Case Study

# Public Knowledge and Awareness of Chronic Kidney Disease in the Kingdom of Saudi Arabia

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## Abstract

Chronic kidney disease is a public health issue that is underappreciated and more deadly than certain other chronic illnesses. A person with CKD often has damaged kidneys, which leads to a loss of function and eventually renal. The purpose of this study was to measure the knowledge and awareness level among the general population in Saudi Arabia about chronic kidney disease. This was cross-sectional research using a questionnaire. Adult Saudi males and females who are between the ages of (18 to 60) years. Exclusion of non-Saudi population. Data was then transferred to the Statistical Package of Social-Science Software (SPSS) program, version 20. Results showed that the majority of the sample falls within the age range of 19-30, with 60.5% of the total sample falling within this category. Gender distribution shows that the sample is predominantly female, with 77.1% of the total sample being female. The p-value of 0.001 indicates a significant association between gender and knowledge and awareness of chronic kidney disease. The Makkah region has the highest number of individuals, followed by the Eastern region. The p-value of 0.001 suggests a significant association between location and knowledge and awareness of chronic kidney disease. In conclusion, despite the high incidence of the ailment, there is still a lack of public education and awareness of chronic kidney disease (CKD) in the Kingdom of Saudi Arabia. Knowledge scores were significantly associated with gender and residence place in the kingdom.

**Keywords:** Kidney, Chronic disease, Awareness, Knowledge

## Introduction

Chronic kidney disease is a public health issue that is underappreciated and more deadly than certain other chronic illnesses. A person with CKD often has damaged kidneys, which leads to a loss of function and eventually renal failure [1]. More than 10% of the world's population suffers from chronic kidney disease (CKD), which has developed into a global public health emergency in recent years [2]. Clinical signs of chronic kidney disease include an increase in urine albumin excretion and/or a reduction in glomerular filtration rate of below 60 mL/min/1.73 $m^2$ (CKD) [3]. which is characterized by a gradual and irreversible decline in kidney function for three months or longer [4]. Symptoms of renal disorders, such as changes in the composition of the blood or urine, are caused by anatomical or functional abnormalities in the kidney, with or without a drop in GFR [5]. Patients with CKD must deal with numerous symptoms, problems, and unexpected circumstances that can limit their ability to participate, as well as time-consuming, intrusive treatments with rigid timetables [6].

During the past few decades, the prevalence of chronic kidney disease (CKD) has been s rising around the world including the Kingdom of Saudi Arabia, in which 5.7% of the population suffers from this disease [7]. Around the world, 8-16% of the population is diagnosed with chronic kidney disease. This high number of prevalence chronic kidney disease creates a crucial health problem that comes with poor outcomes and high costs [8]. In 2008, there were 57 million deaths around the world, 36 million were because of non-communicable chronic diseases. One of the most important things that play a huge role in poor health conditions is CKD since it increases the cardiovascular mortality rate which

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means increasing the death rate of non-communicable chronic diseases [9]. Mortality and morbidity rates increase when CKD progresses to end-stage renal disease [10]. CKD ranked as 24 in 2010 because of early mortality and that should highlight the importance of screening for CKD [11]. Moreover, the United States established The Kidney Early Evaluation Program (KEEP) for people with a high risk of CKD for early diagnosis and prevention [12].

According to a 2018 survey conducted in the Kingdom of Saudi Arabia's Hail Region, where the majority of participants (60%) had a fair comprehension of the condition, CKD awareness was still insufficient [13]. Patients are generally unaware of CKD, renal function, and available treatments. Insufficient educational attainment, unemployment, marital status, and short CKD duration were other variables impacting knowledge levels [7, 14]. There are no statistics available about the occurrence of chronic kidney disease (CKD) and its risk factors in the Saudi Arabian population as a whole [15]. With the evolution of the condition in many individuals, a variety of risk factors are linked to a rising prevalence of chronic kidney disease (CKD) [16]. Chronic kidney disease (CKD) has negative effects on health and lowers quality of life. The public is still unaware of CKD even though it is becoming increasingly common [17]. With regard to CKD prevention and control, the educated Saudi populace had a comparatively high level of positivity and knowledge [18]. We carried out this investigation since there aren't numerous studies that evaluate public understanding and awareness of chronic renal disease, particularly in Saudi Arabia.

