Proceedings S.Z.M.C. Vol: 35(2): pp. 1-6, 2021. PSZMC-784-35-2-2021

Awareness and Prevalence of Risk Factors of Chronic Kidney Disease in Rabigh, Kingdom of Saudi Arabia: A Community Perspective

[1]Arif Abdulmohsen Al Mousa, [2]Imtiaz Ahmad Qureshi, [3]Fahad Anwar, [3]Nadeem Shafique Butt, [3]Marwan A Bakarman, [4]Zohair Jamil Gazzaz, [3,5]Ahmad Azam Malik

[1]Dammam Medical Complex, Dammam, Saudi Arabia
[2]Department of Pathology, King Abdulaziz University, Jeddah, Saudi Arabia
[3]Department of Family and Community Medicine, King Abdulaziz University, Jeddah, Saudi Arabia
[4]Department of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia
[5]University Institute of Public Health, The University of Lahore, Pakistan

ABSTRACT

Introduction: Chronic kidney disease (CKD) has become a global health problem. Growing prevalence rates of diabetes mellitus (DM) and hypertension further add on to potential increase in CKD along with many other contributing risk factors. Community knowledge regarding CKD is gaining more importance considering magnitude of disease and limited available resources. **Aims & Objectives:** To assess community knowledge about CKD and explore prevalence of risk factors for developing CKD among the inhabitants of Rabigh city in Saudi Arabia. **Place and duration of study:** Rabigh city, Kingdom of Saudi Arabia in 2018. **Material & Methods:** A descriptive cross-sectional household survey was performed. Self-administered semi structured questionnaire made by research team was used to interview 340 Saudi inhabitants of the Rabigh city. The required information about awareness of CKD sign and symptoms and its risk factors was obtained and then analyzed using SPSS. **Results:** Study found limited knowledge about signs (23.8%) and symptoms (24.7%) and relatively more idea about treatment options (76.8%). For the CKD risk factors, 61.5% were positive. Out of those, among many risk factors hypertension, proteinuria, family history of kidney disease and DM were found in 17.8%, 17.3%, 15.3% and 13.9% respectively. The most vulnerable age for the CKD risk factors was between 3rd to 4th and 7th decade. **Conclusion:** This study showed varied responses in terms of awareness regarding salient aspects of CKD. More than half of Saudi population under survey of the Rabigh city had risk factors for the CKD. Considering limited knowledge and higher prevalence of risk factors study suggests further exploration to enable early detection of CKD risk factors and prevention through effective awareness program.

Key words: Chronic renal disease, Hypertension, Diabetes mellitus

INTRODUCTION

In recent decades, communicable diseases have been out-shadowed globally by non-communicable diseases (NCDs) as the most common contributor of premature mortality and morbidity, Kidney disease has a major effect on global health, both as a direct cause of global morbidity and mortality and as an important risk factor for cardiovascular disease. CKD is largely preventable and treatable and deserves greater attention in global health policy decision making, particularly in locations with low and middle SDI.[1,2,3] Around 80% of the burden is faced by middle and low income countries and among those, almost one quarter are younger than 60 years.[1]Chronic Kidney Disease (CKD) constitutes a major cost burden to healthcare systems worldwide.[4,5] CKD is defined as "abnormalities of kidney structure or function, present for at least three months".[6] CKD may lead to end stage renal disease (ESRD), which needs renal dialysis or transplantation. Both are additionally associated with further morbidity and mortality at all stages. These procedures are very costly and put lots of financial burden on the patient and the health care facilities, particularly in developing countries.[7] Prevalence of CKD is estimated to be 11-13 % worldwide.[8] Prevalence of earlier stages of CKD is around 100 times greater than that of kidney failure.[9,10] The situation is probably the reverse in developing countries and gulf countries where late presentation is more common.[11,12] Additionally, its association with other prevalent and continuously increasing NCDs such as hypertension,[13]

