

Knowledge and Awareness towards Chronic Kidney Disease Risk Factors in Saudi Arabia

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Abstract

Background: The risk of CKD is high in Saudi Arabia due to increasingly growing prevalence of its risk factors, such as diabetes, hypertension and obesity. Therefore, the objective of this study was to assess the level of awareness of Saudi population towards CKD risk factors in order to generate platform for future planning. **Methodology:** This study included 940 apparently healthy Saudi volunteers, their ages ranging from 17 to 65 years old with a mean age of 35 years. A purposeful questionnaire was designed and used for obtaining data about the CKD risk factors. **Results:** Out of 940 participants, 293 (31.2%) were males and 647 (68.8%) were females, giving males “females” ratio of 1.00:2.21. About 62.3% of the participants were found to believe that DM is one of the main risk factors for CKD, of whom, 74% were males and 57% were females. Approximately 60% of the participants were found believing that hypertension is one of the main risk factors for CKD, of whom 79.5% were males and 51.6% were females. **Conclusion:** There is an increasing in the prevalence of CKD risk factors among Saudi population. Although, the levels of awareness toward some CKD risk factors are relatively increasing, but more health education efforts are deemed importance.

Keywords

CKD, Saudi Arabia, Hypertension, Diabetes, Obesity, Awareness, Risk Factors

1. Introduction

Chronic kidney disease (CKD) is an evolving worldwide public health concern

[1]. CKD witnessed a rapid increase from 36th as leading cause of death in 1990 to the 19th leading cause in 2013 [2]. CKD is associated with many predisposing medical conditions, with most encountered are hypertension (HTN) and diabetes mellitus (DM) [3]. A transformation in the global approach to CKD from the treatment of end stage renal disease (ESRD) to meticulous primary and secondary prevention is so deliberated a complete public health urgency [4].

Risk factors for the development of CKD, mainly chronic kidney failure, would encompass susceptibility factors and initiation factors [5]. Prevention of adverse outcomes of CKD could be simplified by assessing persons with risk factors, to allow earlier detection, and by risk factor lessening in persons without CKD, to prevent or slow the development of the disease. The difficulty of detecting the early stages of CKD makes it challenging to decide whether the risk factors so far recognized relate more to susceptibility, initiation, or progression [6]. HTN, DM, obesity, smoking, Exposure to heavy metals, excessive alcohol consumption, smoking, and the use of non-steroidal anti-inflammatory analgesic drug (NSAID) medications, kidney injury, a history of cardiovascular disease (CVD), hyperlipidemia, metabolic syndrome, hepatitis C virus, HIV infection, and malignancy are the most frequent debated CKD risk factors. An uncontrolled DM and/or HTN can easily and rapidly progress to ESRD [7].

CKD prevalence is high in Saudi Arabia; therefore, preventive interventions are highly recommended, since, CKD prevalence is likely to rise over the next decades due to increase of its risk factors [8].

In a survey for CKD employing household visits, in northern Saudi Arabia, high percentages of risk factors were indicated in a family history (FH) of DM representing 72%, followed by family history of HTN, recurrent urinary tract infection, DM, family history of renal disease, HTN, and NSAID analgesic abuse, constituting 65%, 59%, 26%, 26%, 25%, and 22%, respectively [6]. One of the essential steps towards CKD prevention and control is raising the CKD awareness and increasing health related knowledge among general population. Therefore, the objective of this study was to assess the level of awareness of Saudi population towards CKD risk factors in order to generate platform for future planning.

2. Materials and Methods

In this longitudinal descriptive study, data were obtained from 940 Saudi volunteers living in the city of Hail, the Kingdom of Saudi Arabia (KSA). Participants were randomly selected by simple random method regardless of their age, gender or education level.

Purposeful questionnaire was designed and used for collection of the required data. The following information were obtained from each participant: age, sex, occupation, education level, DM, HTN, Obesity, Hereditary factors, cardiovascular disease, Family history of kidney disease and NSAID analgesics usage.

