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Associated risk factors of end stage renal failure among patients attending kidney dialysis centre in Erbil city - A case control study

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Abstract

Background: End stage renal failure is irreversible impaired in kidney function, at the level were kidneys unable to sustain life, it is a common health problem in Iraq and it is rapidly increasing among the people. This study aimed to highlight common risk factors associated with end stage renal failure for a group of patients in Erbil City

Methods: a case control study was used between periods from April 2016-June2017 according to the criteria of this study 101 patients with end stage renal failure at dialysis centre in Erbil and 90 patients free from renal disease as a control study at medical and surgical wards in both Rizgary and Hawler teaching hospitals, a questionnaire developed according to the aim of study and depending on related reviewed literature, then, the study participants responds obtained through direct structured interview

Result: The nearly matched criteria between two groups were age and gender, the majority of the of both groups were at middle age, married and regarding economic status less than half of the case group were at sufficient status, concerning life style the result revealed that in most of life style and hobbies they were same, regarding drinking plenty water and eating salty food the result detect that case group has not had plenty amount of water and eating salty food, the result showed that the majority of case group had history of hypertension. The finding of the study revealed there were very high significant association between end stage renal failure and economic status, smoking, past urinary tract disorders and eating salty food and high association with hypertension

Conclusion: This study concluded that multiple logistic regression of risk factors for end stage renal failure which revealed risk associated were with higher odds ratio are residential area O.R=4.433 not drinking plenty amount of water O.R=3,327 times while lower odds ratio in economic status O.R=0.243, hypertension O.R=0.191, eating salty food O.R=0.150 smoking, O.R=0.085 and past urinary tract O.R=0.030.

Introduction

Renal failure results when the kidneys decline their function to excrete body's metabolic wastes, the substances normally accumulate in the body fluids as a result of impaired renal excretion [1]. Chronic kidney disease (CKD) or chronic renal failure (CRF) as it was historically termed, is a term that encompasses all degree of decreased renal function, from damaged-at risk through mild, moderate, and severe chronic kidney failure [2].

Chronic kidney disease recognized as a significant global population health problem, it is estimated that by 2030, 70% of patients with end stage renal disease (stage 5 CKD), will be in developing countries such growing demand will overtake the financial capabilities of health care systems [3].

End stage renal failure has many causes that varies among people, the main risk factors for chronic kidney disease are increasing age, diabetes mellitus type II and hypertension, urinary tract disorders as glomerulonephritis, polycystic kidney, renal stone, and enlargement of prostate, medication like analgesic for long duration and atherosclerosis [4].

Population based epidemiological studies in several countries have found high chronic kidney diseases prevalence in its different stages estimated at 10% to 16% of adult population [5]. Prevalence of chronic renal failure (stage3-5CKD) in the adult population is 1.4%-6.3% the principal reported causes of CKD worldwide and diabetes mellitus (30-40%) and hypertension (35-30%) as associated primarily with behavioural risk factors and aging [6].

Aim of the study

Generally, this study aimed to identify more common risk factors those associated with end stage renal failure among sample of patients who attending kidney dialysis centre in Erbil city

Objectives

1. Identify the factors those which considers as risk factors of end stage renal failure (e.g. some patients habit and life style before their disease diagnosis, presence of history of diseases those contributed in developing end stage renal failure).

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2. Find out the association between the mentioned risk factors with end stage renal failure through comparison with a sample of patients without end stage renal failure as a control group.

Methods and patients

Design, setting and time of the study

This case- control study was carried out at kidney dialysis centre in Erbil city and medical –surgical Hospital in both Rizgary teaching Hospital and Hawler Teaching Hospital between periods from April 2016 – June 2017.

Sample of the study

A convenience sample of 101 patients with end stage renal failure selected as a case group and according to the matching criteria of the study during the period of study the researcher selected 90 patients without renal failure as a control group they were selected from medical and surgical wards in both Rizgary and Hawler teaching hospitals.

Eligibility criteria

Matching criteria

Age

Gender

Inclusion criteria

For case group

All adult patients with end stage renal failure

Both gender

For control group

Adult patients without end stage renal failure

Their age and gender matching with the patients' age and gender in case group as a criterion of the study

Patients' who willing to participate in the present study

Exclusion criteria

Too tired patients

New diagnosed patients with renal failure because of their psychological status they refused to participate in the present study

Patients their age less than 18 years old

Patients who refused to participate in this study

Tool and method of data collection

A direct interview was conducted with patients, using a questionnaire designed by the researcher according to the study's aim which contained the following parts: part one includes items regarding sociodemographic characteristics, part two was about habit and hobbies, part three include diet pattern and part four is content family history and past medical and surgical history. the aim of preparing these questions was to explore the factors those may be contributed to the onset of the end stage renal failure for this reason the researcher considered the patients' perspective and responding about their habit, diet and the presence of medical history.

