

# Public Awareness, and Perception towards Chronic Kidney Disease and its Risk Factors in Southern Region, Saudi Arabia

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## Abstract

**Background:** Worldwide, CKDs are the 12th cause of death and the 17th cause of disability, respectively. About 10-13% of the general population had one of the chronic kidney diseases counting more than 500 million persons worldwide. Early diagnosis and treatment of CKD will play an important role in delaying CKD progression [12].

**Aim:** The current study aims to determine the prevalence and awareness of CKD among the general population and its determinants in Southern region of Saudi Arabia.

**Methods:** A descriptive cross-sectional approach was used targeting all accessible population in Southern Saudi Arabia (including four regions, Aseer region, Albaha region, Najran region, and Jazan region), aged 18 years or more and accepting to participate in the study. Data were collected from participants using an online pre-structured questionnaire. The questionnaire covered the following data: participants' socio-demographic data, participants' awareness, and participants' perception towards CKDs, preventive measures and risk. The questionnaire was uploaded online using social media platforms by the researchers and their friends during the period from 20 March 2021 to 20 June 2021.

**Results:** A total of 1317 participants fulfilling the inclusion criteria completed the study questionnaire. Participants' ages ranged from 18 to 69 years with a mean age of 34.1 ± 12.9 years old. Exactly 255 (19.4%) reported that they had a family member with CKD and 130 (9.9%) of the study respondents had DM, 98 (7.4%) had hypertension, while 20 (1.5%) complained of CKD. Exactly 93% of the study participants had heard about CKDs and 80.8% correctly defined the diseases as a kidney condition that was unable to filter waste, toxins, and fluids from the body. A total of 84.3% reported that chronic kidney disease progresses to kidney failure and 42.9% agreed that chronic kidney disease may not have any symptoms until advanced. The most reported source of knowledge were social media (56%), followed by mass media (22.3%), work (22.1%), books (20.3%), health education campaigns (15.8%), and others (31%).

**Conclusion:** In conclusion, the current study revealed that public awareness in Southern region of Saudi Arabia about CKD and its risk factors is low in contrast to their perception towards the disease and its associated risk. Having information from scientific sources such as books, health education campaigns or study was associated with high awareness level.

**Key words:** Chronic kidney disease, awareness, perception, population, Saudi Arabia, risk factors

## Introduction

Chronic kidney disease (CKD) is a gradual loss of kidney function for more than 3 months (1-3). CKD is a silent disease where the patient will not be aware of the kidney disease until they have lost 90% of their kidney function. Given this, increasing awareness of CKD will encourage high risk patients to have regular screening done. Early detection of CKD allows proper management that could slow down CKD progression, prevent cardiovascular and other comorbidities and enable timely initiation of dialysis (4-7).

Globally, CKDs are the 12th cause of death and the 17th cause of disability, respectively (8). About 10-13% of the general population has one of the chronic kidney diseases counting more than 500 million persons worldwide (9, 10). Lately, the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) classified low glomerular filtration rate (GFR) as the 12th leading risk factor for death in general, and the 14th risk factor for Disability-Adjusted Life-Years (DALYs) among 79 risk factors in 2013 (8, 11).

Early discovery and therapy of CKD in its early stages have a significant role in the prevention or postponing of disease progression (12). Many clinical practice guidelines for CKD advise screening of people with high risk for CKD (13, 14) and numerous screening curricula have been performed worldwide to find general population with early stages of CKD (15). Unfortunately, chronic kidney disease is “under-diagnosed” and “under-treated” resulting in decreased chances for prevention. Lack of appropriate and precise definition and classification of stages in the progression of chronic kidney disease stands behind that lost diagnosis. A clinically relevant classification is based mainly on laboratory assessment of the severity of kidney disease, correlation of stage of kidney function with complications, and stratification of risks for loss of kidney function and development of cardiovascular disease (16, 17).

Public awareness regarding CKD is an important predictor for undergoing screening programs which is the main strategy to rule in and minimize the CKD burden (18, 19). Assessing the public awareness of CKD is a cornerstone for health care planners, researchers, and kidney health organizations for establishing a proper health education campaign. The study aims to determine the prevalence and awareness of CKD among the general population and its determinants in Southern region of Saudi Arabia.