2.1. Data Analysis

Statistical Package for Social Sciences (SPSS) was used for analysis and to perform

Pearson Chi-square test for statistical significance (P value). The 95% confidence level and confidence intervals were used. P value less than 0.05 was considered statistically significant.

2.2. Ethical Consent

Each participant was asked to sign a written ethical consent during the interview to obtain the information. The informed ethical consent form was designed and approved by the ethical committee of the College of Medicine (University of Hail, KSA) Research Board.

3. Results

This study included 940 volunteers their ages ranging from 17 to 66 years old with a mean age of 35 years. Out of 940 participants, 293 (31.2%) were males and 647 (68.8%) were females, giving males':females' ratio of 1.00:2.21.

Table 1 and **Figure 1** summarize the distribution of the study subjects by demographical features. The majority of the study subjects were found at age range 19 - 25 years constituting 348 (37%) followed by age groups 45 - 55, ≤ 18 , and ≥ 56 years constituting 179 (19%), 157 (16.7%) and 145 (15.4%), correspondingly. The majority of participants were found with basic education level, were found at age group ≥ 56 and 45 - 55 years old, representing 30/52 (57.7%), and

Table 1. Distribution of the study subjects by demographical features.

Variable	Category	Basic edu	Secondary edu	University	Total
Age					
	≤ 18 years	0	157	0	157
	19 - 25	0	0	348	348
	26 - 34	0	16	26	42
	35 - 44	0	24	45	69
	45 - 55	25	179	0	179
	≥ 56	27	86	7	145
	Total	52	462	426	940
Occupation					
	Teacher	0	106	92	198
	Military	22	2	50	74
	Free work	30	0	32	62
	Student	0	151	252	403
	Other	0	203	0	203
	Total	52	462	426	940
Gender					
	Males	22	163	108	293
	Females	30	299	318	647
	Total	52	462	426	940

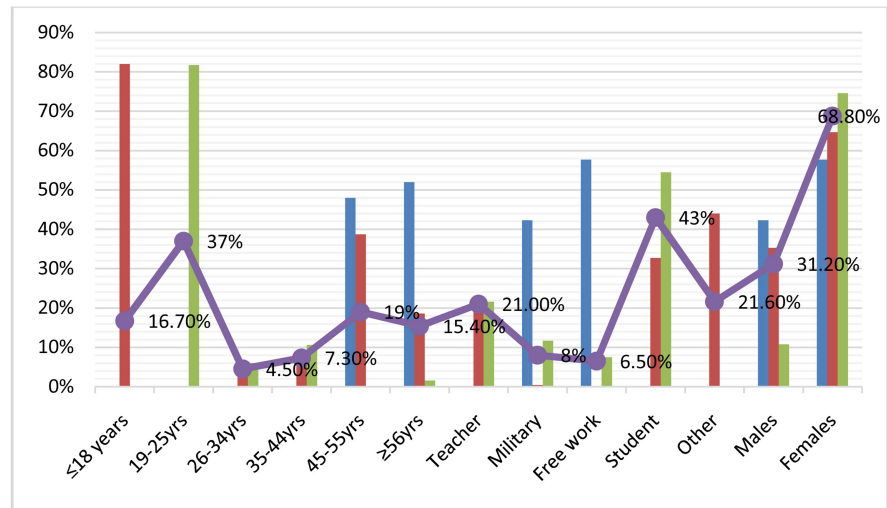


Figure 1. Description of the study population by demographical characteristics.

22/52 (43.3%), respectively, out of the total number of participants with basic education. The majority of participants with secondary education level were found at age group 45 - 55 and ≤18 years, representing 179/462 (38.7%), and 157/462 (34%), respectively, of the total participants with secondary education. The majority of participants with university level were found at age group 19 - 25 and 35 - 44 years, representing 348/426 (81.7%), and 45/426 (10.6%), respectively, of the total participants with secondary education, as described in **Table 1** and **Figure 1**.

