International Journal of Medical Research Professionals
P-ISSN: 2454-6356; E-ISSN: 2454-6364
DOI: 10.21276/ijmrp

Original Research Article.

Awareness and Attitude Concerning Chronic Kidney Disease Risk Factors In Medina, Saudi Arabia

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ABSTRACT

Background: Chronic kidney disease (CKD) is a condition characterized by a gradual loss of kidney function. It's a major public health problem worldwide. It is an epidemic health problem of increasing prevalence. Chronic kidney disease ranked the 18th grade as the cause of world deaths in 2010. Awareness about chronic kidney disease and its risk factors encourage an early screening and patient can obtain proper treatment earlier without facing complications, however awareness about chronic kidney disease is low across populations.

Aim: To determine the awareness level of Medina population about chronic kidney and it's risk factors.

Methods: This study is cross-sectional descriptive study conducted in Saudi Arabia, Medina. It was conducted between the period from July 2017 until November 2017 using random sampling. The study was performed using questionnaire via social media to be reach for large number of individuals. Inclusion criteria included the general adult population aged from 15-88. Diabetic and hypertensive patients.

Results: The study included 401 individuals, the mean of age ± SD was 42.4±16.1, females represented 71.8% and males represented 28.2%. The awareness rate about CKD was 64.1%, 21.8% of patients with HTN and 23.7% of diabetic patients had awareness. The individuals with university, high and secondary education level, individuals in the health fields, Female and having hypertension were significant factors.

Conclusion: Good level of awareness between population was found, but awareness between HTN and diabetic patients was low. Age, education level, sex, income and relation to health field were significant factors that affected the level of awareness of participants.

Keywords: CKD, CKD Awareness, CKD in KSA.

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Article History:

Received: 27-10-2017, **Revised:** 22-11-2017, **Accepted:** 15-12-2017

Access this article online	
Website: www.ijmrp.com	Quick Response code
DOI: 10.21276/ijmrp.2018.4.1.005	

INTRODUCTION

Chronic kidney disease (CKD) is major public health problem which is kidney damage irrespective of the type of kidney disease that exceeds 3 months' duration with a threshold of GFR <60 ml/min/1.73 m^2.[1] CKD is a universal and growing problem worldwide. It is absolutely an epidemic of increasing prevalence.[2] It is a global problem which affects a population's health, putting a major load on healthcare systems.[3] CKD was rated 18th in the list of causes of overall number of world deaths in 2010. On the other hand, it was in 29th position in 1990.[4] 2010 the prevalence of CKD in Saudi Arabia was 5.7%.[5] While this prevalence has increased in China; to be 13.0%.[6] This is close to the percentage of the population with CKD in USA in all four stages in the period between 1999 and 2004.[7] In India, 17.2% presented the prevalence of CKD.[8] In 2013 the World Health Organization's (WHO) Global Action Plan for the Prevention and Control of Non-communicable Diseases (NCDs) 2013– 2020 was adopted. This international plan includes a list of nine public health objectives which will help to reduce the global concern of NCDs through focusing on lifestyle factors and specific NCDs.[9] Interestingly, five of the WHO targets are aimed at important CKD risk factors, namely: physical inactivity[10], high dietary salt intake[11], smoking[12], diabetes and hypertension.[13] Diabetes is one of precipitating causes of CKD, determining 33% of adult patients with CKD.[14] Further, 20% to 40% of diabetic patients will suffer from diabetic nephropathy at the end stage of their disease.[15] The number of diabetic cases increases therefore the incidence of CKD.[16] Hypertension is considered a strong leading cause of CKD and found in most patients with renal failure.[17] Obesity has been established as a danger leading to the development of CKD, independently of hypertension, diabetes, and pre-existing renal disease.[18] In addition, one of modifiable factors which leads to the progression of CKD in community is smoking.[19,20] According to an outcome of CKD, one of the major outcomes is Cardiovascular events in those patients where it is regarded to be a leading cause of morbidity and mortality in individuals with kidney disease.[21,22] Fluid overload is another crucial factor contributing to CVD, as it

