Original Article

Cross-Sectional Assessment of Chronic Kidney Disease Awareness Among the General Population in Makkah

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ABSTRACT

Objectives: A growing global health concern is chronic kidney disease (CKD), which is prevalent in Saudi Arabia as well. In this research, we aimed to assess the knowledge, perception, and attitude toward chronic kidney disease among the general population in Makkah, Saudi Arabia.

Methods: In Makkah City, Saudi Arabia, a cross-sectional survey was carried out in 2023. A random sample of the general population aged 18 to 60 was given an online questionnaire; individuals with CKD and healthcare professionals were not included.

Results: The study's findings showed that 73.6% of participants had little or no awareness of chronic kidney disease (CKD), suggesting that the public had a poor comprehension of the condition. Being young, unmarried, and having a family history of renal disease were all positively correlated with higher awareness levels.

Conclusion: The study emphasizes the urgent need for public health measures, such as education and awareness campaigns, to raise public understanding of chronic kidney disease (CKD) in Makkah, Saudi Arabia.

Keyword: Chronic Kidney Disease (CKD), Makkah, Online questionnaire, Survey, Public awareness.

Introduction

The kidneys play a crucial role in removing waste and extra fluid from the circulation, which the urine then eliminates. Chronic kidney disease (CKD) is a condition that exhibits a gradual disturbance of kidney functions over time [1]. The progression of CKD leads to a dangerous sequence of events, such as loss of the regulation of electrolyte levels, which leads to cardiac arrest [2]. Common causes of CKD involve high blood pressure, heart disease, diabetes, and a family history of kidney failure [3–5].

Other risk factors for developing CKD include age, obesity, smoking, and certain medical conditions such as autoimmune diseases and urinary tract infections [1]. Symptoms of CKD may not appear until the later stages of the disease, frequent symptoms include fatigue, swelling in the legs, frequent urination, and changes in urine output [4, 6]. The goal of CKD management is to slow the progression of kidney damage and treat accompanying symptoms.

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This involves lifestyle changes, such as maintaining a healthy diet low in salt and protein, quitting smoking, and managing underlying conditions like diabetes and high blood pressure [7–9]. In some cases, medications, dialysis, or kidney transplants may be necessary [10]. Recently, data shows that CKD affects 9.1–13.4% of the population globally, and its prevalence is rising due to risk factors like obesity and diabetes mellitus [11, 12]. CKD has become a significant health issue in Saudi Arabia over the past few years, as the incidence and prevalence of end-stage renal disease (ESRD) are increasing in the Saudi population [13]. An epidemiological study in Saudi Arabia reveals that the overall prevalence of CKD stands at 5.7% [14]. The number of CKD patients in Saudi Arabia has increased by 25.1% over the past 10 years. Globally, CKD reported 700 million cases and 1.2 million fatalities in 2017 [15]. Our country's increasing rates of type 2 diabetes, hypertension, and obesity contribute to the progression of CKD [16, 17]. In high-income countries, CKD accounts for more than 2–3% of yearly healthcare costs, making it both a health and financial problem. It's interesting to note that patients with ESRD only account for 0.03% of the overall population [18]. However, people with lower socioeconomic status are more likely to develop ESRD. This means that, despite being a small fraction of the population, the financial burden of treating ESRD is significant. The burden of CKD in developing countries is significantly higher due to the added challenges associated with penury [18]. Individuals with CKD need to work closely with their healthcare provider to monitor and manage their condition. Regular check-ups, blood tests, and urine tests are important for tracking kidney function and adjusting treatment as needed. Therefore, a population with high levels of CKD knowledge and awareness may contribute to improved early detection of undiscovered or early CKD, as well as those at risk of developing CKD [19]. The current study's goal was to assess public awareness of CKD and related risk factors in Makkah, Saudi Arabia.