With regard to the occupation, most of the participants were students followed by teachers constituting 403/940 (42.9%), and 198/940 (21%), respectively. For those with basic education, the majority were found among free work followed by military representing 30/52 (57.7%), and 22/52 (43.3%), in this order. For those with secondary education, most of them were found amongst students followed by teachers representing 203/462 (44%), and 106/462 (23%), in this order. For those with university education, most of them were students followed by teachers representing 252/426 (59%), and 92/426 (21.6%), in this order, as described in **Table 1** and **Figure 1**.

With regard to gender, females were found with greater number in basic education, secondary education and university representing 30/52 (57.7%), 299/462 (64.7%) and 318/426 (74.6%) respectively, as described in **Table 1** and **Figure 1**.

About 128/940 (13.6%) of the participants were found to be diabetic, of whom 57/293 (19.5%) were males and 71/647 (11%) were females. Moreover, around 87/940 (9.3%) of the participants were found hypertensive, of whom 58/293 (20%) were males and 29/647 (4.5%) were females, as indicated in **Table 2** and **Figure 2**.

Table 3 summarizes the distribution of the study population by the main CKD risk factors according to participants' opinion. About 586/940 (62.3%) of the participants were found to believe that DM is one of the main risk factors for CKD, of whom 217/293 (74%) were males and 369/647 (57%) were females.

Table 2. Distribution of the study population by DM and HTN status.

Variable	Category	Males	Females	Total
DM	Yes	57	71	128
	No	236	576	812
	Total	293	647	940
HTN	Yes	58	29	87
	No	235	618	853
	Total	293	647	940

Table 3. Distribution of the study population by main CKD risk factors according to participants' opinion.

Variable	Category	Males	Females	Total
DM	Yes	217	369	586
	No	76	278	354
	Total	293	647	940
HTN	Yes	233	334	567
	No	60	313	373
Hereditary (genes)	Yes	106	285	391
	No	187	362	549
Obesity	Yes	266	578	844
	No	27	69	96
CVD	Yes	86	253	339
	No	207	394	601
NSAID Analgesic	Yes	230	540	770
	No	63	107	170
Family history	Yes	186	103	289
	No	107	544	651

Approximately 567/940 (60%) of the participants believed that HTN is one of the main risk factors for CKD, of whom 233/293 (79.5%) were males and 334/647 (51.6%) were females. About 391/940 (41.6%) of the participants believed that hereditary factor is one of the main risk factors for CKD, of whom 106/293 (36%) were males and 285/647 (44%) were females. About 844/940

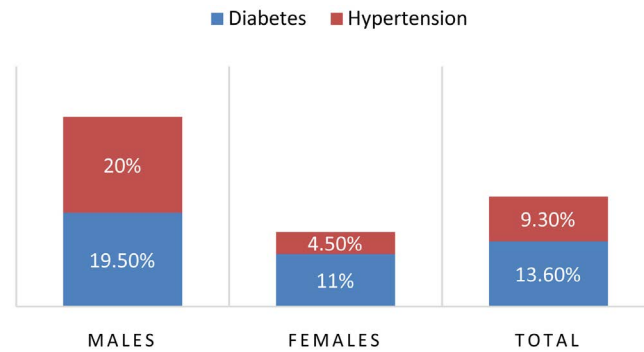


Figure 2. Description of the study population by DM and HTN.

(90%) of the participants believed that obesity is one of the main risk factors for CKD, of whom 266/293 (91%) were males and 578/647 (89%) were females. About 339/940 (36%) of the participants believed that CVD is one of the main risk factors for CKD, of whom 86/293 (29.4%) were males and 253/647 (39%) were females. About 770/940 (82%) of the participants believed that NSAID analgesic is one of the main risk factors for CKD, of whom 230/293 (78.5%) were males and 540/647 (83.6%) were females. About 289/940 (30.7%) of the participants believed that family history of renal failure is one of the main risk factors for CKD, of whom 186/293 (63.5%) were males and 103/647 (16%) were females, as shown in **Figure 3**.