Ethical consideration

Research protocol was reviewed and approved by the ethical committee of college of nursing /Hawler medical university and before patients' interview each patient informed about the aim of the study and the confidentiality of their data was ensured by the researcher also their rights to refuse or participate in the present study was confirmed and then oral informed consent obtained for interview.

Result

The present study is a case-control design for determining the associated risk factors of end stage renal failure. The nearly matched criteria between the two groups were age and gender. Table 1 shows the sociodemographic characteristics of both case and control groups. regarding marital status the highest percentage of both case and control groups (78.2% and 80%) respectively there were married, about 73.3% of case group and 75.65% of control group there from Erbil governorate and the majority of case (66.3%) were from urban area while more than half (57.8%) of control group were from suburban area concerning economic status less than half (41.6%) of case group they revealed that they are at insufficient status, while, near of half (47.8%) of control group there economic status was sufficient regarding occupation 44% of case group were house wives while 27% of control group were governmental employments.

In Table 2 The result shows that the highest percentages (81.2% and 84.4%) of both case and control groups revealed that they had ate three regular meals per day respectively. Concerning drinking water more than half (55%) of case drunk less than 2 litters of water per day while

Table 1. Description of sociodemographic characteristics of (case and control) groups

Sociodemographic characteristics	Groups	
	Case F (%)	Control F (%)
Age group (years)		
18-33	14 (13.9)	15 (16.7)
34- 49	14 (13.9)	12 (13.3)
50-65	48 (47.5)	47 (52.2)
66-81	25 (24.8)	16 (17.8)
Gender		
Female	54 (53.5)	39 (43.3)
Male	47 (46.5)	51 (56.7)
Marital status		
Single	10 (9.9)	8 (8.9)
Married	79 (78.2)	80 (80.9)
Widowed/widower	12 (11.9)	2 (2.2)
Residential area		
Urban	67 (66.3)	32 (35.6)
Sub-urban	25 (24.8)	52 (57.8)
Rural	9 (8.9)	6 (6.7)
Economic status		
Sufficient	20 (19.8)	43 (47.8)
Barely sufficient	39 (38.6)	11 (12.2)
Insufficient	42 (41.6)	29 (32.2)
Level of education		
Illiterate	52 (51.5)	29 (32.2)
Primary school graduate	27 (26.7)	25 (27.8)
Secondary school graduate	8 (7.9)	8 (8.9)
High school graduate	4 (4)	6 (6.7)
Institute graduate	2 (2)	8 (8.9)
College or post graduate	8 (7.9)	14 (15.6)
Occupation		
Governmental employment	4 (4)	12 (13.3)
Housewife	44 (43.6)	25 (27.8)
Self-employment	16 (15.8)	14 (15.6)
Retired	10 (9.9)	14 (15.6)
Jobless	24 (23.7)	22 (24.4)
Student	3 (3)	3 (3.3)

Table 2. Description of diet pattern of control group with diet pattern of case group before their current disease

Diet pattern	Groups	
	case F (%)	Control F (%)
Eating three regular meals during a day		
Yes	82 (81.2)	76 (84.4)
No	19 (18.8)	14 (15.6)
Amount of water by litter/ day		
Less than 2 litters	55 (54.5)	31 (34.5)
2-3 litters	37 (36.6)	46 (51.1)
More than 3 litters	10 (9.9)	13 (14.4)
Desired to eat red meat		
Yes	66 (65.3)	66 (73.3)
No	35 (34.7)	24 (26.7)
Times per week		
N/A	35 (34.7)	24 (26.7)
1-5	54 (53.5)	63 (70)
5-10	12 (11.9)	3 (3.3)
Eating salty food		
Yes	51 (50.5)	20 (22.2)
No	50 (49.5)	70 (77.8)
Eating canned food		
Yes	16 (15.8)	13 (14.4)
No	85 (84.2)	77 (85.6)
Times per week		
N/A	85 (84.2)	77 (85.6)
1-5	13 (12.9)	12 (13.3)
6-10	3 (3)	1 (1.1)

more than half (51.1%) of control group drunk 2-3 litters of water per day. The majority of both a case 65.3% and control group 73.3% desired eating red meat and 53.5% and 70% of both case and control groups eating red meat 1-5 times per week, half (50.5%) of case group desired salty food while the majority (77.8%) of control group not desire eating salty food.

