Original Research Article

Epidemiology of Chronic kidney disease of patients aged 20 years and above attending at King Fahad Specialist Hospital, Buraidah city, Qassim province, Saudi Arabia.

Abstract:

Background: Literature suggested that kidney related problems could be due to multi factorial origin from irrational use of more analgesics, long term complications of many non-communicable common diseases like hypertension and Diabetes and we noticed people at early age landed with kidney problems. The objectives of the study are to determine the demographic factors, prevalence of risk factors association with renal failure patients.

Methodology: This was a cross sectional study conducted among the patients visiting to inpatient and outpatient department of Nephrology unit at King Fahad Specialist Hospital and Buraidah central hospital during the period from the September 2021 to December 2022. During the one-year period from September 2021 to November 2022 distributed the questionnaire to 200 patients. Data entered in statistical package for social sciences (SPSS) and descriptive and inferential statistics like regression analysis was performed.

Results: In the present study, the mean age and standard deviation was 53.16 ± 13.29 and 53.6% were males. About 18.6% smoking, 32.9% not practising salt restriction, 39.3% were using non-steroidal anti-inflammatory drugs (NSAID), 52.9% were diabetes mellitus, 81.4% were hypertensives and 25.7% were having cardio vascular disease (CVD). Duration of renal failure was significantly associated with urinary tract infection, smoking and duration of CVD ($P<0.05$).

Conclusions: Based on the study findings, there is increase prevalence of NSAID use, dyslipidaemia, smoking and uncontrolled status of common co-morbidities. There is a need of community awareness is required and also focus more on existing awareness programs in the population.

Key words: Risk factors of renal failure, Smoking, Dialysis status, Duration of renal failure, Co-morbidities, Saudi Arabia.

Introduction:

Renal failure (RF) is the term used to depict a medical condition in which kidneys fail to perform their function of removing wastes from the body. Kidneys are specialized organs that perform multiple functions including filtration of blood to remove nitrogenous and metabolic wastes, regulation of blood volume and electrolyte composition, excretion of exogenous molecules from blood, assistance in low molecular weight protein metabolism and hormone production e.g. erythropoietin. Due to structural or functional damage, nephrons in kidney are unable to do some or all of these functions leading to an indication of renal failure [1,2].

Chronic renal failure (CRF) is permanent and continuous distortion in kidney function which is often irreversible. CRF can ultimately progress into end stage renal disease (ESRD) which requires renal replacement therapy either through dialysis or kidney transplant. CRF is also termed as chronic kidney disease (CKD) and it is further divided into five sub-types known as “grades” or “stages” depending upon the severity of disease measured through

glomerular fitration rate (GFR) [3]. Glomerular filtration rate can be measured through e GFR calculator through app. Based on calculation, then divided into different grades of chronic kidney disease. Factors used for the calculation of e GFR are creatinine value, age, gender and weight of the study participant.

Over the last two decades there is a steep increase in the kidney related problems globally, including in Saudi Arabia. This can be attributed to non-communicable diseases are increasing worldwide, this increase could be due to many factors' involvement. Some of the reasons could be non-aware, irrational use of analgesics, chronic co morbidities like Diabetes, Hypertension and some infections altogether leads to Renal failure [4]. Number of end stage renal disease population in the year 1986 was 139 per million people approximately, there after there is a tremendous increase of people who are depending on haemodialysis therapy in Saudi Arabia and closely to 10-15 fold increase was observed and estimated annual increase mentioned as 8.6% [5,6].

In many studies revealed that some of the possible causes to get the chronic kidney diseases as there are various risk factors like Diabetes and its long duration of the disease, hypertension, obesity, cardiac failure including ischaemic heart disease, smoking, excessive analgesics use, poor dietary habits, excessive fatty and non-vegetarian diets, some non-modifiable risk factors like, age, race, gender and family history were identified as predisposing factors for chronic kidney diseases.

Of all the risk factors, diabetes and hypertension were identified as a leading primary cause of kidney diseases in the Gulf cooperation council (GCC) countries [7-9].

