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Original Article

Screening for Chronic Kidney Disease in Family Members of Dialysis Patients.

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Abstract

Background: To study the prevalence of chronic kidney disease in family members of dialysis patients

Methods: In this cross-sectional observational study relatives of incident dialysis patient were enrolled. Family members of patients of all ages with history of diabetes mellitus, hypertension, family history of chronic kidney disease, chronic pyelonephritis and autoimmune diseases were included. Relatives already on renal replacement therapy, Hepatitis B and C, HIV reactive patients and with chronic heart and liver failure, chronic infections and septicemia patients were excluded .

Results: Out of these 200 participants, majority (72%) were male. Minimum age of the study population was 18 years and maximum age was 66 years. Mean age was 35.5 ± 9.93 years. Frequency of risk factors in study population showed that out of 200 participants 15% had hypertension, 6% had diabetes, 2.5% had renal stone disease and 74% participants did not have any risk factor. Blood pressure was normal in 83% participants. Blood glucose was normal in 92.5%.

Conclusion: Screening of the family members of ESRD patients is important for the prevention of kidney disease in other family members.

Key Words: Family members,Chronic kidney disease,Dialysis patients

Introduction

Chronic Kidney Disease (CKD) is a worldwide public health problem.[1] The declaration of World Kidney Day to be observed annually beginning in March 2006 sends a clear message to the public, government health officials, physicians, allied health professionals, patients, and families that 'CKD is common, harmful, and treatable. [2]

Chronic kidney disease (CKD) is receiving increased public attention, with early prevalence estimates at 11% and more recent estimates showing that 13% of the US population has some evidence of kidney damage.[3,4] More than 20 million Americans aged 20 and older may have CKD, based on a decreased glomerular filtration rate (GFR), a measure of kidney function. Although CKD is common, many Americans with the key risk factors—diabetes and high blood pressure—do not know they are at risk. In addition, the rising rates of diabetes and obesity will continue to fuel its growth, as both conditions increase the risk of developing CKD and speed its progression. A recent national survey in China indicates that the prevalence of CKD in China is 10.8%.[5] In addition to kidney failure, other serious complications— particularly cardiovascular disease (CVD)—are associated with CKD. Other complications include anemia, malnutrition, bone disease, and depression

The exact prevalence of chronic kidney disease in Pakistan is not clear in the absence of regular national registry data and provided only by small observation series or reports from personal experience, and the quality of data is quite uneven. CKD is defined as presence of kidney damage or glomerular filtration rate less than 60ml/min/1.73msq for 3 or longer, irrespective of cause.[6-8] CKD and ESRD impose a tremendous public health burden, costing the U.S. health care system billions of dollars. In 2006, costs for Medicare patients with CKD exceeded $49 billion, accounting for nearly one-quarter of general Medicare costs (USRDS, 2008). Medicare spending for ESRD reached $22.7 billion during the same year (USRDS, 2008). By 2020, Medicare ESRD costs are expected to reach $55.6 billion (USRDS, 2007). Survival, Mortality and Causes of Death in ESRD Patients Despite advances in dialysis and transplantation, the prognosis of kidney failure remains bleak. The USRDS reported more than 60000 deaths of patients with ESRD, and an annual mortality rate of dialysis patients in excess of 20%. Expected remaining lifetime of patients treated by dialysis were shorter than the age matched general population, varying (depending on race and gender) from 7.1 to 11.5 years for patients aged 40 to 44 years,

and from 2.7 to 3.9 years for patients aged 60 to 64 years. [9-11]

Therapeutic interventions at earlier stages of chronic kidney disease are effective in slowing the progression of chronic kidney disease The major therapeutic strategies that have been tested include strict blood glucose control in diabetes, strict blood pressure control, angiotensin-converting enzyme (ACE) inhibitors and angiotensin-receptor blockers, and dietary protein restriction. Patients with CKD have a large number of comorbid conditions. Comorbidity is defined as conditions other than the primary disease (in this case, chronic kidney disease). Screening and early detection of kidney disease has the aim not only to prevent kidney damage but also to prevent comorbidities associated with chronic kidney disease

Patients and Methods

This cross sectional observational study was conducted at Nephrology Department, Pakistan Institute of Medical Sciences from January 2014 to January 2015.All relatives of incident dialysis patients were taken for the study. Documentation of existing standards of care for chronic diseases associated with renal disease was done and institution of disease management program that facilitate the systematic management of patient with chronic diseases that lead to end stage renal disease. Randomized non-biased sampling of patients admitted or consulted the Nephrology department of Pakistan Institute of Medical Sciences was done. Patients of all ages with history of diabetes mellitus, hypertension, family history of chronic kidney disease, chronic pyelonephritis and autoimmune diseases were included. Patients with renal replacement therapy, Hepatitis B and C, HIV, those with chronic heart and liver failure and finally patients with chronic infections and septicaemic patients were excluded from study.