cardiovascular disease (CVD),[14] obesity[15] and diabetes,[16] further highlights the potential magnitude of impact.[17] Nowadays CKD is becoming a major public health problem worldwide. The incidence is on rise in the most part of the world because of increased prevalence rate of diabetes mellitus (DM) and hypertension. Primary renal disease was the leading cause of CKD several decades ago, but the current evidence supports HTN and DM as the two major risk factors for the kidney disease worldwide. Furthermore, CKD is prevalent in older people showing increasing trend with age.[18] Considering the increasing numbers of older population world-wide, particularly in less developed countries, additional burden due to increased number of older patients may aggravate situation of CKD.[19] Furthermore changing life style, eating habits and increase in population growth rate and life expectancy along with recent trends towards urbanization are other contributory factors to be considered for the rapid rise in the prevalence and incidence of CKD in Saudi Arabia over the last few decades.[11] This is well reflected by the recent dialysis statistics prepared by the Saudi Center for Organ Transplantation (SCOT) which showed the prevalence of end-stage renal failure treated by dialysis is estimated to be 557 cases/per million population (PMP).[20] Inevitably between 2013 - 2015 a rising trend in renal transplantation was noted from 64 (2013) to 80 (2014) and 108 in 2015.[21]

Therefore, it is very important to adopt certain specific preventive measures to reduce the increasing incidence of CKD and its associated consequences and management burden. Relevant literature suggest that CKD and its adverse consequences can be prevented or delayed by timely detection and prompt treatment but unfortunately, CKD is under-diagnosed and undertreated[4] that may potentially further aggravate the issue. The early detection of CKD can provide opportunities for better and need-based preventive measures to reduce the burden of this disease and its sequelae. Considering the limited population based studies in our region regarding CKD and awareness of its associated risk factors we planned this study.

The objective of this study was to assess community knowledge about CKD and explore prevalence of its risk factors among the inhabitants of Rabigh city.

MATERIAL AND METHODS

This cross-sectional study was conducted in Rabigh city, on western coast of Saudi Arabia with population of around 90,000.[22]

People 18 years of age or older who gave consent to participate were considered eligible. Non Saudis aged below 18 were excluded. The structured questionnaire used in this study was developed in the light of previous relevant CKD knowledge surveys and relevant literature including kidney disease self-assessment tool by NHS.[23] Local experts' (nephrologists and health professionals) opinion was also taken for better fit in study settings. The questionnaire was designed and later translated in the Arabic language with amendments according to local socio-cultural characteristics. The information obtained from study questionnaire are explained in Table-1, 2 & 3.

A minimum sample of size 278 was required to attain 80% of power and 95% confidence level to observe difference of 3 from hypothesized proportion of 10% (CKD prevalence) in a population of 100000.

A total of 340 individuals were interviewed using structure questionnaire from 1st June, 2017 to 30th of March 2018. Systematic random sampling was used in different areas of Rabigh city. First part of the questionnaire aimed to get information required for general socio-demographic factors such as age, gender and occupation. Second part assessed risk factors like hypertension, diabetes mellitus (DM), family history of kidney disease, heart attack, stroke and congestive heart failure (CHF). Last part explored CKD related knowledge such as signs, symptoms, complication, causes, prevention, relevant facts and treatment. Participation was totally voluntary and prior written or oral consent was taken. All participants were assured that the shared information will remain confidential and anonymous. Formal ethical approval was taken from Ethics Committee, Rabigh Medicine Faculty. The questionnaires were filled under the supervision of a research team member who also read the questions and documented responses where participants were not able to read and write.

Statistical analysis:

Data was entered and analyzed IBM-SPSS (version 20) software.

RESULTS

In this study we investigated 340 Saudi individuals to find out the risk factors for CKD. Out of them 226 were males and 114 were females in a ratio of about 2:1. Their ages varied from 18 to 88 years with a mean age of 36 years.

Overall CKD risk factors were found in 61.5% (209) of the participants, which includes; hypertension, family history of renal disease, proteinuria and diabetes mellitus as shown in Table-

1. Significant difference was observed in the prevelance of CKD risk factors between males and females under study as show in Table-2. The p-values were; 0.015 for hypertension, 0.018 for urinary system disease and 0.008 for hematuria and proteinuria. Male to female OR of 2.311, 0.124 and 0.257 respectively is shown in Table-2.

Responses to questions in last part related to CKD signs, symptoms, complications, causes, prevention, magnitude in KSA and its late stage treatment options are given in Table-3 which shows that the level of awareness of CKD sign and symptoms and other factors are almost the same between male and female population under study.