has been a common phenomenon in patients with CKD since it leads to impaired salt and water excretion, resulting in intravascular overload. The abnormal fluid status will increase cardiac load, later causing hypertension, which will in turn cause ventricular hypertrophy, and congestive heart failure. Moreover, also having congestive heart failure is shown to reduce the quality of life and imposes additional health care costs.[23-26] A number of biomarkers of fluid retention include: brain natriuretic peptide (BNP) and N-terminal pro-brain natriuretic peptide (NT-proBNP). These biomarkers can accumulate in CKD patients.[27-29] In a retrospective study conducted in Canada between 2001 and 2008 of 2,887 patients with a GFR between 15 and 60 ml/min per 1.73 m2 at nephrology clinic concluded that heart failure is associated with a stepwise increase of developing ESRD and increased risk of mortality before ESRD in patients with CKD.[30] One more outcome of CKD is dialysis. Unfortunately, those patients on dialysis have a 10- to 30-fold increased risk of cardiovascular mortality compared with the general population.[31] Dialysis has also shown to reduce the quality of life of those patients in relation to the environment and social relationships including suffering from depressive symptoms, anxiety, suicidal attempts and sleep disturbance, all of which more in hemodialysis compared to peritoneal dialysis.[32] Awareness of CKD was assessed by several studies in different countries that indicate a high prevalence of the disease in the presence of low awareness level. It is shown that prior acknowledgment of CKD slows down its progression, and so reducing complications and cardiovascular events. Moreover, early referral to a nephrologist has been shown to improve outcomes for those who progress to the end-stage of renal disease.[33-36] Among the African American population a prospective study revealed prevalence of CKD of 20.0%. It also revealed a high prevalence of kidney disease risk factors such as 60% suffering from HTN, and 20% diabetics, and 40% metabolic syndrome. The study included taking anthropometric measures, BP measurements, urine and blood collection and physical activity. Generally, the awareness level was quiet low ranging from 13-17 %. Only 15.8% of participants with CKD were aware of their disease with no gender differences. A lower level of education was noted, less physical fitness and an increased risk of cardiovascular conditions.[37,38] In Tanzania, community-based studies also proved little knowledge about kidney diseases correlated with the low level of education which triggered a target to establish educational programs in the future.[39] Further studies demonstrate the value of the physician's awareness of CKD. This is shown to be unacceptably low while it is no less important than the community's awareness. The less knowledge physicians have about the risk factors, the fewer diagnostic tests and management of kidney diseases will be available for the patients, which may cause a decline in their kidney function status and contribute to patients' ignorance about their condition. It should be said that this is not restricted to nephrologists only, but more importantly includes primary health-care practitioners since the number of nephrologists is yet not enough to treat all patients with CKD.[40] A cross–sectional descriptive study based in Nigeria assessed knowledge and risk factors of CKD among 563 adult residents. The analysis showed low levels of awareness (33.7%) and little knowledge of CKD in the community (27.1%) and physicians should discuss the risk factors of kidney disease and correct misconceptions in the clinic with the patients at the nephrology clinics.[41] A study that evaluated the level of awareness in internal medicine residents revealed among a total of 479 respondents, 99% of residents identified the usual risk factors for CKD as diabetes and hypertension. 87% were aware of the proper assessment of renal function, 90% knew the ideal blood pressure in those patients. On the other hand, more than half were not aware of any guidelines for CKD (KDOQI guidelines) and just half of the residents were lacking awareness of the exact definition of CKD, the CVD outcome of CKD and even less knowledge regarding specific risk factors and the effectiveness of lifestyle modifications on reducing progression to CKD.[42] The aim of this study is to determine the level of awareness of Medina's population of chronic kidney disease and its risk factors, particularly in diabetic and hypertensive patients.

