	27	10.0%

Do you aware about complication of diabetes	Yes	354	89.4%
	No	42	10.6%
If yes, the source of awareness	Medical staff	189	52.5%
	Mass media	88	24.4%
	Friends and relatives	47	13.1%
	Others	36	10.0%

The table 2 shows that the average participant has had diabetes for over 11 years, with a wide variation (high standard deviation). Regarding the type of diabetic, Type 2 (52.3%) is the most common. Additionally, the use of medication, accounting for 73.2%, stands out as the primary method for managing the disease. A significant portion of participants (67.4%) have comorbid conditions, emphasizing the connection between diabetes and other health problems. Nearly half (49.8%) have high blood pressure, a common diabetes comorbidity followed by cardiac problems (31.4%) which reflects high cardiovascular risk in diabetics. Furthermore, a significant proportion (89.4%) of participants are knowledgeable about the general complications of diabetes, with the majority of this information sourced from medical professionals (52.5%).

Table 3 Assessment of awareness of chronic kidney disease among Diabetic patients.

Assessment of awareness of CKD among Diabetic patients		Frequency	Percentage %
Have you ever heard about chronic kidney disease	Yes	253	63.9%
	No	143	36.1%
If yes, can you define what is chronic kidney disease	Yes	116	45.8%
	No	137	54.2%
Can you enumerate symptoms of chronic kidney disease	Yes	159	40.7%
	No	232	59.3%
Did you know that one of the complications of diabetes is CKD	Yes	261	65.9%
	No	135	34.1%

Did you know that CKD may not have any symptoms at the initial stage	Yes	118	29.8%
	No	278	70.2%
Do you believe that there are efficient ways to avoid chronic kidney disease	Yes	154	38.9%
	No	242	61.1%
Do you think that all diabetics should do a periodic kidney function analysis even if they were asymptomatic	Yes	206	52.0%
	No	190	48.0%
Do you know that strict control of blood sugar level can reduce the risk of getting CKD	Yes	238	60.1%
	No	158	39.9%
Did you know that the early screening and treatment of chronic kidney disease can reduce the risk of kidney failure	Yes	210	53.0%
	No	186	47.0%
Have you ever done a kidney function test	Yes	301	76.0%
	No	95	24.0%
Did you know that the adherence to the medical advises can delay prognosis of CKD	Yes	209	53.3%
	No	183	46.7%

Table 3 indicate that a majority of diabetic patients (63.9%) are aware concerning chronic kidney disease, while (36.1%) are not. Only (45.8%) of those aware can define chronic kidney disease. Regarding the symptoms, about (40.7%) can list chronic kidney disease symptoms, but (59.3%) cannot. The majority of patients (70.2%) do not know chronic kidney disease can be asymptomatic in the early stage. The heist percentage (65.9%) know that the diabetes can cause chronic kidney disease, but lowest percentage (34.1%) are unaware. A significant portion (60.1%) of individuals with diabetes recognize that managing blood sugar levels can lower the risk of chronic kidney disease. Only (38.9%) are convinced that chronic kidney disease can be prevented, while (61.1%) feel it is inevitable. More than half of diabetic patients (52%) agree with the diabetics should get periodic kidney function tests. Moreover, more than half of participants (53%) knows that the early treatment can prevent kidney failure and (53.3%) of them recognize that medical adherence delays CKD progression. The majority of patients (76%) have had a kidney function test.

Table 4 Level of awareness of chronic kidney disease among diabetic patients.

Level of awareness of chronic kidney disease among diabetic patients.		Frequency (n=396)	Percentage (%)
Level of awareness	No aware	23	5.8%
	Low aware	168	42.4%
	Aware	109	27.5%
	High aware	96	24.2%

Table 4 reveals that among 396 diabetic patients, 5.8% (23 individuals) were completely unaware of chronic kidney disease (CKD). The majority (42.4%) demonstrated low awareness. At the same time, 27.5% demonstrated a moderate level of awareness, while just 24.2% displayed a high level of awareness regarding CKD.

Table 5 Association of level of awareness and sociodemographic variables.