Methods

This was a cross-sectional study that was carried out using a valid online questionnaire that was also employed in a similar research project [20]. The data was gathered from September 1, 2023, to October 7, 2023. Multiple online platforms were employed to provide an online questionnaire to the general population of Makkah. CKD patients, medical, nursing, and allied health sciences students, and healthcare professionals were excluded. The proposal has been authorized by the Biomedical Ethical Committee of Umm Al Qura University. (Approval number: HAPO-02-K-012-2023-08-1701.) The data was collected, reviewed, and subsequently inputted into the Statistical Package for Social Sciences version 21 (SPSS: An IBM Company). The P value was deemed significant if it was less than or equal to 0.05, and all statistical methods employed were two-tailed. The cumulative sum of discrete ratings for various correct awareness items was used to evaluate the overall level of awareness regarding chronic kidney diseases (CKDs). A participant's overall awareness score was classified as "poor" if it was less than 60% of the total score, and as "good" if it was 60% or higher. The study variables, which included participants' data, daily behaviors, medical data, and drug history, were subjected to descriptive analysis through the prescription of frequency distribution and percentage data. In the same vein, the overall awareness was represented as a graph, while the awareness of CKDs was tabulated. In order to demonstrate the factors that were associated with the awareness level of CKDs among the study participants, a cross-tabulation was conducted using the Pearson chi-square test for significance and an exact probability test in the event of small frequency distributions.

Results

A total of 386 participants fulfilling the inclusion criteria completed the study questionnaire. Participants' ages ranged from 18 to 62 years with a mean age of 29.1 ±11.3 years old. A monthly income of less than 5000 SAR was reported among 256 (66.3%), 230 (59.6%) were single and 135 (35%) were married. A total of 212 (54.9%) had a healthcare practitioner in their family, and 40 (10.4%) had a family history of chronic renal disease. As for lifestyle, the majority 298 (77.2%) were non-smokers. 308 (79.8%) exercised for less than 150 minutes per week, or not at all. (Table 1). As for co-morbidities, 59 (15.3%) of respondents said that they had acute kidney disease, 85 (22%) had osteoarthritis, 45 (11.7%) had hypertension, 33 (8.5%) were diabetic. 187 (48.4%) used non-steroidal anti-inflammatory drugs and 36 (9.3%) frequently used herbal medicine. (Table 2). 301 (78%) knew that a person can live a normal life with only one kidney, 64 (16.6%) believed that herbal supplements can be effective in treating kidney disease, and 213 (55.2%) believed that some medications can help slow the progression of kidney disease. As for the functions of the kidney in the body, 284 (73.6%) said that the kidney cleans the blood, 263

Table 1: Personal characteristics and daily habits of study participants, Makkah, Saudi Arabia.

Personal data	**No**	**%**
Age in years		
18-20	98	25.4%
21-25	116	30.1%
26-30	41	10.6%
31-40	60	15.5%
> 40	71	18.4%
Gender		
Male	141	36.5%
Female	245	63.5%
Educational level		
High school / less	117	30.3%
Bachelor degree	252	65.3%
Post-graduate	17	4.4%
Employment		
Unemployed	209	54.1%
Governmental sector	118	30.6%
Private / military sector	59	15.3%
Monthly income		
< 5000 SAR	256	66.3%
5000-15000 SAR	94	24.4%
> 15000 SAR	36	9.3%
Marital status		
Single	230	59.6%
Married	135	35.0%
Divorced / widow	21	5.4%
Had HCW in your family		
Yes	212	54.9%
No	174	45.1%
Family history of renal failure		
Yes	40	10.4%
No	346	89.6%
Smoking		
Current smoker	38	9.8%
Passive smoker	36	9.3%
Ex-smoker	14	3.6%

Never smoked	298	77.2%
Physical activity		
Never practiced	205	53.1%
< 150 minutes / week	103	26.7%
> 150 minutes/ week	78	20.2%

Table 2: Medical and drug history among study participants, Makkah, Saudi Arabia.