Renal failure is a global problem that may cause significant health burden on the society as a universal prevalence of 13.4% observed in the review study conducted in India and also mentioned as the global estimates as the mortality rate associated with CKD is 1.2 million people per year [10].

A study was conducted in Hail region of Northern Saudi Arabia, revealed as 75% prevalence rate of renal failure associated common risk factors including smoking, prolonged use of NSAIDs, herbal preparations and previous history of cardiovascular diseases [11].

A retrospective study carried out in Tabuk region of Saudi Arabia estimated the prevalence of ESRD in studied population to be 460 per million population. This study also identified age, gender, rural living and obesity as markers of the condition along with indication of hypertension, glomerulonephritis, nephropathy, obstructive uropathy and Bilharziasis as underlying causes of the disease [12].

Another study conducted in Jeddah, Saudi Arabia reported CKD to be prevalent medical condition, in their study observed sample with diabetes mellitus, obesity and hypertension being most common risk factors [13]. A study in Rabigh city of Saudi Arabia noted that the studied population had limited awareness while prevalence of risk factors including family history of kidney disorders, diabetes mellitus, hypertension and proteinuria was high in the sample of population [14].

In view of the above circumstances, the present study was conducted at King Fahad Specialist Hospital and Buraidah central hospital to identify the risk factors and its association with chronic kidney disease. Based on the results, in our regular primary health care practice some preventive strategies to be implemented to reduce the burden on chronic kidney disease.

Objectives:

1. To determine the demographic factors among study population.

2. To find the prevalence of risk factors among the renal failure patients and some risk factors association with the chronic kidney disease patients in Buraidah city.

Methodology:

Target Population and Study Setting:

Patients attending at outpatient and inpatient department of Nephrology unit at King Fahad Specialist Hospital and Buraidah central hospital among the 20 years and above age group were included among both the gender.

Study Design: A cross sectional study was conducted among the chronic kidney patients.

Questionnaire and Data Collection tool:

Interview based questionnaire was designed with the faculty experienced in the Research department (2) and also opinions and discussions were taken from the Nephrology faculty (2) who are working at King Fahad Specialist Hospital and also in Buraidah central hospital. Once questionnaire is prepared in the English version, then translated into Arabic version. Back translation also done from Arabic to English.

Once it is prepared, then we have conducted the pilot study done on 15 participants for the feasibility of the study and necessary corrections in the questionnaire. Questionnaire was designed based on the objectives. It consists of demographic characteristics were included in the first part and specific risk factors questions were included in the 2nd part of the questionnaire. First part of the questionnaire is age, gender, nationality, occupation, education, marital status and family income. Second part of the questionnaire included as some risk factors like smoking, NSAID, lifestyle modifications, some of the non-communicable diseases like hypertension, diabetes, cardiovascular diseases and duration of each disease were included.

Sampling:

Sample size was considered based on the study duration of one year from September 2021 to November 2022. We were able to collect the information from 200 patients. Of which, 140 patients responded to our interview-based questionnaire. All the people attending at outpatient and inpatient department of Nephrology unit at selected hospitals in the study. All the patients visiting at Nephrology unit were considered for the inclusion of the study like a census enumeration.

Inclusion Criteria: Patients aged above 20 years and interest to participate in the study.

Exclusion Criteria: Patients with comatose and unconscious patients were excluded. Non cooperative and patients with major psychiatric illness also excluded.

Ethical Considerations:

After obtaining the Qassim regional ethical committee approval (approval number 1443-680607), study was conducted. Informed consent was taken from the each and every patient before initiation of the study. Privacy and confidentiality of the information of participant was protected and individual information will not be revealed to any agency. Before starting the data collection from Nephrology unit, concerned Hospital director permission was taken.

Statistical Analysis:

Data was entered in Statistical package for Social Sciences (SPSS 21.0 version). Percentages and means were calculated for the descriptive variables. For the risk prediction linear regression analysis was performed with duration of renal failure with demographic factors, some risk factors of the disease and co-morbidities of the diseases. Significance of the test was considered, where p value was less than or equal to 0.05.