Table 3 Is regarding habits and hobbies only 29.7% and 11.1% of cases and control group there were smoker and 41.6% of case and 33.3% of control there were passive smokers and majority (94.1% and 77.8%) of both case and control group there were not drinking alcohol.

Table 4 The majority of case group (73.3%) had hypertension while more than half (58.9%) of control group had no hypertension, the majority of cases (60.4%) and highest percentage of control group (77.8%) ^$had no diabetes mellitus. Concerning history of urinary tract disorders 59% of the case group had history of urinary tract disorders include (21.8%,43.6%,18.81%,2% and 1%) of renal calculi, urinary tract infection, renal cyst, benign prostate hypertrophy and urethral stenosis, while only 22.2% of the control group had history of urinary tract disorders which include (20%, 15.6% and 1.1%) respectively and some of them had more than two urinary tract disorders such as renal calculi, urinary tract infection and renal cyst.

Table 5 represents the result of multiple logistic regression analyze which is reveals the variation and level of association between associated risk factors and occurrence end stage renal failure among a study sample, it shows that there were high significant association between residential area and end stage renal failure with higher logistic regression O.R 4.433, while there were very high significant association with economic status, history of smoking, past history with urinary tract disorders, eating salty food with O.R (0.243, 0.085, 0.030 and 0.150) respectively.

Discussion

The study assessed the common associated risk factors of chronic renal failure among patients attended kidney dialysis centre in Erbil city in parallel the researcher studied a group of patients free from renal failure as a control group with matching criteria of age and gender. according to the result of the present study near of half of the study sample their age was between 50-60 years old. Regarding gender more than half of case group and less than half of control group there were female which is nearly matching according to the criteria of the study

Based on the newest US Renal Data System (USRDS) yearly data report, the prevalence of chronic renal failure from 2007 to 2012 was higher among women (15.1%) than in men (12.1%) Women had a higher prevalence of high urinary albumin to creatinine ratio (9.6% versus 8.1% in men) and a higher prevalence of decreased GFR (7.6% versus 5.4% in men; decreased GFR is defined as eGFR <60 mL/min/1.73 m^2) [6].

Dorothea N *et al.* [7], in their study they compared with normal levels of estimated glomerular filtrations rate and urinary albumin creatinine ratio, the mortality risk associated with chronic kidney disease was slightly higher women than men, the risk for end stage

Table 3. Description of the habits and hobbies of case and control groups

Habits and hobbies	Groups	
	case F (%)	Control F (%)
Smoking		
Yes	30 (29.7)	10 (11.1)
No	71 (70.3))	80 (88.9)
Passive smoker		
Yes	42 (41.6)	30 (33.3)
No	59 (58.4)	60 (66.7)
Place of smoking at home		
N/A	59 (58.4)	60 (66.7)
Indoor	29 (28.7)	22 (24.4)
Outdoor	13 (12.9)	8 (8.9)
Alcohol drinking		
Yes	6 (5.9)	20 (22.2)
No	95 (94.1)	70 (77.8)

Table 4. Description of past medical history of both case and control

Past medical History	Groups	
	Case F (%)	Control F (%)
Hypertension		
Yes	74 (73.3)	37 (41.1)
No	27 (26.7)	53 (58.9)
Duration of hypertension(years)		
N/A	27 (26.7)	53 (58.9)
1-15	57 (56.4)	30 (33.3)
16-30	15 (14.9)	6 (6.7)
31-45	2 (2)	1 (1.1)
Diabetes mellitus		
Yes	40 (39.6)	20 (22.2)
No	61 (60.4)	70 (77.8)
Duration of diabetes mellitus(years)		
N/A	61 (60.4)	70 (77.8)
1-15	25 (24.8)	18 (20)
16-30	12 (11.9)	2 (2.2)
31-45	3 (3)	0 (0)
Urinary tract disorders		
Yes	60 (59.4)	20 (22,2)
No	41 (40.6)	70 (77.8)
Types of urinary tract diseases		
N/A	41 (40.6)	70 (77.8)
Renal calculus	22 (21.8)	18 (20)
Urinary tract infection	44 (43.6)	14 (15.6)
Renal cyst	19 (18.81)	1 (1.1)
Benign Prostate hypertrophy	2 (2)	0 (0)
Urethral stenosis	1 (1)	0 (0)

Table 5. Multiple logistic regression of associated risk factors of end stage renal failure

Risk factors	OR (C.I 95%)	P Value
Residential area	4.433 (1.689-11.633)	0.002 HS
Economic status	0.243 (0.111-0.536)	<0.001 VHS
Smoking	0.085 (0.020-0.365)	0.001 VHS
Hypertension	0.191 (0.066 – 0.551)	0.002 HS
Urinary tract disorders	0.030 (0.008 – 0.106)	<0.001VHS
Renal Cyst	0.026 (0.002- 0.378)	0.008 HS
Drinking non-adequate water	3.327 (0.657- 16.844)	0.146 S
Salty food	0.150 (0.048-0.473)	0.001 VHS

renal disease at a given estimated glomerular filtrations rate and urinary albumin-creatinine ration was equivalent between men and women

Yu M *et al.* [8], they conducted a study about clinical consequence of metabolic syndrome on chronic kidney disease be influenced by gender and menopausal period in Korea they revealed that the prevalence of chronic renal failure increases with aging specially after age of 50 years old in both male and female.