Medical data	**No**	**%**
Co-morbidities		
Osteoarthritis	85	22.0%
Kidney disease	59	15.3%
Hypertension	45	11.7%
Diabetes	33	8.5%
Cardiac disease	8	2.1%
Stroke	7	1.8%
Have analgesics		
Yes	143	37.0%
No	243	63.0%
If yes, frequency of intake (n=143)		
Daily	19	13.3%
Weekly	53	37.1%
Monthly	71	49.7%
Have NSAIDs		
Yes	187	48.4%
No	199	51.6%
Have frequent herbal medicine		
Yes	36	9.3%
No	350	90.7%

Table 3: Public awareness about of chronic kidney disease among study participants, Saudi Arabia.

Awareness items	**No**	**%**
A person can live a normal life with only one kidney		
Correct	301	78.0%
Incorrect	26	6.7%
Dont know	59	15.3%
Herbal supplements can be effective in treating kidney disease		
Correct	64	16.6%
Incorrect	83	21.5%
Dont know	239	61.9%
Some medications can help slow the worsening of kidney disease		
Correct	213	55.2%
Incorrect	16	4.1%
Dont know	157	40.7%
Functions of kidney in the body		
Make urine	263	68.1%
Clean blood	284	73.6%
Maintain blood pressure normal	104	26.9%
Keep blood glucose normal	88	22.8%
Keep bone healthy	71	18.4%
Help breakdown of protein	68	17.6%
Tests asses renal health		
Urine Test	314	81.3%
Blood test	216	56.0%
Blood pressure monitoring	60	15.5%
A fecal test	27	7.0%
Risk factors of chronic kidney diseases		
Diabetes	212	54.9%
Hypertension	190	49.2%
Cardiac diseases	147	38.1%
Obesity	147	38.1%
Excess stress	92	23.8%
Female gender	18	4.7%
Dont know	23	6.0%

Signs / symptoms of chronic renal failure / disease		
Water retention	301	83.8%
Increased fatigue	189	52.6%
Loss of appetite	127	35.4%
Nausea & vomiting	97	27.0%
Fever	70	19.5%

Table 4: Factors associated with participants' awareness of chronic kidney diseases.

Factors		**Overall awareness level**				**p-value**
		Poor		**Good**		
		No	**%**	**No**	**%**	
Age in years	18-20	63	64.3%	35	35.7 %	0.001*
	21-25	77	66.4%	39	33.6 %	
	26-30	32	78.0%	9	22.0 %	
	31-40	49	81.7%	11	18.3 %	
	> 40	63	88.7%	8	11.3 %	
Gender	Male	106	75.2%	35	24.8 %	0.588
	Female	178	72.7%	67	27.3 %	
Educational level	High school / less	82	70.1%	35	29.9 %	0.264
	Bachelor degree	187	74.2%	65	25.8 %	
	Post-graduate	15	88.2%	2	11.8 %	
Employment	Unemployed	146	69.9%	63	30.1 %	0.008*
	Governmental sector	85	72.0%	33	28.0 %	
	Private / military sector	53	89.8%	6	10.2 %	

Monthly income	< 5000 SAR	181	70.7%	75	29.3%	0.106
	5000-15000 SAR	77	81.9%	17	18.1%	
	> 15000 SAR	26	72.2%	10	27.8%	
Marital status	Single	160	69.6%	70	30.4%	0.034*
	Married	110	81.5%	25	18.5%	
	Divorced / widow	14	66.7%	7	33.3%	
Had HCW in your family	Yes	162	76.4%	50	23.6%	0.162
	No	122	70.1%	52	29.9%	
Family history of renal failure	Yes	22	55.0%	18	45.0%	0.005*
	No	262	75.7%	84	24.3%	
Smoking	Current smoker	34	89.5%	4	10.5%	0.109
	Passive smoker	25	69.4%	11	30.6%	
	Ex-smoker	9	64.3%	5	35.7%	
	Never smoked	216	72.5%	82	27.5%	
Physical activity	Never practiced	154	75.1%	51	24.9%	0.603
	< 150 minutes / week	76	73.8%	27	26.2%	
	> 150 minutes/ week	54	69.2%	24	30.8%	
Hypertension	Yes	38	84.4%	7	15.6%	0.079
	No	246	72.1%	95	27.9%	