CKD Risk Factors	**Male** n (%) 145(69.4%)	**Female** n (%) 64(30.6%)	**Total** n (%) 209(100%)
Diabetes mellitus	18 (12.4%)	11 (17.1%)	29 (13.9%)
Hypertension	18 (12.4%)	19 (29.6%)	37 (17.8%)
Circulatory problems	3 (2.0%)	4 (6.2%)	7 (3.3%)
Urinary problems	15 (10.3%)	1 (1.5%)	16 (7.6%)
Family history of kidney disease	28 (19.3%)	8 (12.5%)	36 (17.3%)
Positive proteinuria and hematuria	28 (19.3%)	4 (6.2%)	32 (15.3%)
Anemia	20 (13.7%)	6 (9.3%)	26 (12.4%)
Long term NSAID abuse	15 (10.3%)	11 (17.1%)	26 (12.4%)

Table-1: Distribution of CKD Risk Factors

Presence of CKD risk factors	**Gender**				**Chi-Square**	**P-Value**	**OR M/F**
	Male n=226		**Female n= 114**				
	No	**Yes**	**No**	**Yes**			
Diabetes mellitus	208	18	103	11	0.276	0.600	1.234
Hypertension	208	18	95	19	5.917	0.015	2.311
Circulatory system diseases	223	3	110	4	1.788	0.181	2.703
Urinary system diseases	211	15	113	1	5.606	0.018	(8.06) 0.124
Family history of kidney disease	198	28	106	8	2.310	0.129	0.534
Positive test for blood or proteins in urine	198	28	110	4	7.009	0.008	(3.89) 0.257
Anemia (pallor), liver disease (jaundice) or SLE	206	20	108	6	1.380	0.240	0.572
Analgesics (NSAID's) abuse	211	15	103	11	0.973	0.324	0.502

Table-2: CKD risk factors between males and females

Questions to assess awareness	**Gender**							
	Male n=226				**Female n=114**			
	Yes		**No**		**Yes**		**No**	
	n	%	n	%	n	%	n	%
Symptoms of CKD	60	26.5	166	73.5	24	21.1	90	78.9
Signs of CKD	58	25.7	168	74.3	23	20.2	91	79.8
Complications of CKD	58	25.7	168	74.3	41	36.0	73	64.0
Causes of CKD	113	50.0	113	50.0	65	57.0	49	43.0
Prevention of CKD	109	48.2	117	51.8	65	57.0	49	43.0
CKD,a major health problem in KSA	143	63.3	83	36.7	75	65.8	39	34.2
Treatment of CKD	180	79.6	46	20.4	81	71.1	33	28.9

Table-3: Awareness assessment related to CKD

DISCUSSION

This study tells us different level of knowledge about CKD among the inhabitants of Rabigh City KSA. More than 70% of the population have no awareness about sign and symptoms of CKD and its complications (Table-3) These findings are well in correlation with some regional published studies.[17,22] More than half of study population had certain risk factors for CKD. Among these majority of the males had family history of renal disease and presence of proteinuria, followed by; anemia, DM, hypertension, urinary problems, long term NSAIDs abuse and circulatory problems in order of their frequency. On the other hand, hypetension, DM, NSAIDs abuse, family history of renal disease, anemia, proteinuria and circulatory problems were relatively more common in females. These findings are close to those as reported by Ibrahim Abdelmajeed in one of the regional studies.[24]

Over the last few decades a rapid rise in the incidence of CKD has been observed in Saudi Arabia most probably associated with changes in their standard of living, eating habits, population explosion, trends towards urbanization and improved life expectancy. In the annual reports (2015 & 2016) of the Saudi Center for Organ Transplantation (SCOT), the incidence of dialysis and renal transplant is on rapid increase in the kingdom of Saudi Arabia.[20,21] The results of the different studies from KSA identify DM and hypertension as the two major risk factors responsible for the CKD followed by shift in age demographics.[25]

Other studies from outside the KSA also consider hypertension as a strong risk factor for the development of CKD and is a frequent finding in renal failure patients.[26,27] In our present study, hypertension and DM were found to be significant risk factors for CKD. Gender wise difference showed that females have more than twice the cases of hypertension and DM, thus they have relatively greater chance of developing CKD (Table-1).