Results: In the present study, about 140 chronic kidney patients participated and interviewed approximately 200 patients from King Fahad Specialist hospital and Buraidah Central hospital. The response rate in the study population was 70% and some of them in critical health problems and not responded to our questionnaire. About 140 participants were interviewed over the period of three months from October 2022 to December 2022. The mean age and standard deviation in the study population was 53.16 ± 13.29. Nearly seven out of 10th person of the study population (70%) were in the age group of more than 45 years of age.

Table: 1 - Demographic characteristics of the study population.

Nationality	**Number of participants**	**Percentage**
Saudi	114	81.4
Non-Saudi	26	18.6
Age ± SD	53.16 ± 13.29	
Age Category: 18-30 yrs	6	4.3
31-45 yrs	36	25.7
46-60 yrs	57	40.7
> 60 yrs	41	29.3
Male	75	53.6
Female	65	46.4
Govt employee	12	8.6
Private employee	21	15.0
Housewives	54	38.6
Unemployed	53	37.9

Illiterate	36	25.7
School	63	45.0
Diploma	13	9.3
Bachelor	28	20.0
< 5000 SR/month	81	57.9
5000-10000 SR	34	24.3
>10000 SR	25	17.9
Marital status: Yes	104	74.3
No	36	25.7
Total	140	100

Table 1 depicted that in the study population about 81.4% were Saudi nationals and mean age and standard deviation of the study population was 53.16 ± 13.29. Majority of the study participants between 46-60 years age group about 40.7%. 53.6% were males and 74.3% were married people in the study group.

Table: 2 - Prevalence of risk factors status among chronic kidney disease (CKD) patients in the study population.

Risk factors status	**Chronic kidney disease Number**	**Prevalence**
Family history present	38	27.1
Family history absent	102	72.9
Smoking Present	26	18.6
Smoking absent	114	81.4
Duration of smoking ± SD	3.73 ± 9.48	
Salt restriction: Yes	94	67.1
Salt restriction: No	46	32.9
NSAID: Taken	55	39.3
NSAID: No	85	60.7
Duration of NSAID ± SD	1.74 ± 4.02	
Dyslipidaemia present	55	39.3
Dyslipidaemia absent	85	60.7
Duration of dyslipidaemia ± SD	3.77 ± 6.70	

CGN: Yes	18	12.9
CGN: No	122	87.1
Duration of CGN ± SD	0.70 ± 2.86	
Diabetes present	74	52.9
Diabetes absent	66	47.1
Duration of Diabetes ± SD	7.5 ± 9.71	
Hypertension present	114	81.4
Hypertension absent	26	18.6
Duration of HTN ± SD	9.07 ± 8.58	
CVD: present	36	25.7
CVD: No	104	74.3
Duration of CVD ± SD	1.84 ± 4.42	
Duration of renal failure	3.82 ± 4.15	

Table 2 stated that the 27.1% were having family history of kidney disease. In the present study, about 18.6% smoking, one third of the people (32.9%) not practising salt restriction and 39.3% were using non-steroidal anti-inflammatory drugs (NSAID). In relation to disease co-morbidity, about 12.9% were having chronic glomerulo nephritis, 52.9% were diabetes mellitus, 81.4% of the participants having hypertension and 25.7% were having cardio vascular disease among the chronic disease patients.

Table: 3 – Linear regression analysis of demographic variables associations with duration of renal failure patients.

Variables	**Categories**	**AOR & Confidence interval**	**P value**
Age		0.007 & (-0.048 to 0.062)	0.805
Gender	Male (Ref.Category) Female	0.060 & (-1.380to 1.499)	0.935
Marital status	Married (Ref.Category) Single	0.995 & (-0.727to2.717)	0.255
Income/month	< 5000 (Ref.Category) 5001-10000 SR >10000 SR	-0.534 & -1.476 to 0.409	0.265

Ref.- Reference

Table 3 depicted that the demographic factors of age, gender, marital status and monthly income factors were not significantly associated with duration of renal failure patients in the study population (P>0.05).