## Methodology

A descriptive cross-sectional approach was used targeting all accessible population in Southern Saudi Arabia (including four regions, Aseer region, Albaha region, Najran region, and Jazan region) aged 18 years or more and accepting to participate in the study. A total of 1,596 individuals received the study survey. Exactly 1,317 respondents were eligible and completed the study questionnaire with a participation rate of 82.5%. After obtaining permission from the Institutional ethics committee, data collection started. Data were collected from participants using an online pre-structured questionnaire. The researchers

constructed the survey tool after intensive literature review and expert's consultation. The tool was reviewed using a panel of 3 experts for validation and applicability. Tool reliability was assessed using a pilot study of 35 participants with reliability coefficient ( $\alpha$ -Cronbach's) of 0.78 for awareness items. The questionnaire covered the following data: participants' socio-demographic data like age, gender, education, work and monthly income. The second section covered participants' medical history and family history of CKDs. The third part covered participants' awareness using multiple responses and mutually exclusive questions. The fourth part covered participants' perception towards CKDs, preventive measures and risk. The questionnaire was uploaded online using social media platforms by the researchers and their friends during the period from 20 March 2021 to 20 June 2021. All accessible and eligible population in the study setting were invited to fill the attached tool.

## Data analysis

After data were extracted, it was revised, coded, and fed to statistical software IBM SPSS version 22 (SPSS, Inc. Chicago, IL). All statistical analysis was done using two tailed tests. P value less than 0.05 was statistically significant. For knowledge and awareness items, each correct answer was scored one point and total summation of the discrete scores of the different items was calculated. A patient with score less than 60% (0-16 points) of the total score was considered to have poor awareness while good awareness was considered if they had a score of 60% (17 points or more) of the total or more. Descriptive analysis based on frequency and percentage distribution was done for all variables including participants socio-demographic data, family and personal history of chronic kidney diseases, and source of information regarding chronic kidney diseases. Also, participants' awareness regarding CKDs, risk factors, disease nature, risk factors, and diagnosis methods were shown in frequency tables. Frequency distribution for participants' perception regarding CKDs was also tabled. Cross tabulation was used to assess distribution of public awareness level regarding CKDs according to their personal data, disease history, and source of information. Relations were tested using Pearson chi-square test and exact probability test for small frequency distributions.

## Results

A total of 1,317 participants fulfilling the inclusion criteria completed the study questionnaire. Participants' ages ranged from 18 to 69 years with mean age of 34.1 12.9 years old. Exactly 944 (71.7%) were females and 723 (54.9%) were married while 549 (41.7%) were single. As for educational level, 1,021 (77.5%) had university level of education or above and 260 (19.7%) had secondary level of education. Considering work, 390 (29.6%) were not working or retired while 436 (33.1%) were non-health care workers and only 94 (7.1%) were health care workers. Exactly 255 (19.4%) reported that they had a family member with CKD and 130 (9.9%) of the study respondents had DM, 98 (7.4%) had hypertension, while 20 (1.5%) complained of CKD (Table 1).

**Table 1. Bio-demographic data of study participants, Southern Saudi Arabia**

Bio-demographic data	No	%
<b>Age in years</b>		
18-34	695	52.8%
35-44	309	23.5%
45-64	285	21.6%
65+	28	2.1%
<b>Gender</b>		
Male	373	28.3%
Female	944	71.7%
<b>Marital status</b>		
Single	549	41.7%
Married	723	54.9%
Divorced / widow	45	3.4%
<b>Educational level</b>		
Below secondary	36	2.7%
Secondary	260	19.7%
University/ above	1021	77.5%
<b>Work</b>		
Not working / retired	390	29.6%
Student	397	30.1%
Non-health care worker	436	33.1%
Health care worker	94	7.1%
<b>Monthly income</b>		
< 3000 SR	581	44.1%
3000-6000 SR	191	14.5%
6000-10000 SR	183	13.9%
> 10000 SR	362	27.5%
<b>Family history of CKD</b>		
Yes	255	19.4%
No	1062	80.6%
<b>Have chronic diseases?</b>		
None	1038	78.8%
DM	130	9.9%
HTN	98	7.4%
CKD	20	1.5%
Autoimmune disease	17	1.3%
Others	100	7.6%