### *Objectives*

The main objective of this study was to measure the knowledge and awareness level among the general population in Saudi Arabia about chronic kidney disease

## Materials and Methods

### *Study Design*

This study will be a Cross-sectional study.

### *Study Setting: Participants, Recruitment, and Sampling Procedure*

This observational cross-sectional study was carried out in Saudi Arabia.

### *Inclusion and Exclusion Criteria*

Adult males and females who are older than 18 years old until 60 years old in Saudi Arabia. Excluded who are younger than 18 years old and older than 60 years old and non-Saudi population.

### *Sample Size*

Using the Qualtrics calculator, a sample size of 384 was estimated with a 95% confidence level.

### *Method for Data Collection and Instrument (Data Collection Technique and Tools)*

A structured online questionnaire was used as a study tool. This tool was used based on the study conducted by researcher Sami Alobidai [19]. The final version of the questionnaire consisted of 41 classified into two main sections.

Section one contained demographic details and socioeconomic background characteristics questions.

The second section includes a chronic kidney disease knowledge questionnaire Patients' lifestyle, normal renal function, methods of assessing renal function, risk factors, cause of chronic kidney disease, and signs & and symptoms related to the disease.

### *Scoring System*

There are 24 questions in the CKD knowledge questionnaire, and the choices for responses are "True," "False," and "I don't know." One point was awarded for each accurate response, and zero for each erroneous response. The response "I don't know" received a score of 0 since it was deemed to indicate ignorance. A thorough literature assessment of previous public and relevant surveys was conducted to construct the questionnaire. The finalized version of the questionnaire was administered to 121 members of the public, 28 nephrologists, and 27 students to validate it. The responses were divided into three categories according to the attained score. A score of 0-14 (low), 15-19 (moderate), 20-24 (high) knowledge.

### *Analyzes and Entry Method*

On a computer, collected data was input using Excel by Microsoft (2016) Windows software. After that, data was moved to version 20 of the Statistical Package of Social Science Software (SPSS) application for statistical analysis.

## Results and Discussion

**Table 1** showed that in terms of age, the majority of participants fall within the 19-30 age range, accounting for 60.5% of the total. This is followed by the 31-40 age group at 16.8%, the 41-50 age group at 14.8%, and the 51-60 age group at 7.8%. When it comes to gender, the majority of participants are female, making up 77.1% of the total, while male participants account for 22.9%. Regarding location, the highest number of participants are from the Makkah region at 25.6%, followed by the Eastern region at 12.7% and the Medina region at 16.2%. The education level of the participants is varied, with the majority holding a Bachelor's degree at 64.4%, followed by those with secondary education at 19.7% and diploma holders at 8.3%. In terms of occupation, the largest group of participants are students at 38.9%, followed by those in the government sector at 22.1% and the unemployed at 17.2%. When it comes to monthly income, the majority of participants earn less than 5 thousand Saudi riyals per month, accounting for 53.6% of the total. This is followed by those earning 5-10 thousand Saudi riyals at 23.5% and 10-15 thousand Saudi riyals at 13.2%. In terms of marital status, the majority of participants are single at

54.8%, followed by married participants at 39.9%, divorced at 3.4%, and widowed at 1.9%.