Table: 4 - Specific kidney related factors linear regression analysis with duration of renal failure patients.

Variables	Categories	AOR & Confidence interval	P value
Urinary tract infection	Yes (Ref.cat) No	1.887 & (0.459 to 3.314)	0.010
Kidney anomalies	Yes (Ref.cat) No	0527 & (-1.876 to 2.929)	0.665
Chronic glomerulo nephritis	Yes (Ref.cat) No	-0.550 & (-2.639 to 1.539)	0.604
Tumours	Yes (Ref.cat) No	1.036 & (-4.775 to 6.846	0.725

Of all the specific kidney risk factors mentioned above in the table, urinary tract infection was statistically significant association was observed with duration of renal failure (P = 0.010) (Table – 4).

Table: 5 - Some variables of co-morbidity conditions predictions with renal failure patients in the study population.

Variables	Categories	AOR & Confidence interval	P value
Diabetes	Yes (Ref.cat) No	1.191 & (-0.273 to 2.655)	0.110
Hypertension	Yes (Ref.cat) No	-0.110 & (-2.006 to 1.785)	0.909
CVD	Yes (Ref.cat) No	0.354 & (-1.328 to 2.036)	0.678
Dyslipidaemia	Yes (Ref.cat) No	-0.519 (-2.040 to 1.002)	0.501

Table 5 shown that in relation to co-morbidities of certain diseases such as diabetes, hypertension, cardiovascular diseases and dyslipidaemia were not associated with duration of renal failure patients (P>0.05).

Table: 6- Linear regression analysis of certain risk factors variables predictions with duration of renal failure.

Variables	AOR	Confidence interval	P value
Duration of NSAID	0.003	-0.015 to 0.022	0.730
Duration of smoking	-0.010	-0.017 to -0.004	0.002
Duration of lipidaemia	0.009	-0.003 to 0.021	0.135
Duration of Diabetes	-0.001	0.009 to 0.006	0.729
Duration of HTN	0.003	-0.006 to 0.011	0.527
Duration of CVD	-0.018	-0.034 to -0.002	0.028
Duration of CGN	-0.010	-0.033 to 0.013	0.402
Duration of Dialysis	1.000	0.985 to 1.015	0.001

Table 6 depicted that in the study population of some duration of risk factors according to the linear regression analysis, there is significant association was observed with duration of renal failure with duration of smoking (P - 0.002), duration of cardiovascular disease (P - 0.028) and duration of dialysis (P - 0.001).

Discussion:

The present hospital based cross sectional study was conducted during the period from October 2022 to December 2022 with an objective to find the prevalence of risk factors among the chronic kidney disease (CKD) patients attending at major hospitals of Qassim province. In the current study mean age and standard deviation of the CKD patients was 53.16 ± 13.29. An article published in the year 2014 at Tabuk city, almost close observation of mean age and standard deviation was observed in their study as 48 ± 17 years [12]. Another study conducted in India by Rajapurkar MM, John GT et al in different zones from north, south, east and west zones included more than 50,000 participants, study mentioned as that the mean age and standard deviation was 50.1 ± 14.6 years [15].

In our study, CKD patients of males' contribution about 53.6%. There is some difference of occurrence of CKD in relation to the gender could be due to ethnic and other lifestyle factors and diseases distribution geographically. One of the assumptions as males are relatively bit tense in managing their family needs including financial issues and also other societal responsibilities. A similar finding was observed in a study conducted in United States of America (USA) mentioned as male contribution in CKD patients was 56% [16]. Close to our finding of male gender among the CKD patients in Saudi Arabia was 54.5% [17] and same male gender in the United Kingdom study was 60% [18].