Furthermore, the other sociodemographic characteristics of the study sample the majority of them were married and they were resident in Erbil governorate, on economic status distribution less than half of case group stated that their economic status is insufficient while less than half of the control group their economic status were sufficient, and majority of the study sample were housewives

Because most of the wastes from food consumption can flittered by the kidneys so they may affect the renal function for this reason the diet pattern of persons may associated as a risk factors of renal failure, the result of the present study found that the highest percentage of the study participants stated that they had three regular meals per day. In concern of drinking water, depending on the responds of the renal failure patients to the question regarding the daily amount of water were they drunk before they diagnosed the result of present study revealed that more than half of the case group drunk less than 2 litters of water while about half of control group stated that they were drunk between 2-3 litters of water according to the result of the present study drinking non adequate amount of water had 3.327 times risk factors on kidney failure , majority of the study sample in both groups stated that they were liked to eat red meat and statistically there were no significant association between renal failure and eating meat may be this result related to the number of the sample and the method of measuring the amount of the meat that they ate the researcher believes this type of risk need further study .Regarding eating salty food half of the case group desired to eat salty food before their current disease while the majority of the control group not desired to eat salty food and the result of the study revealed that eating salty food had 0.150 times risk factors on kidney failure with high significant statistical relationship.

Epidemiological evidence also suggests that balance of water intake and output may have implications for development of CKD. Insufficient water intake, particularly in settings of arduous physical labour and high ambient temperature may be associated with chronic kidney disease CKD prevalence [9].

Peraza *et al.* [10] assumed that repeated blood volume lessening because of sweating and lack of drinking water may cause decrease kidney function with repeated insults eventually influencing to chronic kidney disease in men and women. Regarding smoking according to the result of the present study only 29.7% of case group were smoker and majority of them were passive smoker with indoor smoking by their family member while only 11.1% of control group were smoker and 33.3% of them were passive smoker and the result reported that smoking had 0.085 times risk factor with very high significant relationship with kidney failure and majority of study sample were not drinkers.

Rabi Yacoub *et al.* [11], they found an important statistically significant risk of CKD caused by smoking in hypertensive nephropathy and diabetic nephropathy patients and weak, statistically insignificant association between smoking and CKD caused by glomerulonephritis. In a follow-up of 10.3 years study about role of smoking in renal damage among Norwegian population [12] studied the deteriuos effect of smoking on renal function in detail they found that persons below age 70current smokers had 4.0 times and former-smokers had a 3.3 times higher risk of kidney failure when compared with never smokers respectively.

The majority of the patients with renal failure had history with hypertension while more than half of control group had hypertension with 0.191 times risk and high significant relationship with kidney failure and majority of them had history with diabetes mellitus and more than half cases had history with diabetes mellitus and there was no significant relationship found with kidney failure this may be there were no big different between the case and control group regarding the number of patients with diabetics the researcher thought that this issue need further study with large number of sample , in concern of history of urinary tract disorders the majority of the cases had history with different types of urinary tract disorders with 0.030 times risk factors and very high significant relationship with kidney failure, while the highest percentage of control group had no history with urinary tract disorders.

In a large screened cohort study of 17- years follow up study [13] they found that hypertension was an independent risk factor for development of end stage renal disease in Okinawa, Japan, the result of this study indicated that high – normal blood pressure and hypertension are independent risk factors for end stage renal disease ESRD as compared with an optimal blood pressure in both men and women.

In their study about chronic kidney disease and associated risk factors in Bajo Lempa region of EL-Salvador Carlos M *et al.* [6] they found an association between chronic renal failure with age, male gender, high blood pressure and family history of chronic renal disease

A study conducted by Lola N *et al.* [14] to investigate the predisposing factors to chronic renal failure in Negiria the found that the main factors that predisposed patients to chronic renal failure were hypertension, diabetes mellitus, cardiovascular diseases, obesity furthermore the result of this study revealed that the common social lifestyle that influenced the development of chronic renal failure were drinking alcohol, drugs abusers and cigarette smokers.

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