**Table 1.** Sociodemographic characteristics of participants (n=702)

| Parameter | | No. | Percent |
|---|---|---|---|
| Age | 19 -30 | 425 | 60.5 |
| | 31-40 | 118 | 16.8 |
| | 41 -50 | 104 | 14.8 |
| | 51 -60 | 55 | 7.8 |
| Gender | Male | 161 | 22.9 |
| | Female | 541 | 77.1 |
| Location | Al Bahah region | 39 | 5.6 |
| | Al-Jawf region | 48 | 6.8 |
| | Northern border region | 56 | 8.0 |
| | Riyadh region | 54 | 7.7 |
| | Eastern Region | 89 | 12.7 |
| | Qassim region | 37 | 5.3 |
| | Medina region | 114 | 16.2 |
| | Tabuk region | 3 | .4 |
| | Jazan region | 3 | .4 |
| | Hail region | 8 | 1.1 |
| | Asir region | 67 | 9.5 |
| | Makkah Region | 180 | 25.6 |
| | Najran region | 4 | .6 |
| Education Level | Uneducated or do not have a degree | 1 | .1 |
| | primary | 5 | .7 |
| | middle | 16 | 2.3 |
| | secondary | 138 | 19.7 |
| | diploma | 58 | 8.3 |
| | Bachelor's | 452 | 64.4 |
| | Postgraduate | 32 | 4.6 |
| Occupation | free business | 16 | 2.3 |
| | student | 273 | 38.9 |
| | Not employed | 121 | 17.2 |
| | Retired | 31 | 4.4 |
| | Government sector employee | 155 | 22.1 |
| | private sector employee | 66 | 9.4 |
| | Other | 40 | 5.7 |
| Monthly Income (in Saudi Riyals) | Less than 5 thousand Saudi riyals per month | 376 | 53.6 |
| | 10-5 thousand Saudi riyals per month | 165 | 23.5 |
| | 10-15 thousand Saudi riyals per month | 93 | 13.2 |
| | More than 15 thousand Saudi riyals per month | 68 | 9.7 |
| Marital Status | Married | 280 | 39.9 |
| | Single | 385 | 54.8 |
| | Divorced | 24 | 3.4 |
| | Widowed | 13 | 1.9 |

**Table 2** shows that 1.7% of the respondents have kidney disease, with the majority of them (91.7%) reporting chronic kidney disease. Additionally, 7.5% of the individuals have hypertension, with 77.4% of them reporting chronic hypertension. Furthermore, 6.8% of the respondents have high blood sugar (diabetes), and 85.4% of them have chronic diabetes. In terms of heart problems, 2.0% of the individuals reported having heart problems, and 71.4% of them had chronic heart problems. Additionally, only 0.6% of the respondents have had a stroke, with 75.0% of them reporting chronic stroke. About 11.0 percent of the participants have a family history of renal failure. Furthermore, a family member employed in the healthcare industry is held accountable by 54.7% of the participants. In terms of lifestyle habits, 7.1% of the individuals reported smoking, while 30.1% had less than 150 minutes of physical activity per week. Furthermore, 6.4% of the respondents have osteoporosis, and 42.6% of them take painkillers, with the majority taking them monthly. It is also interesting to note that 22.9% of the individuals take non-steroidal anti-inflammatory drugs, and 28.6% take herbal medicines, with the majority taking them monthly.

**Table 2.** Clinical factors of the participants (n=702)

| Parameter | | No. | Percent |
|---|---|---|---|
| Kidney disease: | Yes | 12 | 1.7 |
| | no | 664 | 94.6 |
| | I don't know | 26 | 3.7 |
| If your answer is yes: | sharp | 1 | 8.3 |
| | chronic | 11 | 91.7 |
| Hypertension : | Yes | 53 | 7.5 |
| | no | 649 | 92.5 |
| If your answer is yes: | sharp | 12 | 22.6 |
| | chronic | 41 | 77.4 |
| High blood sugar known as diabetes: | Yes | 48 | 6.8 |
| | no | 654 | 93.2 |
| If your answer is yes: | sharp | 7 | 14.6 |
| | chronic | 41 | 85.4 |
| Heart problems such as heart failure or heart attack: | Yes | 14 | 2.0 |
| | no | 688 | 98.0 |
| If your answer is yes: | sharp | 4 | 28.6 |
| | chronic | 10 | 71.4 |
| Have you ever had a stroke? | Yes | 4 | .6 |
| | no | 698 | 99.4 |
| If your answer is yes: | sharp | 3 | 75.0 |
| | chronic | 1 | 25.0 |
| Do you have a family history of kidney failure: | Yes | 77 | 11.0 |
| | no | 625 | 89.0 |
| Does anyone in your family work as a healthcare professional, for example, a | Yes | 384 | 54.7 |
| | no | 318 | 45.3 |