Results

Total 200 family members of the patients on maintenance dialysis for ESRD were included after taking the consent and fulfilling the inclusion and exclusion criteria. Out of these 200 participant majority (72%) were male . Minimum age of the study population was 18 years and maximum age was 66 years. Mean age is 35.5 ± 9.93 years. Donors' breakup revealed that 112 (56%) were sons, followed by 36(18%) daughters and 24(12%) brothers. Hypertension (15%) was the commonest risk factor found (Table 1). Blood pressure was normal in 83%. Blood glucose was found to be normal in 92.5% and increased in 7.5% participants (Table 2).

Majority (85.5%) of the participants did not have any urinary protein, 21(10.5%) had 1+ protein, 6(3%) had 2+ protein, and 2 (1%) participants had 3+ urinary protein . Similarly 178 (89%) participants did not have urinary glucose, 10(5%) had 1+ glucose, 7(3.5%) had 2+ glucose, 4(2%) had 3+ glucose and one (0.5%) had 4+ urinary glucose. Lipid profile was normal in 73.5%. Minimum Hb was 8, maximum was 18, mean was 12.12 ±2.09 g/dl. (Table 2). On ultrasound kidney sizes were normal in 79%.

Table 1:Frequency of risk factors

Risk factors	Number	Percentage
Hypertension	30	15%
Diabetes Mellitus(DM)	12	6%
Coronary artery disease	2	1%
Stone disease	5	2.5%
Hypertension+DM	3	1.5%
No risk factor	148	74%

Table 2:Descriptive statistics of the study population (n=200)

Variables	Range	Min	Max	Mean	SD
Age	48	18	66	35.95	9.931
Weight(Kg)	67	42	109	72.67	15.34
Blood glucose(mg /dl)	232	54	234	106.21	31.41
Urine pH	3.0	5.0	8.0	6.007	.7933
RBC in Urine	62	0	62	2.37	6.937
WBC in Urine	43	0	43	1.88	4.440
Serum Creatinine (mg/dl)	6.68	.32	3.20	.8176	.4342
Haemoglobin	97.0	8.0	18.0	12.12	2.090
Serum Phosphorus	2.18	3.00	5.18	3.7380	.3880
Serum Calcium	8.9	7	9.5	8.44	.3991

Discussion

Chronic kidney disease (CKD) is increasingly recognized as a global public health problem. The declaration of World Kidney Day to be observed annually beginning in March 2006 sends a clear message to the public, government health officials, physicians, allied health professionals, patients, and families that 'CKD is common, harmful, and treatable.[12] The exact prevalence of chronic kidney disease in Pakistan is not clear in the absence of regular national registry data and provided only by small observation series or reports from personal experience, and the quality of data is quite uneven.

CKD is defined as presence of kidney damage or glomerular filtration rate less than 60ml/min per 1.73 msq for 3 or more months, irrespective of cause.[13] We included 200 relatives of the patients with ESRD and on dialysis. Though this number is not much large as compared to international screening analysis, it still gives us direction toward the future strategies. Same cross-sectional survey of screening to identify CKD among family members of ESRD patients was conducted at different community dialysis centers in Georgia.[14] Family members of ESRD patients were recruited for CKD screening. A medical history, measurements of BP, serum glucose, hemoglobin (Hb), serum creatinine, and urinalysis were obtained at community screening sites. Of 221 family members screened between 1999 and 2001 in Georgia, 13.9% had an estimated creatinine clearance (Ccr) _60 ml/min. Proteinuria of 1+ or more was found on urinalysis in 9.9%. In our analysis proteinuria was significantly present and was 1+ in 10% of the patients. However in another screening survey, out of 84 participants, 26% of these had proteinuria.[15-17]A multicenter study in China shows presence of CKD is different between first-degree relatives and spouses of CKD patients.[18]

Hypertension was present in 15% of our study population, where as it was present with much higher frequency in a cross-sectional survey in Georgia where 58% of the study participants were hypertensive, some of which were getting treatment for hypertension and some unaware of their disease. [14] Where as in other surveys, 21.9% of the family members of the ESRD patients had hypertension, and these results were comparable with our study results.

In present study, 7.5 % of the participants had impaired blood glucose and 92.5% of the participants had normal blood glucose. When we compare these results with international data, it was found that in Georgia survey, 18.6% of the study population had increased blood glucose.[8] Where as in other survey 18.1 % of the participants had impaired blood glucose

The study by Iseki in the Okinawa region of Japan also demonstrated that proteinuria and high serum creatinine level are two valuable prognostic factors for end-stage renal disease. [18] Out of 200 participants , 8% of the participants had increased serum creatinine.

Conclusion

1. Screening of the family members of ESRD patients is important for the prevention of kidney disease in other family members.
2. In present study 13 % of the patients had proteinuria, 15 % of the patients had increased blood pressure, 7.5 % of the participants had impaired blood glucose.

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