Table 2. Awareness regarding chronic kidney disease and its Risk Factors in Southern Region of Saudi Arabia. Exactly 93% of the study participants had heard about CKDs and 80.8% correctly defined the diseases as a kidney condition that was unable to filter waste, toxins, and fluids from the body. A total of 84.3% reported that chronic kidney disease progresses to kidney failure and 42.9% agreed that chronic kidney disease may not have any symptoms until advanced. As for symptoms, the most reported were tiredness (61.6%), followed by poor appetite (32.6%), difficulty sleeping (27.3%), itchy skin (21.7%), and shortness of breath (21.5%). Exactly 87.6% of the study participants agreed that treatments for kidney failure include kidney transplant and dialysis, 83.3% know that dialysis for renal failure is to remove toxins, and 88.5% said adherence to treatment strategy will help people to live healthily. As for risk factors, the most identified diseases were kidney diseases like stones or infections (67.8%), followed by cardiomyopathy (67.8%), hepatic failure (56%), DM (43.7%), hypertension (43.2%), obesity (36.1%), and autoimmune diseases (24.8%). Considering drugs that may cause CKDs, NSAIDs were the most identified (42%), followed by antibiotics (37.7%), diuretics (22.2%), antidiabetics (17.8%), antipsychotics (13.7%), and anticoagulants (10.6%). Exactly 50.3% of the participants agreed that Family members with kidney disease increase risk for CKD, 36.9% reported that kidney disease is diagnosed with a simple blood test, and 34.4% know that Glomerular filtration rate is a measure for functioning kidney.

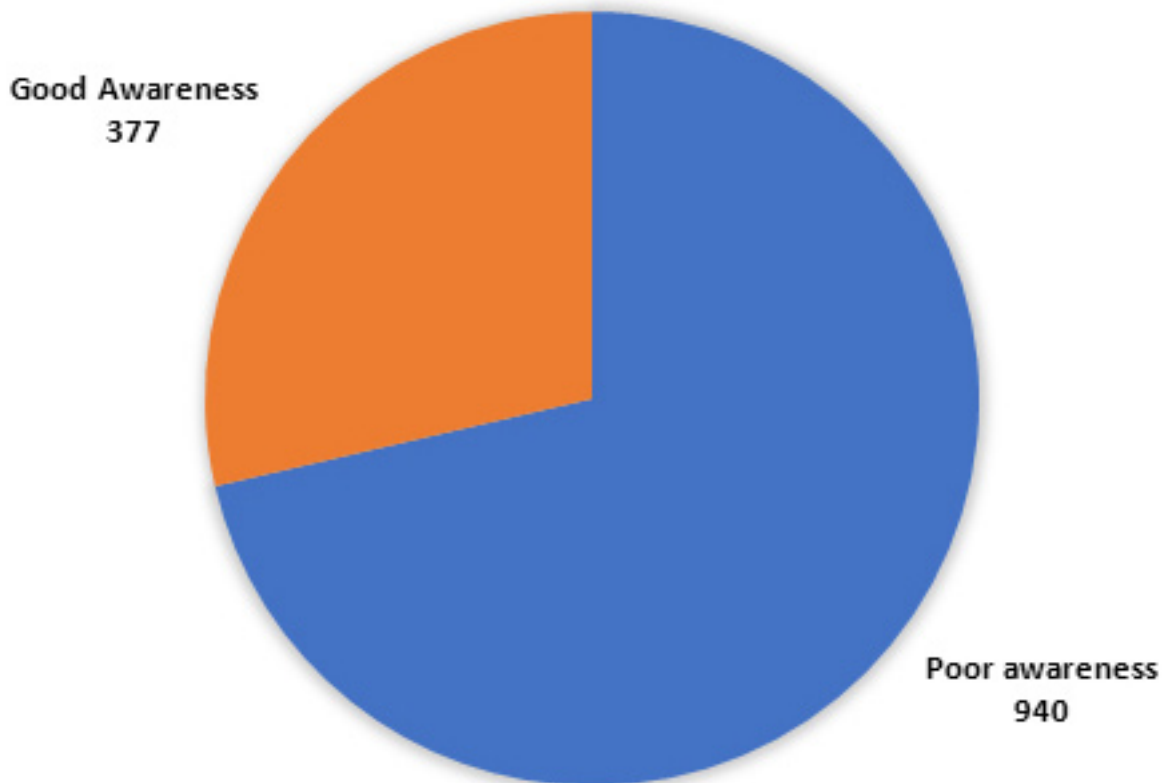
Table 2. Awareness regarding chronic kidney diseases and its Risk Factors in Southern Region of Saudi Arabia