| | | | |
|---|---|---|---|
| doctor, nurse, nutritionist, or pharmacist: | | | |
| | Yes | 50 | 7.1 |
| | no | 571 | 81.3 |
| Do you smoke : | Ex-smoker | 16 | 2.3 |
| | Passive smoking (inhaling cigarette smoke indirectly through the environment) | 65 | 9.3 |
| | Less than 150 minutes per week | 211 | 30.1 |
| Physical activity : | More than 150 minutes per week | 258 | 36.8 |
| | Sedentary lifestyle (nothing) | 233 | 33.2 |
| Do you have osteoporosis? | Yes | 45 | 6.4 |
| | no | 657 | 93.6 |
| Do you take painkillers: | Yes | 299 | 42.6 |
| | no | 403 | 57.4 |
| | Daily | 29 | 9.8 |
| If the answer is yes: | Weekly | 78 | 26.4 |
| | monthly | 188 | 63.7 |
| Do you take non-steroidal anti-inflammatory drugs: ibuprofen (Ibuprofen), diclofenac (Voltaren), etc? | Yes | 161 | 22.9 |
| | no | 541 | 77.1 |
| Do you take herbal medicines: | Yes | 201 | 28.6 |
| | no | 501 | 71.4 |
| | Daily | 23 | 11.4 |
| If the answer is yes: | Weekly | 59 | 29.4 |
| | monthly | 119 | 59.2 |

According to the data provided, **Table 3** showed that anyone can live with one healthy kidney, with 85.2% of respondents agreeing with this statement. Additionally, the survey results show that 74.2% of respondents understand that the kidneys clean the blood, while 65.5% recognize that the kidneys make urine. Interestingly, 53.8% of respondents think that some drugs can help prevent chronic renal disease from getting worse. On the other hand, it is concerning that only 36.2% of respondents recognize that kidneys help maintain bone health. In terms of alternative treatments, 53.3% of respondents think that treating chronic kidney disease using herbal supplements can be successful. 66.0% of the participants correctly identified the purpose of a blood test in determining kidney health, while 8.3% were misinformed and 25.8% did not have sufficient knowledge about it. Similarly, for the urine test, 80.1% of the participants recognized its importance in determining kidney health, with only 4.0% considering it false and 16.0% being unsure. When it comes to stool tests, only 22.1% of the participants accurately understood their relevance to kidney health, while a staggering 37.7% were misinformed and 40.2% were uncertain.

Finally, when it comes to monitoring blood pressure, 51.6% of the participants correctly recognized its importance in determining kidney health, while 10.8% considered it false and 37.6% were unsure.

**Table 3.** General knowledge and awareness of participants about chronic kidney disease and tests used to determine kidney health (n=702)

| | True | Fault | Don't know |
|---|---|---|---|
| Anyone can live with one healthy kidney | 598<br>85.2% | 26<br>3.7% | 78<br>11.1% |
| Herbal supplements can be effective in treating chronic kidney disease | 145<br>20.7% | 183<br>26.1% | 374<br>53.3% |
| Some medications can help slow the worsening of chronic kidney disease. | 378<br>53.8% | 32<br>4.6% | 292<br>41.6% |
| The kidneys make urine. | 460<br>65.5% | 94<br>13.4% | 148<br>21.1% |
| The kidneys clean the blood. | 521<br>74.2% | 32<br>4.6% | 149<br>21.2% |
| It helps the kidneys maintain normal blood sugar levels | 339<br>48.3% | 110<br>15.7% | 253<br>36.0% |
| The kidneys help maintain blood pressure | 392<br>55.8% | 45<br>6.4% | 265<br>37.7% |
| The kidneys help break down protein in the body | 203<br>28.9% | 128<br>18.2% | 371<br>52.8% |
| Kidneys help maintain bone health | 254<br>36.2% | 103<br>14.7% | 345<br>49.1% |
| Blood test | 463<br>66.0% | 58<br>8.3% | 181<br>25.8% |
| Urine test | 562<br>80.1% | 28<br>4.0% | 112<br>16.0% |
| Stool test | 155<br>22.1% | 265<br>37.7% | 282<br>40.2% |
| Monitor blood pressure | 362<br>51.6% | 76<br>10.8% | 264<br>37.6% |

**Table 4** showed that, with regard to the diabetes risk factor, 61.4% of individuals correctly classified it as such, whereas 7.4% classified it as a flaw and 31.2% were undecided. Just 11.8% of individuals correctly classified being female as a risk factor; 39.6% classified it as a flaw, and 48.6% were unclear. The risk factor of hypertension was correctly identified by 58.4% of participants, with 5.3% identifying it as a fault and 36.3% being unsure. Of the participants, 41.5% properly classified it as a risk factor for cardiac issues, such as heart failure or heart attack; 11.0% incorrectly classified it as a flaw, and 47.6% were unclear. 38.2% of individuals correctly recognized high stress as a risk factor, 15.5% incorrectly classified it as a flaw, and 46.3% were undecided. Lastly, 51.6% of individuals correctly classified obesity as a risk factor, compared to 7.7% who classified it as a flaw and 40.7% who were unclear.