Table 4 summarizes the distribution of the study population by the secondary CKD risk factors according to participants' opinion. About 908/940 (97%) of the participants were found to believe that nutritional factor is one of the main risk factors for CKD, of whom 279/293 (95%) were males and 629/647 (97%) were females. About 527/940 (56%) of the participants believed that salt is one of the main risk factors for CKD, of whom 231/293 (79%) were males and 296/647 (46%) were females. About 404/940 (43%) of the participants believed that meat is one of the main risk factors for CKD, of whom 123/293 (42%) were males and 281/647 (43%) were females. About 767/940 (82%) of the participants believed that tobacco smoking is one of the main risk factors for CKD, of whom 208/293 (71%) were males and 559/647 (86%) were females. About 678/940 (72%) of the participants believed that alcohol is one of the main risk factors for CKD, of whom 137/293 (47%) were males and 541/647 (84%) were females, as shown in **Figure 4**.

4. Discussion

Increased identifying of individuals with undetected CKD or CKD at early stages or those at risk of developing CKD might be more frequent among populations with high levels of awareness towards kidney related diseases. Thus the present study was aiming at exploring Saudi population awareness towards CKD risk factors.

The present study surveyed a population with diverse demographical characteristics, though the number of females was more than males. However, about

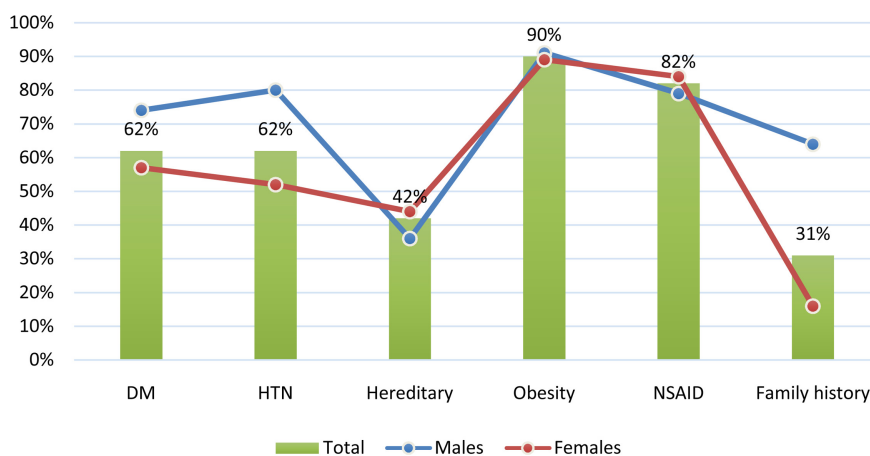


Figure 3. Description of participants, who believed that these are the main risk factors for CKD.

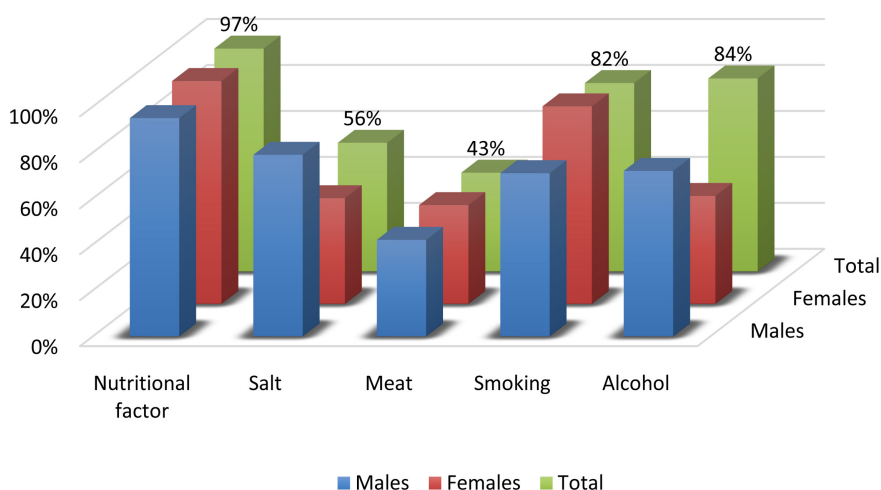


Figure 4. Description of participants, who believed that these are co-risk factors for CKD.