Awareness items		No	%
Heard about CKD	Yes	1225	93.0%
	No	92	7.0%
CKD is?	kidney condition that is unable to filter waste, toxins, and fluids from body	1064	80.8%
	Inflammation / infection of kidney	62	4.7%
	Kidney stones	44	3.3%
	Don't know	147	11.2%
Chronic kidney disease progresses to kidney failure	Yes	1110	84.3%
	No	9	.7%
	Don't know	198	15.0%
Chronic kidney disease may not have any symptoms until advanced	Yes	565	42.9%
	No	262	19.9%
	Don't know	490	37.2%
If symptomatic, what could be the symptoms?	Tiredness	811	61.6%
	Poor appetite	430	32.6%
	Difficulty sleeping	360	27.3%
	Itchy skin	286	21.7%
	Shortness of breath	283	21.5%
	Don't know	481	36.5%
Treatments for kidney failure include kidney transplant and dialysis	Yes	1154	87.6%
	No	16	1.2%
	Don't know	147	11.2%
Dialysis for renal failure to remove toxins	Yes	1097	83.3%
	No	38	2.9%
	Don't know	182	13.8%
Adherence to treatment strategy will help people to live healthy	Yes	1165	88.5%
	No	16	1.2%
	Don't know	136	10.3%
Do you think the following disorders could be a risk factor for having CKD?	Kidney diseases	893	67.8%
	Cardiomyopathy	893	67.8%
	Hepatic failure	738	56.0%
	DM	576	43.7%
	Hypertension	569	43.2%
	Obesity	475	36.1%
	Autoimmune diseases	327	24.8%
Don't know	217	16.5%	
Do you think the following medications could be a risk factor for having CKD?	NSAIDs	553	42.0%
	Antibiotics	496	37.7%
	Diuretics	293	22.2%
	Antidiabetics	234	17.8%
	Antipsychotics	180	13.7%
	Anticoagulants	140	10.6%
	Don't know	505	38.3%
Family members with kidney disease increase risk for CKD	Yes	662	50.3%
	No	169	12.8%
	Don't know	486	36.9%
Kidney disease is diagnosed with a simple blood test	Yes	486	36.9%
	No	270	20.5%
	Don't know	561	42.6%
Glomerular filtration rate is a measure for functioning kidney	Yes	452	34.3%
	No	17	1.3%
	Don't know	848	64.4%

Figure 1. Overall awareness level regarding CKD and its Risk Factors in Southern Region of Saudi Arabia. Exactly 377 (28.6%) participants had good awareness level regarding CKDs while 940 (71.4%) had poor awareness level.

Figure 2. Source of knowledge regarding CKD and its Risk Factors in Southern Region of Saudi Arabia. The most reported sources of knowledge were social media (56%), followed by mass media (22.3%), work (22.1%), books (20.3%), health education campaigns (15.8%), and others (31%).