**Table 4.** knowledge of participants about risk factors for chronic kidney disease (n=702)

| | True | Fault | Don't know |
|---|---|---|---|
| Diabetes | 431<br>61.4% | 52<br>7.4% | 219<br>31.2% |
| To be female | 83<br>11.8% | 278<br>39.6% | 341<br>48.6% |
| hypertension | 410<br>58.4% | 37<br>5.3% | 255<br>36.3% |
| Heart problems such as heart failure or heart attack | 291<br>41.5% | 77<br>11.0% | 334<br>47.6% |
| Excessive stress | 268<br>38.2% | 109<br>15.5% | 325<br>46.3% |
| Obesity | 362<br>51.6% | 54<br>7.7% | 286<br>40.7% |

**Table 5** showed that water retention was recognized as a symptom by 77.5% of the participants. However, 3.4% of them provided incorrect information, and 19.1% didn't know about this symptom. Fever was recognized by only 37.3% of the participants as a symptom of advanced chronic kidney disease or kidney failure. Moreover, 19.1% of the participants provided incorrect information, and 43.6% didn't know about this symptom. Nausea and vomiting were recognized as symptoms by 45.4% of the participants, and 11.7% provided incorrect information. However, 42.9% of the participants didn't know about these symptoms. Anorexia, which refers to a loss of appetite, was recognized by 49.4% of the participants, and only 6.8% provided incorrect information. However, 43.7% of the participants didn't know about this symptom. Increased fatigue was recognized as a symptom by 68.7% of the participants, and only 3.4% provided incorrect information. However, 27.9% of the participants didn't know about this symptom.

**Table 5.** Knowledge of participants about symptoms of advanced chronic kidney disease or kidney failure (n=702)

| | True | Fault | Don't know |
|---|---|---|---|
| Water retention (excess water in the body) | 544<br>77.5% | 24<br>3.4% | 134<br>19.1% |
| fever | 262<br>37.3% | 134<br>19.1% | 306<br>43.6% |
| Nausea - vomiting | 319<br>45.4% | 82<br>11.7% | 301<br>42.9% |
| Anorexia | 347<br>49.4% | 48<br>6.8% | 307<br>43.7% |
| Increased fatigue | 482<br>68.7% | 24<br>3.4% | 196<br>27.9% |

The knowledge and awareness score showed that 68.1% of the participants exhibited low knowledge and awareness, 25.4% had moderate knowledge and awareness, and only 6.6% had high knowledge and awareness **(Figure 1).**