METHODOLOGY

A cross-sectional descriptive study conducted in Medina, Saudi Arabia. The period of the study is from July 2017 until November 2017 using random sampling. Inclusion criteria included the general adult population aged 14-88 including diabetic and hypertensive patients. Exclusion criteria included incomplete data. After obtaining consent from the participants, the data were collected through social media such as WhatsApp or Twitter as a part of a self-administered electronic questionnaire sent to more than 400 Saudi civilians living in Medina, Western Region, Saudi Arabia. The questions were asked to draw information about age, gender, marital status and education level and patient awareness, which includes general knowledge of CKD, its risk factors, consequences and management. Consent from participants will be taken after explaining to them that all of the information will be confidential and for research purposes only. The data will be entered into the computer and will be analyzed by using the SPSS Version 20 Descriptive Statistics. This will be used to describe demographic and disease characteristics of the patients and their knowledge will be assessed. Percentages and frequencies will be used for the categorical variables, while means and standard deviations will be calculated for the continuous variables. Data are presented as mean ± standard deviation categorical variables were compared using Chi-square and contingency tables.

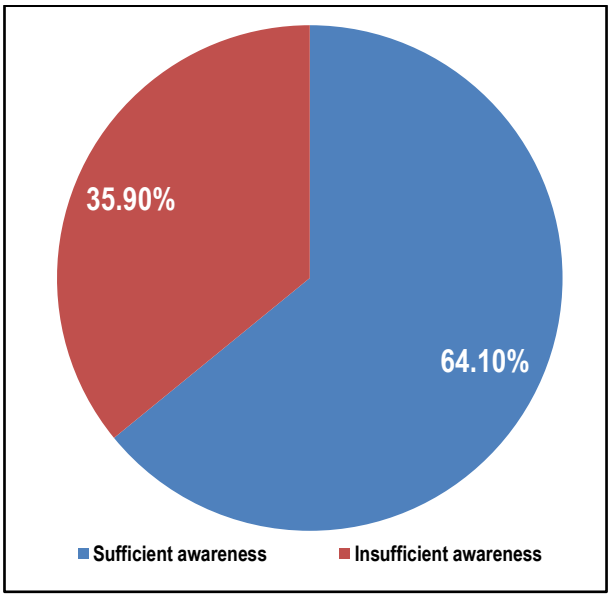

Fig 1: The prevalence of awareness between individuals

Table 1: Demographics of participants

Variable	Participants (n=401) N (%)
AGE (YEARS)	
Range	15-88
Mean ± SD	42.4 ± 16.1
Median	40
EDUCATIONAL LEVEL	
Illiterate	32 (8)
Elementary	20 (5)
Intermediate	18 (4.5)
Secondary	74 (18.5)
High	38 (9.5)
University	219 (54.6)
RELATED TO HEALTH FIELD	
Yes	50 (12.5)
No	351 (87.5)
SEX	
Male	113 (28.2)
Female	288 (71.8)
NATIONALITY	
Saudi	385 (96)
Non-Saudi	16 (4)
MARITAL STATUS	
Single	68 (17)
Married	283 (70.6)
Divorced	15 (3.7)
Widow	35 (8.7)
INCOME	
2K-5K	95 (23.7)
5K-7K	69 (17.2)
7K-10K	84 (20.9)
> 10K	153 (38.2)
CHRONIC DISEASE **	
Yes	186 (46.4)
No	215 (53.6)
CHRONIC KIDNEY DISEASE	
Yes	78 (19.5)
No	323 (80.5)
HTN	
Yes	102 (25.4)
No	299 (74.6)
DM	
Yes	94 (23.4)
No	307 (76.6)
DM TYPE	
Type I	15 (16)
Type II	79 (84)
CARDIAC DISEASE	
Yes	33 (8.2)
No	368 (91.8)
OTHER CHRONIC DISEASES	
Yes	29 (7.2)
No	372 (92.8)

** Some of them have more than 1 chronic disease,
HTN; Hypertension, DM; Diabetes Mellitus.

RESULTS

The present study included 401 individuals; the age range of participants was 15 to 88 years old with a mean ± SD of 42.4± 16.1 years. Females were more dominant 71.8% than males 28.2%. The large majority of individuals had university education 219 (54.6%), while high education and secondary education represented 38 (9.5%) and 74 (18.5%) respectively, there were 18 (4.5%) with intermediate education, 20 (5%) with elementary education and 32 (8%) were illiterate.