**Figure 1. Overall awareness level regarding CKDs and its Risk Factors in Southern Region of Saudi Arabia**



**Figure 2. Source of knowledge regarding CKD and its Risk Factors in Southern Region of Saudi Arabia**

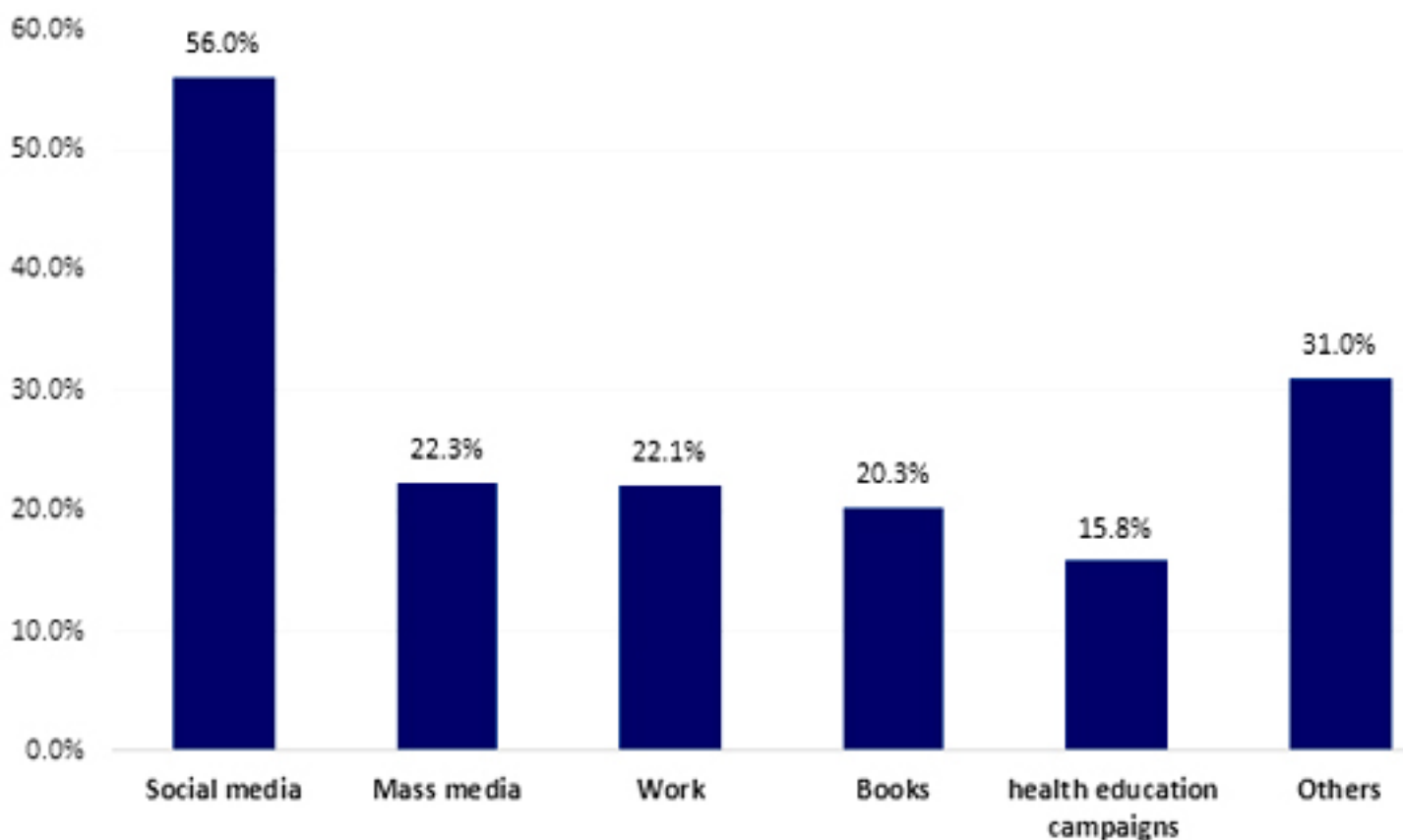


Table 3. Distribution of participants awareness level regarding CKDs by their bio-demographic data

Factors	Knowledge level				p-value
	Poor (0-16)		Good (17-27)		
	No	%	No	%	
<b>Age in years</b>					
18-34	477	68.6%	218	31.4%	.011*
35-44	239	77.3%	70	22.7%	
45-64	208	73.0%	77	27.0%	
65+	16	57.1%	12	42.9%	
<b>Gender</b>					
Male	262	70.2%	111	29.8%	.567
Female	678	71.8%	266	28.2%	
<b>Marital status</b>					
Single	363	66.1%	186	33.9%	.001*
Married	546	75.5%	177	24.5%	
Divorced / widow	31	68.9%	14	31.1%	
<b>Educational level</b>					
Below secondary	29	80.6%	7	19.4%	.083
Secondary	197	75.8%	63	24.2%	
University/ above	714	69.9%	307	30.1%	
<b>Work</b>					
Not working / retired	307	78.7%	83	21.3%	.001*
Student	255	64.2%	142	35.8%	
Non-health care worker	332	76.1%	104	23.9%	
Health care worker	46	48.9%	48	51.1%	
<b>Monthly income</b>					
< 3000 SR	415	71.4%	166	28.6%	.478
3000-6000 SR	143	74.9%	48	25.1%	
6000-10000 SR	133	72.7%	50	27.3%	
> 10000 SR	249	68.8%	113	31.2%	
<b>Family history of CKD</b>					
Yes	158	62.0%	97	38.0%	.001*
No	782	73.6%	280	26.4%	
<b>Have chronic diseases?</b>					
None	752	72.4%	286	27.6%	.170\$
DM	87	66.9%	43	33.1%	
HTN	66	67.3%	32	32.7%	
CKD	15	75.0%	5	25.0%	
Immunosuppressive disease	13	76.5%	4	23.5%	
Others	63	63.0%	37	37.0%	
<b>Source of information</b>					
Social media	505	71.6%	200	28.4%	.001*§
Health education / campaigns	115	57.8%	84	42.2%	
Mass media	185	65.8%	96	34.2%	
Books	110	43.1%	145	56.9%	
Work	135	48.6%	143	51.4%	
Others	302	77.4%	88	22.6%	

