

Risk Factors of Chronic Renal Failure in Adult Patients at King Khalid Hospital, Najran City, Saudi Arabia

Mohammed Dhafer Yahya Alzamanan, Abdullah Salem Mohammed Al Rayshan, Abdullah Saleh Alyami

Najran University, Najran, Saudi Arabia

ABSTRACT

Background: chronic kidney disease (CKD) is defined as a reduced glomerular filtration rate, increased urinary albumin excretion, or both and it is an increasing public health issue with prevalence estimated to be 8–16% worldwide. **Objective:** the risk factors for CKD are increasing in the Saudi population. Hence, this descriptive study aimed to assess the files of the adult patients with chronic renal failure (CRF) at King Khalid Hospital, Najran City, Saudi Arabia. It also identified the relationship of these common risk factors such as hypertension, diabetes mellitus, polycystic kidney disease, certain infections, effects of nonsteroidal anti-inflammatory drugs (NSAIDs) with CRF. **Methods:** a structured-type interview was conducted with checklist with 50 samples from the patient's record using the non-probability sampling technique. Frequency and percentage distributions were used to describe the incidence and the common risk factors associated with CKD. **Results:** this study revealed that the most affected group of people with renal failure was from 41 to 50 years age group, which represented about 30% of all samples taken from King Khalid Hospital. Hypertensive patients occurred to be highest in 90% of patients with CRF, while the patients with polycystic kidney disease had low risk of renal failure with 20%. Diabetes mellitus was reported in about 70% of patients. Lifestyle, diet and genetic factors are important factors in developing this disease and they are greatly associated with chronic renal failure.

Keywords: risk factors; chronic kidney disease; renal failure; hypertension; diabetes mellitus; nonsteroidal anti-inflammatory drugs.

INTRODUCTION

Chronic kidney disease (CKD) is defined as a reduced glomerular filtration rate, increased urinary albumin excretion, or both, and it is an increasing public health issue with prevalence estimated to be 8–16% worldwide ⁽¹⁾. Chronic kidney disease refers to an irreversible deterioration in renal function, which classically develops over a period of years. Initially, it is manifested only as a biochemical abnormality. Eventually, loss of the excretory, metabolic and endocrine functions of the kidney leads to the clinical symptoms and signs of renal failure, which are referred to as uremia. When death is likely without renal replacement therapy, it is called end-stage renal disease/failure (ESRD or ESRF) ⁽²⁾.

Wide geographical variations in the incidence of disorders causing CKD exist. The most common cause of glomerulonephritis in sub-Saharan Africa is malaria. Schistosomiasis is a common cause of renal failure due to urinary tract obstruction in parts of the Middle East, including southern Iraq. The incidence of ESRF varies between racial groups. End-stage renal failure is three to four times as common in black Africans in the UK and USA as it is in whites and hypertensive nephropathy is a much more frequent cause of end-stage renal failure in this group. The prevalence of diabetes mellitus and hence of

diabetic nephropathy is higher in some Asian groups than in whites. The age is of relevance; CKD due to atherosclerotic renal vascular disease is much more common in the elderly than in the young. Over 70% of all cases with CKD are due to diabetes mellitus, hypertension and atherosclerosis ⁽³⁾. Locally, the risk factors for chronic kidney disease (CKD) are increasing in the Saudi population. Consequently, the incidence and prevalence of ESRD have increased substantially in Saudi Arabia over the past three decades. Many reports have shown evidence of increasing prevalence of the most common causes of ESRD in Saudi Arabia such as diabetes, and obesity-conditions associated with many chronic diseases. Furthermore, the incidence and prevalence of renal replacement therapy (RRT) have been increasing substantially in the last three decades. The majority of patients with ESRD are getting their RRT in the form of haemodialysis (around 53.7%), with 5.1% on peritoneal dialysis and with 41.2% renal graft. Around 70% of RRT is provided by Ministry of Health free of charge ⁽⁴⁾. In Saudi Arabia, CKD is more prevalent in the highly productive age group. The highest number of people receiving dialysis treatment is found in the age group of 31 to 45 years. However, the prevalence and incidence of the earlier stages of

CKD is shifting to the older age groups. This concurs with global reports where the changes in age demographics to older age groups are associated with increased incidence and prevalence trends of CKD. For instance, in Saudi Arabia during the early 1980's the mean age of people with ESKD was 37.9 years, then in the 1990s it was 51 years ⁽⁵⁾.