13.6% of the participants were found to be diabetic, of whom 19.5% were males and 11% were females. It was previously reported in a large survey from the northern Saudi, the prevalence of DM was 27% [9]. Consequently, such prevalence is expected in randomized samples. Moreover, it was reported that the prevalence of DM in general Saudi population was 30%. The prevalence of DM was 34.1% in males and 27.6% in females ($p < 0.0001$) [10].

In the current study, around 9.3% of the participants were found hypertensive, of whom 20% were males and 4.5% were females. In a comprehensive survey (included 5000 persons) from northern Saudi, the overall prevalence of hypertension was 30.2%. The prevalence of male was 30.8% and female was 29.6%. The risk of hypertension increases with the increase of age, as well as, with increasing of body mass index (BMI) and this was found to be statistically significant $p < 0.0001$ [11].

In the present study about 62.3% of the participants believed that DM is one of the main risk factors for CKD, of whom 74% were males and 57% were

Table 4. Distribution of the study population by secondary CKD risk factors according to participants' opinion.

Variable	Category	Males	Females	Total
Nutritional factor	Yes	279	629	908
	No	14	18	32
	Total	293	647	940
Salt	Yes	231	296	527
	No	62	351	413
Meat	Yes	123	281	404
	No	170	366	536
Smoking	Yes	208	559	767
	No	58	88	173
Alcohol	Yes	137	541	678
	No	156	106	262

females. With absence of such data from Saudi Arabia, these findings may indicate a relatively higher awareness level toward DM as a risk factor for CKD, particularly among males. This is similarly the situation for hypertension, approximately 60% of the participants believed that HTN is one of the main risk factors for CKD, of whom 79.5% were males and 51.6% were females.

In the present study about 41.6% of the participants believed that hereditary factor is one of the main risk factors for CKD, of whom 36% were males and 44% were females. According to our personal contact, in the Saudi community, many people think that renal diseases, particularly those associated with kidney failure are hereditary.

On the other hand, about 90% of the participants believed that obesity is one of the main risk factors for CKD, of whom 91% were males and 89% were females. A study from Saudi Arabia has reported that the overall prevalence of obesity was 63.6% and the prevalence of males was 56.2% and the prevalence of females was 71% [12]. The increased consumption of fast foods and sugar dense beverages (e.g., sodas) as well as the extensive use of cars, elevators, escalators, and remotes in recent years has dramatically increased the burden of obesity in KSA. Thus the increased prevalence rate of obesity in the present study indicates the magnitude of the problem in relation to daily life-style. According to Forbes, Saudi Arabia ranks 29 on a 2007 list of the fattest countries with a percentage of 63.5% of its citizens being overweight (BMI > 25) [13].

Furthermore, about 36% of the participants in this study believed that cardiovascular disease (CVD) is one of the main risk factors for CKD, of whom 29.4% were males and 39% were females. In a recent study from Saudi Arabia to assess

the level of risk for CVD among young Saudi women, only 15% of the sample were free of risk factors, the majority had either one (57.5%) or two (20.8%) risk factors. Additionally, 6.7% were considered to be at high-risk with three or more risk factors. The most common risk factors were physical inactivity (74%) and overweight/obesity (25%/29%) [14].

About 82% of the participants in the present study believed that nonsteroidal anti-inflammatory (NSAID) analgesic is one of the main risk factors for CKD, of whom 78.5% were males and 83.6% were females. Although, this is very high percentage of awareness, but there is an extensive use of NSAID among Saudi population. The top utilized medication class in Saudi Arabia was analgesics specifically diclofenac with different brands from local and international companies. This class represents 67% of the top used drugs in Saudi Arabia [15].

Moreover, in the present study, the levels of awareness toward some secondary risk factors such salt, meat, smoking and alcohol consumption were variable since these factors are known to contribute to several chronic diseases.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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