Obesity and smoking are other reported risk factors, known to trigger CKD and its progression.[28,29] In addition NSAIDs use have also been associated with CKD disease progression[30] and we found in our study that 26 (12.4%) of the 209 inhabitants positive for CKD risk factors had a positive history of long term NSAIDs abuse, 17.1% being females and 10.3% males.

When we probed for the urinary system disease as a CKD risk factor, significant difference was observed between male and female participants with females showing around 8 times less chances of developing CKD than males. In the same way individuals positive for hematuria and proteinuria showed significant difference between males and females, with prone females having round 4 times less risk of CKD than males. Table-1

When we move on to assess the awareness about the signs and symptoms and the complications of CKD, most of the participants have little or no knowledge about it. On the other hand, around 50% of the individuals have some awareness of the common risk factors causing CKD and acknowledged that disease can be prevented or delayed. In addition, more than 63% were of the opinion that CKD is a major health problem in KSA and above 70% were in knowledge of dialysis or transplant as treatment options for the advanced stage of CKD. (Table-3)

In order to reduce the increasing burden on the health specialties dealing with the management of CKD, it is of utmost importance to improve the level of awareness and health-promoting behaviors by community education, along with development of preventive strategies to combat CKD.[31,33,34]

Generally well-designed, interactive, frequent, and multifaceted educational interventions that include both individual and group participation may improve knowledge, self-management, and patient outcomes in people with CKD.[32]

Different international crosssectional studies published from Singapore, Hong Kong and Iran also advocate the need of community education to create awareness about signs and symptoms and early recognition of risk factors and management of CKD.[1,35,36] Globally the burden of CKD is on the rise over the past few decades, therefore it is highly recommended to significantly control the development of CKD by application of effective prevention and control strategies at primary health care levels.[1]

The strategies include the identification of individual's risk factors as well as at-risk populations as potential targets. This should comprise of targeted approach at both the individual and the community levels, for expansion of the current awareness levels on health literacy as well as social and economic risk factors. Early detection of the risk factors for CKD in individuals is a challenging job especially when one has to identify individuals with undiagnosed CKD and those who are at-risk for development of CKD or those at-risk of end stage CKD. Prevention of advance stages of CKD could be facilitated by identification of at-risk individuals, by earlier and timely diagnosis and management; and by reducing the development of risk factors in individuals with no known renal problem.

The findings of our study have an important implication for both clinicians and policy makers in KSA. There are significant knowledge gaps related to CKD in our population, and those at-risk of developing CKD such as diabetics and/or hypertensive patients. Hence, health literacy and awareness about CKD should be directed towards individuals among the at-risk group.

The disease burden of CKD is rapidly aggravating in Saudi Arabia. This increased burden carries more liabilities for health professionals and contributes significant burden on the health care system.[20] As CKD mostly remains asymptomatic along its course, early detection and control of modifiable risk factors are necessary to delay the progression of CKD into later aggressive stages, which consequently improve patient outcomes. Evidence from the reported literature shows that proper early treatment (with medications and anti-hypertensive therapy) could delay the deterioration of CKD.[29]

Health education is very important, particularly about certain medications that trigger the progression of CKD, including over-the-counter non-steroidal anti-inflammatory agents and contrast agents used in radiological imaging. Moreover, literature shows evidence that proper use of early treatment (with medications and anti-hypertensive therapy) could delay the deterioration of CKD.[29] Prevention through awareness program may subsequently result in reduction of the modifiable risk factors for CKD that in turn, will result in reduction of disease burden of CKD in the Saudi region.

CONCLUSION

Individuals with CKD are quickly rising in number every year in KSA. More than half of Saudi population of the Rabigh city under study has certain risk factors for the CKD. Considering limited knowledge and higher prevalence of CKD risk factors suggests further exploration to enable early detection and timely management of these cases. Thus, prevention through community education will be quite helpful, will delay the progression of CKD and will improve patient outcomes and at national level will reduce the burden of CKD on health professionals and healthcare facilities.