The incidence and prevalence of this chronic disease have been increased tremendously. There are no reports and no study that has conducted in the chosen region. Hence, this study aimed to assess the files of the adult patients with age ranges from 15 to 70 years old with chronic renal failure at the King Khalid Hospital, Najran City, Saudi Arabia from April to July 2015. It also identified the relationship of these common risk factors such as hypertension, diabetes mellitus, polycystic kidney disease, certain infections, effects of nonsteroidal anti-inflammatory (NSAIDs) drugs with chronic renal failure.

METHODS

This descriptive study was conducted to assess of files of adult patients with ages 15-70 years old and suffered from the chronic renal failure at King Khalid Hospital in Najran City, Saudi Arabia during the period from April to July, 2015. Najran is a modern town and capital city of Najran province that is located in the Southern region of KSA.

A structured-type interview was conducted with checklist to collect the important information from the files of the patients. Fifty samples from the patient's records were collected using the non-probability sampling technique and selecting the files of patients suffered from chronic renal failure with age 15-70 years old. Patients with hypertension, diabetes mellitus (DM), polycystic kidney disease (PKD), certain infections and those taking nonsteroidal anti inflammatory drugs (NSAIDs) were included as risk factors of CKD.

Records were taken in measuring the grade of hypertension, the type of DM, the severity of PKD, onset of the infection and the type of NSAIDs. Frequency and percentage distributions were used to describe the incidence and the common risk factors associated with CKD in Najran City, KSA.

The study was done after approval of ethical board of Najran University.

RESULTS

A total of 50 Saudi patients with chronic renal failure aged 15 to 70 years old were

reviewed over the period 4 months (April to July, 2015).

Table 1 showed the distribution of patient with CRF and it revealed that the most affected group of people with renal failure was from 41 to 50 years age group, which represented about 30% of all samples taken from King Khalid Hospital. Age group of 61 to 70 yielded 10%, which was considered the lowest in the age distribution having the CRF.

Table 1: distribution of patients (15-70 year age group) with chronic renal failure.

Age group (Year)	Frequency	Percentage
15-20	8	13.3
21-30	8	10.0
31-40	9	23.3
41-50	10	30.0
51-60	8	13.4
61-70	7	10.0
Total	50	100.0

Table 2 displayed the distribution of the risk factors of the patients with CRF. Hypertensive patients appeared to be the highest in 45 (90%) patients with CRF, while the patients with polycystic kidney disease had low risk of renal failure with 10 (20%). Diabetes mellitus (DM) is the leading cause of CKD and ESRD in both developed and developing countries, about 70% (35 CRF patients) had diabetes mellitus.

Table 2: distribution of patients with risk factors of chronic renal failure (CRF).

Diagnosis	Number of patients with CRF	Percentage
Hypertensive With CRF	45	90%
Without CRF	5	10%
Diabetes Mellitus With CRF	35	70%
Without CRF	15	30%
Polycystic Kidney Disease With CRF	10	20%
Without CRF	40	80%
Taking NSAIDs* With CRF	15	70%
Without CRF	35	30%

*NSAIDs – nonsteroidal anti inflammatory drugs

DISCUSSION

Chronic kidney disease is the progressive and irreversible destruction of the kidneys. The risk of CKD increased in people older than 65 years ⁽⁶⁾. The number of people with CKD in the older age group (50 and older) had been increasing dramatically in the last three decades. Although the older age group constituted only 3.2% of the adult populations in Saudi Arabia, 21% of the cases of ESKD were reported in this group. The number of the older age group is expected to increase to 13% of the adult population in Saudi Arabia over the next two decades. Thus, significant increases in the prevalence of CKD in older people in the future can be predicted. This trend in prevalence of CKD among people over 65 is associated with more co-morbid diseases (e.g. cardiovascular disease, diabetes, hypertension, etc.), which increases the pressure on health care services, impacts on the quality of life of patients and their families and reduces life expectancies. Thus as people age, screening for risk factors of CKD becomes a priority for all healthcare professionals; screening will achieve earlier detection, greater opportunity to control predisposing risk factors (e.g. glycemic and hypertension control) and the delay of further deterioration in kidney function ⁽⁵⁾.

Renal function decreases with age in both men and women. Among the elderly population, more than one-half of the subjects screened had CKD stages 3–5 (GFR < 60 ml/min per 1.73 m²) according to the National Kidney Foundation Kidney Disease Outcomes Quality Initiative (K/DOQI) guidelines ⁽⁷⁾. Thus, the elderly population is more prone to develop CKD after various renal insults ⁽⁸⁾. In the CREDIT study the odds ratios of CKD ranged from 1.45 to 2.18 for every 10-year increase in age among subjects older than 30 years of age in Turkey ⁽⁹⁾.