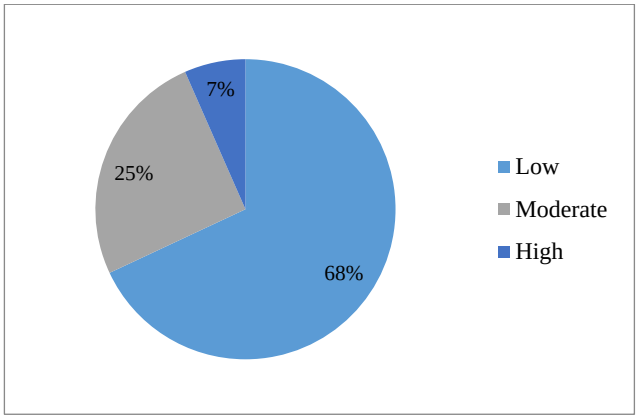


**Figure 1.** Knowledge and awareness score of participants about chronic kidney disease.

**Table 6** shows that the majority of the sample falls within the age range of 19-30, with 60.5% of the total sample falling within this category. The distribution decreases as age increases, with only 7.8% of the sample falling within the 51-60 age range. However, the p-value of 0.119 indicates that there is no significant association. Moving on to marital status, the table displays the distribution of individuals across different marital statuses. The majority of the sample consists of single individuals, followed by married individuals. The p-value of 0.183 suggests that there is no significant association. Gender distribution shows that the sample is predominantly female, with 77.1% of the total sample being female. The p-value of 0.001 indicates a significant association between gender and knowledge and awareness of chronic kidney disease. The table also presents the distribution of individuals across different regions. The Makkah region has the highest number of individuals, followed by the Eastern region. The p-value of 0.001 suggests a significant association between location and knowledge and awareness of chronic kidney disease. Furthermore, the table provides the distribution of individuals across different education levels. The majority of the sample holds a bachelor's degree, followed by individuals with a secondary education level. The p-value of 0.305 indicates no significant association. Occupation distribution shows that the majority of the sample consists of students, followed by individuals working in the government sector. The p-value of 0.667 suggests no significant association. Finally, the table presents the distribution of individuals across different monthly income levels. The majority of the sample falls within the income range of less than 5,000 Saudi Riyals, followed by the 5,000 - 10,000 range. The knowledge and awareness of chronic renal disease and monthly income are significantly correlated, as indicated by the p-value of 0.049. The findings therefore demonstrated a substantial relationship between the general understanding and awareness of chronic kidney disease and gender, region, and monthly income.

**Table 6.** Association between the sociodemographic characteristics of the participants and knowledge and awareness of chronic kidney disease