REFERENCES

1. Couser WG, Remuzzi G, Mendis S, Tonelli M. The contribution of chronic kidney disease to the global burden of major noncommunicable diseases. Kidney international. 2011; 80(12): 1258-70.
2. Ji-Cheng Lv, Lu-Xia Zhang Prevalence and Disease Burden of Chronic Kidney Disease 09 August 2019.
3. Zhang Q-L, Rothenbacher D. Prevalence of chronic kidney disease in population-based studies: systematic review. BMC public health. 2008; 8(1):117.
4. Nathan R. Hill, Samuel T. Fatoba, Jason L. Oke, Jennifer A. Hirst, Christopher A. O'Callaghan, Daniel S. Lasserson, F. D. Richard Hobbs. Global Prevalence of Chronic Kidney Disease – A Systematic Review and Meta-Analysis July 6, 2016, 10.1371/journal.pone.0158765
5. Jha V, Wang AY-M, Wang H. The impact of CKD identification in large countries: the burden of illness. Nephrology Dialysis Transplantation. 2012; 27(suppl 3):iii32-iii8.
6. KDIGO. Chapter1: Definition and classification of CKD. Kidney Int Suppl. 2013; 3:19.
7. Mahdavi-Mazdeh M. Why do we need chronic kidney disease screening and which way to go? Iranian journal of kidney diseases.2010;4(4):275
8. Hill NR, Fatoba ST, Oke JL, Hirst JA, O'Callaghan CA, Lasserson DS, et al. Global Prevalence of Chronic Kidney Disease–A Systematic Review and Meta-Analysis. PLoS One. 2016; 11(7):e0158765.
9. Health UDo, Services H. Kidney disease statistics for the United States. Bethesda, MD: National Kidney and Urologic Diseases Information Clearinghouse, National Institutes of Health. 2011.
10. K/DOQI clinical practice guidelines on hypertension and antihypertensive agents in chronic kidney disease. American Journal of Kidney Diseases : the official journal of the National Kidney Foundation. 2004; 43(5 Suppl 1):S1-290.
11. Hassanien AA, Al-Shaikh F, Vamos EP, Yadegarfar G, Majeed A. Epidemiology of end-stage renal disease in the countries of the Gulf Cooperation Council: a systematic review. JRSM short reports. 2012; 3(6):1-21.
12. Jha V, Garcia-Garcia G, Iseki K, Li Z, Naicker S, Plattner B, et al. Chronic kidney disease: global dimension and perspectives. The Lancet. 2013; 382(9888):260-72.
13. Meng L, Fu B, Zhang T, Han Z, Yang M. Salt sensitivity of blood pressure in non-dialysis patients with chronic kidney disease. Renal failure. 2014; 36(3):345-50.
14. Currie G, Delles C. Proteinuria and its relation to cardiovascular disease. International journal of Nephrology and Renovascular Disease. 2014; 7:13.
15. Cohen E, Fraser A, Goldberg E, Milo G, Garty M, Krause I. Association between the body mass index and chronic kidney disease in men and women. A population-based study from Israel. Nephrology Dialysis Transplantation. 2013; 28(suppl 4):iv130-iv5.
16. Gómez-Huelgas R, Martínez-Castelao A, Artola S, Górriz JL, Menéndez E. Consensus document on treatment of type 2 diabetes in patients with chronic kidney disease. Nefrología. 2014; 34(1):34-45.
17. Ginawi IA, Ahmed HG, Al-hazimi AM. Assessment of risk factors for chronic kidney disease in Saudi Arabia. Hypertension. 2014; 1(1.4).
18. Tonelli M, Riella M. Chronic kidney disease and the ageing population. Journal of renal care. 2014; 40(1):1-5.
19. Organization WH. Good health adds life to years: Global brief for World Health Day 2012.
20. Dialysis in the Kingdom of Saudi Arabia. Saudi Journal of Kidney Diseases and Transplantation. 2017; 28(4):949-57.
21. SCOT. Annual Report 2015, Saudi Center for Organ Transplantation (SCOT). 2015.
22. Population and Housing Census of Saudi Arabia, 2007-2025. Available from: https://knoema.com/SAPHC2010/population-and-housing-census-of-saudi-arabia-2007-2025?location=1000280-rabigh.
23. NHS. Kidney disease self-assessment. Available from:https://www.nhs.uk/Tools/Pages/Kidneydisease.aspx.
24. Ginawi IA, Ahmed HG, Ashankyty IM, Altamimi T, Almogbel M, Alsuedaa A, et al.