In the region of Najran, KSA the age group 41 to 50 years is the prime and working group, lifestyle like smoking, diet, fitness and family history have been affected in acquiring the chronic kidney diseases.

Chronic kidney disease has become a serious public health issue. There are currently over 1.4 million patients receiving renal replacement therapy worldwide. Factors such as race, gender, age and family history are highly important. For instance, being of African-American decent, older age, low birth weight and family history of kidney disease are considered to be strong risk factors for chronic kidney disease. Moreover, smoking, obesity, hypertension, and

diabetes mellitus can also lead to kidney disease. An uncontrolled diabetic and/or hypertensive patient can easily and quickly progress to an end-stage kidney disease patient. Exposure to heavy metals, excessive alcohol consumption, smoking and the use of analgesic medications also constitute risks. Experiencing acute kidney injury, a history of cardiovascular disease, hyperlipidemia, metabolic syndrome, hepatitis C virus, HIV infection and malignancy are further risk factors. Determination of serum creatinine levels and urinalysis in patients with chronic kidney disease risk will usually be sufficient for initial screening ⁽¹⁰⁾. The risk factors cited in this study were common in the Najran City.

Hypertension has long been a defined risk factor for both CKD and ESRD and accounts for 27% of all ESRD patients in the United States and 28% of hemodialysis patients in Turkey ^(11,12).

Systemic hypertension is transmitted to intraglomerular capillary pressure leading to glomerulosclerosis and loss of kidney function; thus variable risks of impaired renal function have been reported among hypertensive subjects ⁽¹²⁾. At study entry, 5.9% of the hypertension detection and follow-up program trial participants had a serum creatinine of 1.5 mg/dl or greater. Among the 8683 participants, 2.3% of those with serial serum creatinine measurements above 1.5 mg/dl experienced clinically significant loss of renal function over 5 years ⁽¹³⁾.

Similar to the result done on 50 patients in King Khalid Hospital in Najran City, KSA, hypertensive patients showed the highest incidence of 45 (90%) patients.

Diabetes mellitus (DM) is the leading cause of CKD and ESRD in both developed and developing countries ⁽¹⁴⁾. According to the registry of Turkish Society of Nephrology, diabetic patients constitute 37.3% of the hemodialysis population in Turkey ⁽¹¹⁾. According to the USRDS data, half of the ESRD patients in the United States had diabetic nephropathy ⁽¹⁵⁾.

Mechanisms that lead to kidney disease in diabetes included hyperfiltration injury, advanced glycosylation end products and reactive oxygen species. At the molecular level, numerous cytokines, growth factors and hormones such as transforming growth factor-beta and angiotensin II cause pathologic changes associated with diabetic nephropathy ⁽¹⁵⁾.

In conclusion, the risk factors of chronic renal failure among Saudi patients ranged from 15 to 70 years old in Najran City at the King Khalid Hospital and this revealed that the working group

of 40 to 50 years old have been greatly affected by the CRF. It might bring by the cause of healthy lifestyle such as poor diet, poor water intake, and lack of exercise or family history. In Saudi Arabia the significant increase in the prevalence of CKD in older people in the future can be predicted. As the people ages, screening for risk factors of CKD becomes a priority for all healthcare professionals; screening will achieve earlier detection, greater opportunity to control predisposing risk factors to delay of further deterioration in kidney function ⁽⁵⁾.

Among the several identified risk factors, hypertension has been the most common, classically in essential hypertension, there is an increase in the afferent arteriolar resistance, with a lesser increase in efferent resistance, so renal blood flow (RBF) decreases, filtration fraction (FF) increases and glomerular filtration (GFR) tends to be preserved. GFR falls with age in normal subjects and this fall may be exacerbated in hypertension ⁽¹²⁾. High blood pressure can also damage the blood vessels of your kidneys, heart and brain. The kidneys are highly vascularized, meaning they contain lots of blood vessels. So, blood vessel diseases are generally dangerous to your kidneys.

Diabetic patients have also been identified as risk factor. The world Health Organization (WHO) has reported that Saudi Arabia ranks the second highest in the Middle East and is seventh in the world for the rate of diabetes. It is estimated that around 7 million of the population are diabetic and almost around 3 million have pre-diabetes ⁽¹²⁾.

Lifestyle, diet and genetic factors played important factors in developing this disease and they are greatly associated with chronic renal failure.

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