Diabetes	Yes	28	84.8%	5	15.2 %	0.125
	No	256	72.5%	97	27.5 %	
Cardiac disease	Yes	8	100.0 %	0	0.0%	0.087$
	No	276	73.0%	102	27.0 %	
Stroke	Yes	7	100.0 %	0	0.0%	0.110$
	No	277	73.1%	102	26.9 %	
Osteoarthritis	Yes	63	74.1%	22	25.9 %	0.898
	No	221	73.4%	80	26.6 %	
Have analgesics	Yes	105	73.4%	38	26.6 %	0.960
	No	179	73.7%	64	26.3 %	
Have NSAIDs	Yes	134	71.7%	53	28.3 %	0.408
	No	150	75.4%	49	24.6 %	

P: Pearson X2 test $: Exact probability test * P < 0.05 (significant)

(68.1%) said that it makes urine, 104 (26.9%) reported that it maintains normal blood pressure and 88 (22.8%) knew it keeps blood glucose normal. As for tests to assess renal health, the most reported were urine test 314 (81.3%), blood test 216 (56%), and blood pressure monitoring 60 (15.5%). (Table 3). A total of 102 (26.4%) of the study participants had an overall good awareness about CKDs, but most of them 284 (73.6%) had a poor awareness level.35 (35.7%) of young participants had an overall good awareness about CKD compared to 8 (11.3%) of those aged over 40 years old, with recorded statistical significance (P=0.001). Also, 63 (30.1%) of unemployed participants had a good awareness level versus 6 (10.2%) of those who work in the private sector (P=0.008). Good awareness about CKD was detected among 70 (30.4%) of single participants compared to 25 (18.5%) of those married (P=0.034). Additionally, 18 (45%) of those with a family history of renal failure had a good awareness of the disease in comparison to 84 (24.3%) of those without (P=0.005). (Table 4).

Discussion

High-risk populations should be screened for CKD as an effective public health measure for early detection and treatment. For these interventions to be effective, the public needs to be educated about CKD, especially about the methods of screening. If CKD is made more widely known, individuals who are at risk for developing it or who have undetected CKD or early-stage CKD can be identified more frequently. The main objective of this study was to assess awareness about CKD in Makkah City, Saudi Arabia. Our study disclosed that the public has poor knowledge of CKD in general. A previous study mentioned that CKD is