In the present study prevalence of smoking among the CKD patients was 18.6%. Almost near to our study finding was observed in a study conducted in Singapore mentioned as current smoking status among the chronic kidney patients was 15.1% and also former smoking among the study population was 5.8% was observed in the year 2006 and current

smoking status may be increased further by this time and also increased smoking as global tendencies in the populations [19]. Another study conducted in Palestine and stated that the high prevalence of smoking, closely one third of the patients were smokers (31.85%) and also revealed as a smoking as an independent risk factor for the development of chronic kidney disease [20].

In our current study, another important risk factor of diabetes mellitus among the current study CKD patients was 52.9%. In our local context of Saudi Arabia, a study conducted in Riyadh revealed as a prevalence of diabetes among the stage 2-5 CKD patients, the prevalence of diabetes was 46.3%. As such diabetes prevalence is globally increasing and there is no exception even among the CKD patients. On the contrary little more prevalence was observed among the CKD patients globally due to its longevity, high age and other co-morbidities with CKD [21].

In the present study, hypertension prevalence among the CKD patients was 81.4%. In hypertension prevalence among the general population of Hail revealed as 19% and may predict more prevalence of hypertension among the CKD patients in case of hospital settings [11]. One study conducted in United States of America (USA) in the year 2017-18, mentioned as the prevalence of hypertension among the general population about half of the people (49.64%) were hypertensives. Among them, 16% were CKD patients and also highlighted about the controlled status of hypertension was only two thirds (40%) [22]. On the whole prevalence of hypertension varies from age, ethnicity and geographical areas and also spectrum of the disease varies among the CKD patients.

In our study, linear logistic regression analysis was done with demographic factors like age, gender, marital status and income were not significantly associated with duration of renal failure (P>0.05). A study conducted in Egypt by Kamal NN, Kamel EG et al stated that in the logistic regression analysis of sociodemographic factors like age, gender and income were significantly associated with the chronic kidney disease (P<0.05) [23].

In the current study, urinary tract infection was significantly associated with duration of renal failure (AOR:1.887 & (CI: 0.459 to 3.314). A similar observation as urinary tract infection is significantly associated with the chronic kidney disease and also stated that one of the triggers for the CKD and can be controlled [24]. In the present study, in addition to UTI and other factors like duration of smoking, duration of cardiovascular diseases and duration of dialysis also identified as predictors and significantly associated with the duration of renal failure (P<0.05). A study concluded as cardiovascular events already present among the chronic kidney patients tend to have more mortality and shown significant association was observed with duration of renal failure [25]. Another multi centric study published in American journal of kidney diseases also highlighted about the time of initiation of dialysis and duration of dialysis significantly associated with the outcome of renal failure [26].

Some limitations observed in our study as some of the patients (20) refused to participate due to their extreme old age, less educated people and less aware about research benefits to the community.

Conclusions:

Based on the study results, high prevalence of modifiable risk factors like non-steroidal anti-inflammatory drugs (NSAID) usage and dyslipidaemia status was observed in almost two fifth of (39.3%) CKD study population. Another important non modifiable risk

factors like hypertension prevalence as four out of five (81.4%) among CKD patients and more than half of diabetes (52.9%) prevalence was observed among the CKD patients. Duration of renal failure was significantly associated with urinary tract infection, smoking and duration of cardio vascular diseases ($P<0.05$).

There is a need to create awareness about the population in relation to primary prevention strategies for the reduction of modifiable risk factors like NSAID use, smoking and lipids management. Secondary prevention modalities will be implemented to control the disease, certain non-modifiable risk factors like diabetes, hypertension and cardiovascular diseases control status among the CKD patients.

Recommendations:

Based on the findings, need to create the risk factors awareness among the general population and also to educate the CKD patients about their co-morbid conditions control to lead a good quality of life.

Ethical approval for study protocol /Study design /Methodology: The study was approved by the Qassim Regional Research Ethics Committee at concordance with National Committee of Bio & Medical Ethics (NCBE), Kingdom of Saudi Arabia (ethical approval number: 1443-680607).

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