| | | knowledge and awareness level | | | Total (N=702) | P value |
|---|---|---|---|---|---|---|
| | | High | Moderate | Low | | |
| Age | 19 - 30 | 27 | 125 | 273 | 425 | 0.119 |
| | | 3.8% | 17.8% | 38.9% | 60.5% | |
| | 31- 40 | 7 | 24 | 87 | 118 | |
| | | 1.0% | 3.4% | 12.4% | 16.8% | |
| | 41 -50 | 7 | 19 | 78 | 104 | |
| | | 1.0% | 2.7% | 11.1% | 14.8% | |
| | 51- 60 | 5 | 10 | 40 | 55 | |
| | | 0.7% | 1.4% | 5.7% | 7.8% | |
| marital status | Single | 24 | 113 | 248 | 385 | 0.183 |
| | | 3.4% | 16.1% | 35.3% | 54.8% | |
| | Married | 20 | 60 | 200 | 280 | |
| | | 2.8% | 8.5% | 28.5% | 39.9% | |
| | Divorced | 1 | 3 | 20 | 24 | |
| | | 0.1% | 0.4% | 2.8% | 3.4% | |
| | Widow | 1 | 2 | 10 | 13 | |
| | | 0.1% | 0.3% | 1.4% | 1.9% | |
| Gender | Male | 14 | 57 | 90 | 161 | 0.001 |
| | | 2.0% | 8.1% | 12.8% | 22.9% | |
| | Female | 32 | 121 | 388 | 541 | |
| | | 4.6% | 17.2% | 55.3% | 77.1% | |
| Location | Al Bahah region | 2 | 7 | 30 | 39 | 0.001 |
| | | 0.3% | 1.0% | 4.3% | 5.6% | |
| | Al-Jawf region | 3 | 11 | 34 | 48 | |
| | | 0.4% | 1.6% | 4.8% | 6.8% | |
| | Northern border region | 2 | 9 | 45 | 56 | |
| | | 0.3% | 1.3% | 6.4% | 8.0% | |
| | Riyadh region | 4 | 14 | 36 | 54 | |
| | | 0.6% | 2.0% | 5.1% | 7.7% | |
| | Eastern Region | 13 | 34 | 42 | 89 | |
| | | 1.9% | 4.8% | 6.0% | 12.7% | |
| | Qassim region | 1 | 13 | 23 | 37 | |
| | | 0.1% | 1.9% | 3.3% | 5.3% | |
| | Medina region | 6 | 18 | 90 | 114 | |
| | | 0.9% | 2.6% | 12.8% | 16.2% | |
| | Tabuk region | 1 | 1 | 1 | 3 | |
| | | 0.1% | 0.1% | 0.1% | 0.4% | |
| | Jazan region | 0 | 0 | 3 | 3 | |
| | | 0.0% | 0.0% | 0.4% | 0.4% | |
| | Hail region | 1 | 1 | 6 | 8 | |
| | | 0.1% | 0.1% | 0.9% | 1.1% | |
| | Asir region | 4 | 27 | 36 | 67 | |
| | | 0.6% | 3.8% | 5.1% | 9.5% | |
| | Makkah Region | 9 | 42 | 129 | 180 | |
| | | 1.3% | 6.0% | 18.4% | 25.6% | |
| | Najran region | 0 | 1 | 3 | 4 | |
| | | 0.0% | 0.1% | 0.4% | 0.6% | |
| Education Level | Uneducated or do not have a degree | 0 | 1 | 0 | 1 | 0.305 |
| | | 0.0% | 0.1% | 0.0% | 0.1% | |
| | Primary | 0 | 1 | 4 | 5 | |
| | | 0.0% | 0.1% | 0.6% | 0.7% | |
| | middle | 1 | 1 | 14 | 16 | |
| | | 0.1% | 0.1% | 2.0% | 2.3% | |
| | Secondary | 13 | 34 | 91 | 138 | |
| | | 1.9% | 4.8% | 13.0% | 19.7% | |
| | Diploma | 2 | 13 | 43 | 58 | |
| | | 0.3% | 1.9% | 6.1% | 8.3% | |
| | Bachelor's | 28 | 115 | 309 | 452 | |
| | | 4.0% | 16.4% | 44.0% | 64.4% | |
| | Postgraduate | 2 | 13 | 17 | 32 | |
| | | 0.3% | 1.9% | 2.4% | 4.6% | |
| Occupation | free business | 1 | 4 | 11 | 16 | 0.667 |
| | | 0.1% | 0.6% | 1.6% | 2.3% | |
| | Government sector employee | 13 | 46 | 96 | 155 | |
| | | 1.9% | 6.6% | 13.7% | 22.1% | |
| | private sector employee | 4 | 16 | 46 | 66 | |
| | | 0.6% | 2.3% | 6.6% | 9.4% | |
| | Student | 16 | 74 | 183 | 273 | |
| | | 2.3% | 10.5% | 26.1% | 38.9% | |
| | Retired | 3 | 8 | 20 | 31 | |
| | | 0.4% | 1.1% | 2.8% | 4.4% | |
| | Not employed | 8 | 23 | 90 | 121 | |
| | | 1.1% | 3.3% | 12.8% | 17.2% | |
| | Other | 1 | 7 | 32 | 40 | |
| | | 0.1% | 1.0% | 4.6% | 5.7% | |
| Monthly Income (in Saudi Riyals) | Less than 5,000 | 22 | 80 | 274 | 376 | 0.049 |
| | | 3.1% | 11.4% | 39.0% | 53.6% | |
| | 5,000 - 10,000 | 11 | 48 | 106 | 165 | |
| | | 1.6% | 6.8% | 15.1% | 23.5% | |
| | 11,000 - 15,000 | 5 | 27 | 61 | 93 | |
| | | 0.7% | 3.8% | 8.7% | 13.2% | |
| | Over 15,000 | 8 | 23 | 37 | 68 | |
| | | 1.1% | 3.3% | 5.3% | 9.7% | |

Chronic kidney disease (CKD) is a condition that affects the kidneys and can lead to serious health problems if left untreated. In the Kingdom of Saudi Arabia, CKD is a growing concern due to the high prevalence of risk factors such as diabetes and hypertension [2]. Despite this, public knowledge and awareness of CKD in the Kingdom of Saudi Arabia remains limited [5]. This paper will discuss the current state of public knowledge and awareness of CKD in the Kingdom of Saudi Arabia, the reasons behind this lack of awareness, and the steps that can be taken to improve public knowledge and awareness of CKD.

The prevalence of CKD in the Kingdom of Saudi Arabia is high, with estimates suggesting that up to 20% of the population may be affected. This is due in part to the high prevalence of risk factors such as diabetes and hypertension, which are major contributors to the development of CKD. Despite this, public knowledge and awareness of CKD in the Kingdom of Saudi Arabia remains limited [2, 15].