P: Pearson X2 test

§ Exact probability test

\* P &lt; 0.05 (significant)

Table 3. Distribution of participants awareness level regarding CKDs by their bio-demographic data. Good awareness level regarding CKDs was detected among 42.9% of old aged participants compared to 31.4% of those who were aged 18-34 years with detected statistical significance ( $P=.011$ ). Also, 33.9% of single participants had good awareness level versus 24.5% of the married group ( $P=.001$ ). Good awareness was also detected among 51.1% of health care workers in comparison to 21.3% of non-working group ( $P=.001$ ). Exactly 38% of participants with a family history of CKDs had good awareness level compared to 26.4% of others without ( $P=.001$ ). Also, 56.9% of participants who had their information from books had good awareness versus 42.2% who reported for health education and 22.6% of those from other sources ( $P=.001$ ).

Table 4. participants' perception towards chronic kidney disease and its Risk Factors in Southern Region of Saudi Arabia. Exactly 90.7% of the study participants agreed that they will go to a health facility if they have signs of kidney disease, 89.4% agreed that early detection of CKD is important to slow its progress, 76.9% reported that chronic kidney disease carries high risk of death, 75.6% think that it is possible to prevent chronic kidney disease. Only 46.2% think that is not too expensive to have a kidney screening test.

Table 4. participants' perception towards chronic kidney diseases and its Risk Factors in Southern Region of Saudi Arabia

Perception items	Disagree		Neutral		Agree	
	No	%	No	%	No	%
Kidney function test is necessary though there is no sign of CKD	112	8.5%	248	18.8%	956	72.6%
It is not too expensive to have a kidney screening test	190	14.7%	505	39.1%	596	46.2%
Chronic kidney disease carries high risk of death	71	5.4%	233	17.7%	1012	76.9%
I will go to a health facility if I have signs of kidney disease	38	2.9%	85	6.5%	1193	90.7%
It is possible to prevent chronic kidney disease	77	5.9%	244	18.5%	995	75.6%
Early detection of CKD is important to slow its progress	44	3.3%	95	7.2%	1177	89.4%

## Discussion

Early detection and treatment of CKD is an important reliever of associated high economic and public health burden (20). Recently, there has been a necessity for a transition from costly hospital-based intervention to a less expensive approach with the highest health benefits and economic value of preventive measures, particularly, when applied early (21). And since lifestyle and environmental factors influence the major risk factors of CKD, population-based preventive strategies appear the cheapest and best solution. Improving awareness regarding health issues enhances health behaviour, (22) with assessing the elements of health influences positively on beneficial management of kidney disease (23). Awareness and perception of CKD with its related risk factors improves risk perception and obtainability for screening for early diagnosis (24). This provides opportunities for early treatment; reduces morbidity, mortality, and health care costs. Low level of awareness is associated with lower perceived susceptibility to CKD (25). Disease prevention by improving awareness and risk factors would add value to the quality of life and increase productivity (26). The current study aimed to assess the public awareness, and perception towards CKD and its risk factors in Southern Region of Saudi Arabia. Also, to detect participants' awareness determinants and related factors.