Most of individuals weren't related to health field 351 (87.5%), whereas 50 (12.5%) reported that they were related to health field. There were 385 (96%) Saudi individuals and 16 (4%) only were non-Saudi. There were 283 (70.6%) married individuals, 68 (17%) singles, 35 (8.7%) and 15 (3.7%) were widows and divorced respectively. Regarding the income, 95 (23.7%) had income of 2000 to 5000 SR, 69 (17.2%) had 5000 to 7000 SR, 84 (20.9%) had 7000 to 10000 SR and 153 (38.2%) had more than 10000 SR income. There were 8 questions to investigate the chronic diseases that the participants suffered, some participants suffered more than one disease. There were 186 (46.4%) had chronic diseases, 78 (19.5%) had chronic kidney disease, 102 (25.4%) had hypertension, 33 (8.2%) had cardiac disease, 94 (23.4%) had diabetes mellitus; 15 (16%) of them had type I and 79 (84%) had type II and finally there were 29 (7.2%) suffered other chronic diseases. The demographics of participants are shown in table1. Regarding awareness of individuals, there were 257 (64.1%) had sufficient awareness, while 144 (35.9%) had insufficient awareness, figure1.

We investigated the awareness of participants about the diseases that lead to chronic kidney disease, there were 244 (60.8%) thought that diabetes mellitus leads to CKD, 239 (59.6%) thought that HTN also leads to CKD and 204 (50.9%) thought that CHD leads to CKD. There were 69 (17.2%),72(18%) and 127 (31.7%) were totally agree that obesity, genetic materials and repeated inflammation lead to CKD respectively. Also there were 119 (29.7%) were totally agree that kidney stones lead to CKD, 153 (38.2%) and 145 (36.2%) were totally agree that analgesic cold and smoking lead to CKD respectively. Table 2 shows the detailed answers of participants represented in number and percent.

By comparing the two groups; those with sufficient awareness and those with insufficient awareness, it was found that there was a significant difference regarding the mean of age between the two groups (P-value=0.006), where the mean age of insufficient awareness was more than those with sufficient awareness. The level education was a significant factor between the two groups (P-value=0.035), the individuals with university, high and secondary education were more dominant to have sufficient awareness. Health field was a significant factor (P-value=0.005), more of those with no health field relation (84%) had sufficient awareness. Also, gender and having HTN were significant factors (P-value=0.029, 0.025 for gender and HTN respectively), females were more dominant in the group with sufficient awareness (75.5%) and the large majority of those without HTN had sufficient awareness. Marital status, having chronic disease, suffering CKD, DM or its type, cardiac disease and other chronic diseases were not significant factors. The income of individuals was a factor that significantly affected the awareness of participants (P-value=0.024), table 3.

Table 2: Answers of participants about the factors lead to CKD

Questions	No	I don't Know	Yes		
Do you think DM lead to CKD	31	126	244		
	(7.7)	(31.4)	(60.8)		
Do you think HTN lead to CKD	26	136	239		
	(6.5)	(33.9)	(59.6)		
Do you think CHD lead to CKD	41	156	204		
	(10.2)	(38.9)	(50.9)		
	Totally Agree	**Disagree**	**Indifferent**	**Agree**	**Totally Agree**
Do you think obesity lead to CKD	4	53	121	154	69
	(1)	(13.2)	(30.2)	(38.4)	(17.2)
Genetic material lead to CKD	4	76	97	152	72
	(1)	(19)	(24.2)	(37.9)	(18)
Do you think repeated inflammation lead to CKD	1	17	52	204	127
	(0.2)	(4.2)	(13)	(50.9)	(31.7)
Kidney stones lead to CKD	2	24	55	201	119
	(0.5)	(6)	(13.7)	(50.1)	(29.7)
Do you think analgesic cold lead to CKD	5	16	78	149	153
	(1.2)	(4)	(19.5)	(37.2)	(38.2)
Smoking lead to CKD	3	20	75	158	145
	(0.7)	(5)	(18.7)	(39.4)	(36.2)