The purpose of this study, which was conducted among Saudi citizens, was to find out how much the general people knew and understood about chronic kidney disease. The findings of

this study indicated that the surveyed population exhibited a generally inadequate understanding of CKD. The participants exhibited a limited understanding of the functions of the kidney, similarly, these results are relative to those of a study done in Saudi Arabia [19], which also aligns with findings from recent research conducted among the general population in Australia [20]. Nonetheless, the participants exhibited a commendable level of understanding of the significance of blood and urine analysis in assessing renal well-being. A majority of the participants accurately recognized that diabetes mellitus, hypertension, heart disorders, and obesity are risk factors for CKD. However, only 39.6% of respondents correctly identified being female as not a risk factor for CKD. According to a Saudi Arabian research evaluating participants' knowledge and awareness of the risk factors for chronic kidney disease, a sizable number of them—62.3%—believed that diabetes mellitus represents one of the main risk factors for CKD. Approximately 60% of the participants exhibited a belief that hypertension is a prominent risk factor for CKD [21], proportionate with the results revealed by Alobaidi *et al.*, [19]. However, a recent study of people in Australia found that whereas 60.6% of the respondents recognized diabetes mellitus as a risk factor for chronic kidney disease (CKD), only 38.3% did the same for hypertension [20]. In line with our investigation, several studies showed diminished recognition of diabetes mellitus and hypertension as significant factors in CKD in Hong Kong, Nigeria, Singapore, and Iran as well [12, 22-24].

In our study, 28.6% of the participants were taking herbal medications, and only 26.1% of them correctly said that herbal medications are not effective in treating CKD, and 53.8% correctly said that some medications can help slow down the worsening of CKD. In a study, it was shown that a significant proportion of the participants, namely 50.1%, lacked awareness of the potential benefits of pharmaceuticals in slowing the progression of CKD. Additionally, a substantial majority of 66.9% held the misconception that herbal supplements could effectively cure CKD. These findings suggest a notable deficiency in the knowledge of CKD therapy among the population under investigation [19]. Gheewala *et al*. also found comparable findings among the Australian population. Specifically, 51.2% of the respondents showed awareness of the potential of pharmaceuticals to decelerate the progression of CKD. Conversely, a significant proportion of 76.6% held the misconception that herbal supplements are efficacious in the treatment of CKD [20]. Without adequate public and patient education initiatives, there exists a genuine possibility that several individuals with CKD may resort to using herbal drugs as a means of treating their condition, perhaps leading to further detrimental effects. Our study revealed higher knowledge and awareness scores in participants according to gender as females had higher scores than males, residents of the eastern region exhibited higher scores, and participants with monthly income less than 5000 Riyal. A study finding also indicated a significant increase in CKD knowledge scores among older individuals, who had higher levels of education, had more economic resources, were married, and engaged in physical activities for more than 150 minutes per week [19]. In addition, Gheewala *et al*. observed a statistically significant association between greater levels of educational attainment among respondents and an increased score in chronic kidney disease (CKD) knowledge [20].

To improve public knowledge and awareness of CKD in the Kingdom of Saudi Arabia, several steps can be taken. First, there needs to be a greater emphasis on education and awareness campaigns about the condition, including its risk factors, symptoms, and the importance of early detection and treatment. This can be done through a variety of channels, including television and radio advertisements, social media campaigns, and educational programs in schools and community centers. Finally, there needs to be a greater emphasis on preventive healthcare in the Kingdom of Saudi Arabia. This can be done by investing in infrastructure and resources for preventive healthcare, including screening programs for chronic conditions such as CKD. Additionally, healthcare professionals need to be trained on the importance of screening for CKD and on how to educate their patients about the condition [25].

## Conclusion

In conclusion, despite the high incidence of the ailment, there is still a lack of public education and awareness of chronic kidney disease (CKD) in the Kingdom of Saudi Arabia. This is due in part to a lack of education and awareness campaigns about the condition, a lack of emphasis on preventive healthcare, and a lack of awareness among healthcare professionals about the importance of screening for CKD. Knowledge scores were significantly associated with gender and residence place in the kingdom.

To improve public knowledge and awareness of CKD in the Kingdom of Saudi Arabia, there needs to be a greater emphasis on education and awareness campaigns about the condition, as well as investment in infrastructure and resources for preventive healthcare. By making these changes, we can enhance the health of Saudi Arabia's population and lessen the country's CKD burden.

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