Survey for potential risk factors for susceptibility to chronic kidney disease in hail region, KSA. Management in Health.2013;17(2)
25. Al-Sayyari AA, Shaheen FA. End stage chronic kidney disease in Saudi Arabia. A rapidly changing scene. Saudi Medical Journal. 2011; 32(4):339-46.
26. Chia YC, Ching SM. Hypertension and the development of New onset chronic kidney disease over a 10 year period: a retrospective cohort study in a primary care setting in Malaysia. BMC nephrology. 2012; 13(1):173.
27. Meyrier A. Nephrosclerosis: update on a centenarian. Nephrol Dial Transplant. 2015; 30: 1833-1841. CrossRef PubMed
28. Yun HR, Kim H, Park JT, Chang TI, Yoo TH, Kang SW, Choi KH, Sung S, Kim SW, Lee J, Oh KH, Ahn C, Han SH; Obesity, Metabolic Abnormality, and Progression of CKD.2018 Sep; 72(3):400-410.
29. Eknoyan G. Obesity and chronic kidney disease. Nefrologia. 2011; 31(4):397-403.
30. Plantinga L, Grubbs V, Sarkar U, Hsu C-y, Hedgeman E, Robinson B, et al. Nonsteroidal anti-inflammatory drug use among persons with chronic kidney disease in the United States. The Annals of Family Medicine. 2011; 9(5):423-30.
31. Chow WL, Joshi VD, Tin AS, van der Erf S, Lim JFY, Swah TS, et al. Limited knowledge of chronic kidney disease among primary care patients–a cross-sectional survey. BMC Nephrology. 2012; 13(1):54.
32. Pamela A Lopez-Vargas [1], Allison Tong [2], Martin Howell[2], Jonathan C Craig[2] Educational Interventions for Patients With CKD: A Systematic Review 10.1053/j.ajkd.2016.01.022
33. Hemmelgarn BR, Zhang J, Manns BJ, James MT, Quinn RR, Ravani P, et al. Nephrology visits and health care resource use before and after reporting estimated glomerular filtration rate. JAMA. 2010; 303(12):1151-8.
34. Wright-Nunes JA, Luther JM, Ikizler TA, Cavanaugh KL. Patient knowledge of blood pressure target is associated with improved blood pressure control in chronic kidney disease. Patient education and counseling. 2012; 88(2):184-8.
35. Chow K, Szeto C, Kwan B, Leung C, Li P. Public lacks knowledge on chronic kidney disease: telephone survey. Hong Kong Med J. 2014; 20(2):139-44.
36. Roomizadeh P, Taheri D, Abedini A, Mortazavi M, Larry M, Mehdikhani B, et al. Limited knowledge of chronic kidney disease and its main risk factors among Iranian community: an appeal for promoting national public health education programs. International journal of health policy and management. 2014; 2(4):161.

The Authors:

Dr. Arif Abdulmohsen Al Mousa
Internal Medicine Resident,
Dammam Medical Complex, Saudi Arabia.

Dr. Imtiaz Ahmad Qureshi
Assistant Professor,
Department of Pathology,
Faculty of Medicine in Rabigh,
King AbdulAziz University, Jeddah, Saudi Arabia.

Dr. Fahad Anwar
Assistant Professor,
Department of Family and Community Medicine,
Faculty of Medicine in Rabigh,
King AbdulAziz University, Jeddah, Saudi Arabia.

Dr. Nadeem Shafique Butt
Associate Professor,
Department of Family and Community Medicine,
Faculty of Medicine in Rabigh,
King AbdulAziz University, Jeddah, Saudi Arabia.

Professor Marwan A Bakarman
Department of Family and Community Medicine,
Faculty of Medicine in Rabigh,
King AbdulAziz University, Jeddah, Saudi Arabia.

Dr. Zohair Jamil Gazzaz
Associate Professor,
Department of Medicine,
Faculty of Medicine in Rabigh,
King AbdulAziz University, Jeddah, Saudi Arabia.

Dr. Ahmad Azam Malik
Assistant Professor,
Department of Family and Community Medicine,
Faculty of Medicine in Rabigh,
King AbdulAziz University, Jeddah, Saudi Arabia.
Visiting Faculty:
University Institute of Public Health,
The University of Lahore, Pakistan

Corresponding Author:

Dr. Arif Abdulmohsen Al Mousa
Internal Medicine Resident,
Dammam Medical Complex, Saudi Arabia.
E-mail: Aalmosa0002@stu.kau.edu.sa