Table 3: Comparison between the two groups regarding CKD awareness

Characteristics of Participants	Awareness about CKD		P value
	Sufficient (n=257)	**Insufficient (n=144)**	
AGE MEAN ± SD	40.7 ± 15.3	45.4 ± 17.1	0.006*
EDUCATIONAL LEVEL			
Illiterate	17 (6.6)	15 (10.4)	0.035*
Elementary	11 (4.3)	9 (6.3)	
Intermediate	6 (2.3)	12 (8.3)	
Secondary	47 (18.3)	27 (18.8)	
High	26 (10.1)	12 (8.3)	
University	150 (58.4)	69 (47.9)	
RELATED TO HEALTH FIELD			
Yes	41 (16)	9 (6.3)	0.005*
No	216 (84)	135 (93.8)	
SEX			
Male	63 (24.5)	50 (34.7)	0.029*
Female	194 (75.5)	94 (65.3)	
NATIONALITY			
Saudi	247 (96.1)	138 (95.8)	0.892
Non-Saudi	10 (3.9)	6 (4.2)	
MARITAL STATUS			
Single	52 (20.2)	16 (11.1)	0.060
Married	178 (69.3)	105 (72.9)	
Divorced	7 (2.7)	8 (5.6)	
Widow	20 (7.8)	15 (10.4)	
INCOME			
2K-5K	57 (22.2)	38 (26.4)	0.024*
5K-7K	38 (14.8)	31 (21.5)	
7K-10K	50 (19.5)	34 (23.6)	
> 10K	112 (43.6)	41 (28.5)	

CHRONIC DISEASE			
Yes	115 (44.7)	71 (49.3)	0.380
No	142 (55.3)	73 (50.7)	
CHRONIC KIDNEY DISEASE			
Yes	45 (17.5)	33 (22.9)	0.189
No	212 (82.5)	111 (77.1)	
HTN			
Yes	56 (21.8)	46 (31.9)	0.025*
No	201 (78.2)	98 (68.1)	
DM			
Yes	61 (23.7)	33 (22.9)	0.853
No	196 (76.3)	111 (77.1)	
DM TYPE			
Type I	11 (18)	4 (12.1)	0.455
Type II	50 (82)	29 (87.9)	
CARDIAC DISEASE			
Yes	19 (7.4)	14 (9.7)	0.416
No	238 (92.6)	130 (90.3)	
OTHER CHRONIC DISEASES			
Yes	18 (7)	11 (7.6)	0.814
No	239 (93)	133 (92.4)	