The study results showed that more than one quarter of the study participants (28.6%) had good awareness level regarding CKD and its related risk factors. The vast majority of the participants (93%) had heard about CKDs and more than three quarters (80.8%) correctly defined the diseases as a kidney condition that is unable to filter waste, toxins, and

fluids from the body. As for disease progression and nature, more than three quarters (84.3%) correctly knew that chronic kidney disease progresses to kidney failure but less than half of them (42.9%) knew that chronic kidney disease may not have any symptoms until advanced. Considering symptoms, the most reported were tiredness which was known by two thirds of the participants, followed by poor appetite (32.6%), difficulty sleeping (27.3%), itchy skin (21.7%), and shortness of breath (21.5%). With regard to treatment approaches for CKDs, the highest portion (87.6%) of the study participants correctly defined those treatments for kidney failure include kidney transplant and dialysis, and they know that dialysis for renal failure to remove toxins and adherence to treatment strategy will help people to live healthily. Regarding risk factors, high awareness was detected for some diseases including kidney diseases like stones or infections, cardiomyopathy, and hepatic failure while DM, hypertension, and obesity were known for less than half of the participants but less than one quarter reported for autoimmune diseases. As for drugs that may cause CKDs, NSAIDs were the most identified (42%), followed by antibiotics (37.7%), diuretics (22.2%), and antidiabetics. About half of the participants correctly know that family members with kidney disease increase risk for CKD, while one third reported that kidney disease is diagnosed with a simple blood test, and know that Glomerular filtration rate is a measure for functioning kidney. Awareness level was significantly higher among young aged and old aged participants than others at their middle age. Also, participants with positive family history for CKDs had higher awareness besides those who work in the health care field. Considering source of information, social media had the upper hand among participants followed by mass media and work place.

Similar studies showed different levels of public awareness regarding CKDs. In Nigeria, Oluyombo R et al (27), found that about 34% of community participants had heard of kidney disease with 59.3% from the media and 35.3% from health workers. The level of knowledge of CKD was good in 27.1%. About two thirds do not know the correct location of the kidneys. Only 24.5% know that NSAIDs cause higher risk of kidney disease. A laboratory test for kidney function was known by 4.4%; 45.9% and 47.8% think that CKD can be cured by spiritual means and herbal concoctions respectively. In Australia, Gheewala PA et al (28), assessed that the median CKD knowledge scores of the public was 12 out of 24 (50%). In Iran, a lower level of knowledge regarding CKD was detected were 10.4% knew that CKD could be asymptomatic in the initial stages. Only 12.7% knew diabetes and 14.4% knew hypertension was a CKD risk factor (29). In the United States (US), the awareness of CKD among people with low glomerular filtration rate was 24.3% (30), while in Australia, only 2.8% and 8.6% of the population studied were able to cite hypertension and diabetes respectively as risk factors of CKD (31). In a study among African Americans, only 23.7% knew at least one laboratory test for kidney disease and <3.0% agreed that CKD is an important health condition (32). In Saudi Arabia, Alobaidi S et al (33), estimated that the mean (SD) kidney disease knowledge score of the study population was 11.99 ( $\pm$  4.70), with scores ranging from 0 to 22. 42.9% of the respondents had knowledge scores less than 11. Another study was conducted by Alateeq FAS et al (34), and concluded that the awareness towards CKD manifestation is relatively low, which necessitates the important of community-based intervention including health educational programs.

Regarding perception towards CKDs and its related risk factors, the current study showed that the vast majority (90.7%) of the study participants agreed that they will go to a health facility if they have signs of kidney disease, and 89.4% agreed that early detection of CKD is important to slow its progress. As for complications and risk of CKDs, about three quarters see that chronic kidney disease carries high risk of death, and also think that it is possible to prevent chronic kidney disease. Less than half of the participants think that it is not too expensive to have a kidney screening test.

## Conclusions and recommendations

In conclusion, the current study revealed that public awareness in Southern Saudi Arabia about CKD and its risk factors is low in contrast to their perception towards the disease and its associated risk. Having information from scientific sources such as books, health education campaigns or study was associated with high awareness level. Periodic public health education campaigns about kidney health and associated risk factors for CKDs should be recommended in the Saudi community. Also, application of continuous community-based screening programs mostly reduces the burden of CKD, as well as, increases the level of public awareness.

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