Variables		Level of awareness				p - value
		No aware	Low aware	Aware	High aware	
Age groups	7-17	7	3	3	0	0.000
	18-28	0	0	5	8	
	29-39	0	8	3	6	
	40-50	6	26	14	19	
	51-61	0	63	40	30	
	62-72	10	57	41	28	
	73+	0	11	3	5	
Gender	Male	11	67	43	45	0.602
	Female	12	101	66	51	
	Urban	3	93	71	81	0.000

Area of residence	Sub rural	10	46	6	4	
	Rural	10	29	32	11	
Educational level	Illiterate	13	116	47	15	0.000
	Able to read and write	0	5	0	8	
	Primary school	10	23	15	10	
	Secondary school	0	8	9	16	
	High school	0	0	10	4	
	Institute	0	6	12	19	
	College	0	10	16	14	
	Post graduate	0	0	0	10	
Marital state	Single	7	3	24	14	0.000
	Married	16	162	85	82	
	Widowed	0	0	0	0	
	Separated	0	3	0	0	
	Divorced	0	0	0	0	
Religion	Muslim	23	168	109	92	0.006
	Christian	0	0	0	4	
	Yezidi	0	0	0	0	
	Others	0	0	0	0	
Occupation	Governmental employee	0	12	28	41	0.000
	Private employee	3	6	3	11	
	Student	7	3	0	0	
	Out of work	4	52	33	10	
	House wife	9	95	41	31	
	Retired	0	0	0	3	
	Daily wages	0	0	4	0	

Table 5 examines the statistical significance (p-value) of associations between sociodemographic variables (age, gender, residence, education, etc.) and levels of CKD awareness (No aware, Low aware, Aware, High aware). Statistical analysis was conducted to examine the potential association using chi-square test. The results show a statistically significant association ($p < 0.05$) between chronic kidney disease awareness levels and all sociodemographic variables studied—except for gender, which did not demonstrate a significant relationship.

Discussion

In the present study, the study population is mostly middle-aged to elderly, urban-dwelling, married Muslim women with low education levels. These findings align with research by Nahlah Fahad et al. (Nahlah Fahad et al., 2023) which assessed diabetic patients awareness of chronic kidney disease in community. Their study also found that most participants were over 40 years old, with married women accounting for 52.3% of the sample and 38% being employed. These findings are similar with Ghimire et al.'s (Ghimire et al., 2021) research, which reported that most diabetic adult were women aged 51–60 years with limited level of education.

The study revealed that most patients had been diagnosed with type 2 diabetes mellitus for more than 11 years. Previous study done by Nahlah Fahad et al. (Nahlah Fahad et al., 2023) which explored that patients with type 2 diabetes were reported and had a DM duration of 5–15 years. However, nearly half of diabetic patients have high blood pressure, a common diabetes comorbidity. This mirrors previous research on CKD prevalence in diabetic and hypertensive populations, where a majority of diabetics had coexisting hypertension, and about half of hypertensive patients also had diabetes. A high proportion of respondents (89.4%) demonstrated awareness of diabetes-related complications, consistent with Ghimire et al.'s (Ghimire et al., 2021) earlier observations on patients' understanding of diabetic health risks.

The finding of the study revealed that the largest group (42.4%) has inadequate awareness about chronic kidney diseases. Where the significant portion (27.5%) has moderate awareness about

chronic kidney disease. Approximately one-fourth of the population (24.2%) exhibits significant awareness, suggesting familiarity with kidney disease dangers, warning signs, and appropriate health precautions. The results parallel with other studies conducted by Nahlah Fahad et al. (Nahlah Fahad et al., 2023), Alghamdi et al. (Alghamdi et al., 2022), Albujaays et al. (Albujaays et al., 2018), Susanjalee et al. (Susanjalee et al., 2023) concerning that the nearly half of participants were considered as a poor level of awareness, followed by a moderate, and good awareness level of awareness regarding chronic kidney disease.

Furthermore, the results of the present study show a statistically significant association ($p < 0.05$) between chronic kidney disease awareness levels and all sociodemographic variables studied like (age, marital status, level of education, area of residence, religion and occupation) except for gender, which did not demonstrate a significant relationship. These results are similar with the work of Mondal et al. in Bangladesh (Mondal et al., 2021) which revealed that the knowledge of chronic kidney disease was significantly associated with sex, level of education, occupation. However, Al-qahtani et al. (Al-qahtani et al., 2024) have reported that higher awareness was associated with patient's age and education, which align with our finding. Similar to the results reported by Ghimire et al. (Ghimire et al., 2021) the present study found that gender showed no statistically significant association with awareness levels. The study done by Hussain et al. (Hussain et al., 2019) showed that there is no association was observed between the knowledge about CKD and gender.

Conclusion

The study indicated that among 397 diabetic individuals, the awareness of chronic kidney disease (CKD) was generally limited, with about one quarter demonstrating high awareness, while nearly half of diabetic individuals had low awareness. A notable relationship ($p < 0.05$) was identified between the levels of CKD awareness and various sociodemographic factors, including age, location, marital status, and education; however, gender did not exhibit a significant correlation. These findings highlight the need for targeted educational interventions to improve CKD awareness, particularly

among diabetic patients with lower education levels and older age groups, to facilitate early detection and management of CKD complications.

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Conflicts of Interest

The authors declare that there are no conflicts of interest related to this work.

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