DISCUSSION

Awareness of CKD and its risk factors increases availability for early screening and early diagnosis[43], hence treatment of CKD is performed early and this result in decrease in the progression rate of the disease.[44] Knowledge of CKD still low across populations[40], low awareness is related to lower CKD perceived susceptibility.[45] The present study included 401 participants, there was sufficient awareness in 64.1%, while 35.9% had insufficient awareness about CKD. Our results are better than that found in survey on US adults, where<10% of individuals with CKD had awareness and awareness was present in <40% of individuals with CKD stage 4.[46] Another survey from Taiwan on CKD patients showed that the awareness was 8% and 25% among those with CKD stages 3 and 4, respectively.[47] It should be noted that our study performed on the population with or without CKD and it showed higher rate of awareness than previous studies on patients with CKD. A study reported from rural community of south-west Nigeria showed that the level of awareness was low, where the awareness rate was 33.7% only in general population.[41] Tamura et al[48] reported 10 % level of awareness. Globally, it is well known that hypertension was a risk factor for CKD[49], and the increase in diabetes prevalence is associated with CKD[50] and 25-40% of those with type 2 diabetes risk of developing CKD.[51] The current study showed that 60.8% thought that DM was a risk factor for CKD, 59.6% and 50.9% informed that HTN and CHD respectively were risk factors for CKD. In a study on urban African-American adults[52] it was found that only 18% and 14% knew that diabetes and hypertension respectively were risk factors for the development of CKD. Lower percent of awareness about diabetes and hypertension as risk factors were reported in an Australian study, where 9% and 3% knew that diabetes and hypertension respectively were risk factors.[53] It was reported from a study on rural population that less than 50% and 1/3 of population thought that hypertension and diabetes respectively lead to CKD.[41] In this study, 38.4% and 17.2% of individuals were agreed and totally agree that obesity was a risk factor for CKD respectively. It is known that obesity is related to CKD and its progression.[50] By asking participants if genetic material was a risk factor for CKD, there were 37.9% agree and 28% were totally agree, while only 10 % thought it was hereditary in a previous study.[41] There were 50.9% agree and 31.7% totally agree that repeated inflammation leads to CKD. Regarding kidney stones as a risk factor for CKD, there were 50.1% agree and 29.7% totally agree. It was reported that continues use of NSAIDs compounds may increase the risk of CKD[54], NSAIDs have adverse renal effects including nephrotic syndrome with interstitial nephritis, interstitial nephritis, papillary necrosis, acute renal failure and chronic renal failure with or without glomerulopathy.[55] In one study[41] it was reported that 30% of individuals thought that NSAIDs adversely affected the kidney. In the current study, there were 37.2% agree that analgesic was CKD risk factor and 38.2% were totally agree. It was thought that CKD prevalence will increase, where smoking increase substantially[56] as smoking has serious consequences on CKD patients by its influence on CKD progression.[57] In the present study, there were 36.2% totally agree that smoking was a risk factor and 39.4% were agree. Regarding the factors that may influence awareness of population, we found that nationality, marital status, chronic disease as CKD, cardiac disease and diabetes mellitus type didn't effect on the awareness of participants, however age, higher education, individuals' relation to health field, gender, income and having HTN were significantly affected the awareness of individuals about CKD. Patients with HTN represented 21.8% of individuals with sufficient awareness, while there were 23.7% of diabetic patients had sufficient awareness. It was found that increased age was related to increase in awareness in African- Americans[58], and it was found no effect of age on awareness of CKD status[46], however in the present study, younger age was related to higher awareness and this was in agreement with the results of a Nigerian study on the rural population, which reported that older individuals were of less awareness.[41] The previous study showed that there was a positive association between high level of education and awareness[41] this

was in agreement with our results. In the contrary to our results, the previous study[41] demonstrated that males had higher awareness than female, whereas in our study we found that 75.5% of sufficient awareness were females. As far as we know, the present study was the first study to assess the awareness about CKD between population, the previous studies were performed either on CKD patients or those with CKD developing risk, the only study was found performed on population was from Nigeria, however our study covered investigation about more risk factors and factors that may influence the awareness level of individuals. Further studies are recommended to investigate the awareness between larger sample size.

CONCLUSION

From the present study we concluded that there was a good level of awareness (64.1%) between Saudi population in Medina. Age, education level, relation to health field, gender, income and hypertension were significant factors that affected awareness of patients. Low percentage of either hypertensive or diabetic patient had sufficient awareness about CKD although they are at risk of developing CKD.

ACKNOWLEDGMENT

We would like to acknowledge the efforts of our supervisors Prof. Ghada A. Wassif and Dr. Abdulwahab alharthi who helped us in every step of our study. We also appreciate the medical inters Doa'a alamri, Bashayr Saeed Alharbi, Lamia Khalif Alharbi and the medical student Amjad Taj Mohammad for their effort as data collectors.

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Source of Support: Nil.

Conflict of Interest: None Declared.

Cite this article as: Abrar Alharbi, Kenana Owidah, Nehal Aluofi, Kafaf Jalali, Mohammad Karbouji. Awareness and Attitude Concerning Chronic Kidney Disease Risk Factors In Medina, Saudi Arabia. Int J Med Res Prof. 2018 Jan; 4(1):14-20.
DOI:10.21276/ijmrp.2018.4.1.005