associated with lower socioeconomic status. The prevalence of CKD was found to be linked with various socioeconomic indicators, especially lower income and education levels [21]. However, our results indicate that our participants' awareness of CKD is not significantly affected by socioeconomic status. In our study, there were no statistically significant differences between males and females. In terms of age, we found that younger age groups (18-20, and 21-25) are more aware of CKD than older age groups. According to the existing literature, characteristics such as greater socioeconomic status, occupation, and the existence of risk factors such as diabetes and hypertension (HTN) have a positive impact on the level of CKD awareness. Yet, our findings showed that higher educational levels did not affect awareness of CKD. Furthermore, our findings revealed that unemployed participants demonstrated a higher level of knowledge regarding CKD, followed by employment in the governmental sector and the private or military sector, respectively. This irregularity may have resulted from university students possibly selecting "unemployed" due to the absence of an option for “student” in the question regarding employment status in the original English questionnaire which we have chosen to translate without any modifications [20]. Even though diabetes and hypertension are causes of chronic kidney disease (CKD) and patients should undergo screening programs. Our results indicated that participants with diabetes and HTN knew less than respondents without diabetes and HTN. This finding may indicate problems with our healthcare system and health education, or it may simply be the result of selection bias or sample size. Participants with a family history of renal failure are more aware of CKD, possibly due to increased exposure. Three hundred and one (78%) of respondents knew that a person can live with only one kidney, 213 (55.2%) of participants said that some medications could slow down the kidney disease's progression, and 83 (21.5%) correctly said that taking herbal supplements is not effective in treating kidney disease. In a recent similar study on the Saudi public, 766 (80.5%) were aware that one kidney is sufficient to live a normal life, 474 (49.9%) said there is medications can delay the progression of CKD, and 319 (33.1%) correctly said that herbal supplements are ineffective in the treatment of CKD [20]. It was identified by the respondents that kidneys have the role of cleaning blood 284 (73.6%) and making urine 263 (68.1%) as part of their function. However, respondents held poor knowledge of the kidneys' role in regulating blood pressure, keeping blood glucose normal, and keeping bones healthy, similar to a recent study among the Saudi population [20] and the Australian public [22]. Another study conducted in Taif City, Saudi Arabia, revealed that 1247 (87.9%) of their respondents said that the kidney function is to filter waste products in the blood [23]. A urine test was chosen by the majority of respondents 314 (81.3%) as the test to assess renal health, and more than half chose blood testing 216 (56%). These results indicate good public knowledge of the tests used to assess renal health. A study conducted on the Saudi public yielded similar results and found that 836 (87.9%) of participants stated urine testing is usually used to detect kidney function and 764 (80.4%) said blood tests [20]. Another study was conducted on diabetes mellitus (DM) patients in Al-Ahsa Governorate, Saudi Arabia, in which 83 (30.6%) of the participants said that they knew about the different methods to measure kidney function [24].In terms of identifying risk factors of CKD, 212 (54%) and 190 (49.2%) of participants believed that DM and hypertension (HTN), respectively, are associated with CKD. These results are better than a study conducted on the Saudi public which revealed that DM was chosen by 414 (29.2) of their participants, in addition to 651 (45.9%) who chose HTN [23]. Another study conducted on the public of Jazan Province, Saudi Arabia, revealed similar results [25].In comparison, in studies in Iran, Hong Kong, Singapore, and Nigeria, diabetes and hypertension were identified as risk factors for CKD at a lower rate in Singapore [26-29]. As far as signs and symptoms of chronic renal failure and disease, water retention was chosen by the majority of participants 301 (83.8%), followed by increased fatigue 189 (52.6%). We summarize our findings as such: our participants had poor awareness regarding CKD, with only 102 (26.4%) respondents having good knowledge, similar to a study on the Jazan public [25] .As a result, awareness campaigns, public health measures, and educational programs are necessary to increase awareness. Accordingly, we suggest that various health campaigns be organized and arranged to increase general knowledge about CKD. Before interpreting the results of this study, it is crucial to consider its limitations. We conducted a cross-sectional study online using a questionnaire that we distributed through various social media platforms. However, this method could result in selection bias.

Conclusion

According to the findings of this study, there is a large knowledge and comprehension gap about chronic kidney disease (CKD) among the general population of Makkah City. In spite of the fact that chronic kidney disease (CKD) is becoming more prevalent in Saudi Arabia and around the world, only 102 (26.4%) of respondents displayed a decent understanding of the disease. It is important to note that lower socioeconomic position and higher levels of education did not have a significant impact on the levels of CKD awareness. The findings of the study highlight the importance of solid public health initiatives, such as awareness campaigns and educational programs, in order to improve knowledge of chronic kidney disease (CKD) and potentially increase the number of people who recognize it at an early stage. It is necessary to do additional research in order to design and evaluate the efficacy of such treatments in terms of boosting awareness of chronic kidney disease (CKD) and reducing the progression of illness among high-risk populations.

Conflict of Interest

None

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