ORIGINAL ARTICLE

To Assess the Renal Functions and Common Risk Factors of its Impairment in A Group of General Population

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ABSTRACT

Background: In Pakistan more than 25 million people are suffering from kidney diseases. Kidney damage can be detected at earlier stage by simple laboratory tests like renal function tests, proteinuria and estimated Glomerular Filtration Rate (GFR).

Objective: To assess renal functions and common risk factors of its impairment in a group of general population on world kidney day 2018.

Materials and Methods: It is a descriptive study conducted in Central Diagnostic Laboratory, Mayo Hospital/ King Edward Medical University (KEMU), Lahore It was carried out on 158 Healthy subjects without history of renal disease. All collected data was entered and analyzed by using Statistical package for social sciences (SPSS version 20).

Results: 85(54%) were males and 73(46%) females. Mean $\pm$ SD age was 44.3 ±13.9 years. 50(32%) were hypertensive, 30(19%) were hyperglycemic, 28(18%) had proteinuria, 30(19%) had Hyperuricemia and 18(12%) had increased creatinine levels. Mean ± SD glucose, creatinine and uric acid levels were 130± 30, 1.2± 0.7 and 4.5± 1.3 mg/dl respectively.

Conclusion: Screening of subjects without renal known disease with diagnosed hypertension, diabetes or hyperuricemia as risk factors for CKD is required. 18 undiagnosed cases of CKD were identified in this survey.

Keywords: risk factors, CKD, Renal function test.

INTRODUCTION

Chronic kidney disease (CKD) is defined as kidney damage or glomerular filtration rate <60ml/min for three months or more irrespective of the cause[1]. CKD affects almost 10% population of the world. It is among the top 20 causes of death around the world[2]. It is progressively increasing in developing countries like Pakistan[3]. Major causes of kidney damage are obesity, smoking, diabetes mellitus , hypertension, chronic glomerulonephritis, obstructive uropathy, hyperuricemia, polycystic kidney disease, pyelonephritis, heavy metals exposure, excessive alcohol consumption and the use of analgesic medications[4]. The most common causes of kidney damage are systemic hypertension and diabetes mellitus[5].

CKD is classified on the basis of GFR from stage 1 to 5 (more than 90 to less than 15 ml/min)[6]. The mortality and morbidity in chronic kidney disease are attributed to cardiovascular diseases. The other Complications of chronic kidney disease include anemia, bone diseases, hypertension and stroke.[1,6] The complications of CKD impose huge burden on economy as the only treatment available is kidney transplant and peritoneal or hemodialysis. On average a patient needs 2 to 3 dialysis per week that cost approximately PKR 29852. Due to increasing incidence of CKD there will be a need of increases dialysis center which is difficult for a developing country like Pakistan. Pakistan had 140 dialysis centers in 2004 which increases to 175 in 2009[7]. Regular monitoring of diabetes and hypertension which are the most common risk factors for CKD can control the risk of developing CKD[8].

In this background of huge disease burden , the population should be screened for detection of early kidney damage by simple laboratory tests like renal function tests, uric acid, proteinuria, urine complete examination, glucose (BSR), estimated GFR, albumin to creatinine ratio and regular monitoring of common causes like blood pressure and diabetes mellitus[9].

The world kidney day was celebrated in Mayo hospital, Lahore on 8 march 2018. In this medical screening camp, 158 people were examined by experts outside the nephrology department. They were tested free of cost for BSR, creatinine, uric acid and complete urine examination.

METHODOLOGY

The study design was approved by the Institutional Review Board. It was a Descriptive study conducted at Central Laboratory Pathology Department, Mayo Hospital/ KEMU. Non-Probability convenient sampling technique was applied to select study subjects without history of renal impairment After informed consent of all the subjects, the relevant information was recorded. Blood pressure (B.P) was recorded by calibrated mercury sphygmomanometer. Under aseptic measures 3 ml of venous blood was collected in yellow top vacutainer already marked with subject ID. The blood sample was allowed to clot at room temperature for 15-20 minutes and then centrifuged at 3000 Revolutions per minute for 3 minutes to separate serum. Separated serum of each sample was analyzed for glucose, creatinine and uric acid on Chemistry analyzer AU480 by Beckman Coulter. For proteinuria, urine sample was collected in a sterile container properly labelled with patient's identification number. After centrifugation at 3000 RPM for 5 minutes, urinary protein was checked by urine strips in the supernatant.

Statistical Analysis: All collected data was entered and analyzed by using SPSS 20. Qualitative variables like gender, history of hyperglycemia, hypertension, hyperuricemia, proteinuria and increased creatinine were presented as frequency and percentage. Quantitative variables like age, glucose, creatinine and uric acid levels were presented as mean ± SD.

RESULTS

Table 1: Summary of Results

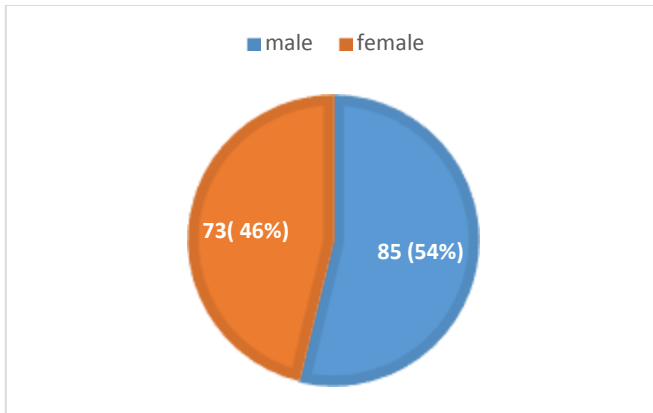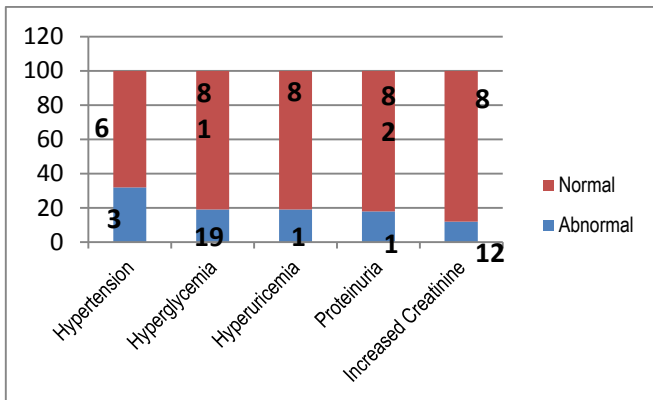| Study variables	Results
Age (Mean ±SD) years	44.3± 13.9
Gender% (M: F)	85(54): 73 (46)
Hypertension %	50(31.6%)
Proteinuria %	28(18%)
Hyperglycemic %	30(19%)
Hyperuricemia %	30(19%)
BSR (Mean ± SD)mg/dl	130± 30
Creatinine (Mean ± SD) mg/dl	1.2±0.72
Increased Creatinine %	18(12%)
Uric acid (Mean ± SD) mg/dl	4.51±1.3
Hyperuricemia %	30(19%)

Figure 1: Frequency of Male and Females

Figure 2: Percentage of Hypertension, Hyperglycemia, Hyperuricemia, Proteinuria and Increased Creatinine.

DISCUSSION

CKD is one of the leading causes of mortality and disability worldwide. It affects 10 per cent of the adult population worldwide[10,11]. Although it is a global concern but developing countries are relatively more affected. A systematic review conducted by Hasan et al reported that 109.9 million people from developed countries suffer from CKD whereas 387.5 million of developing countries had CKD. The prevalence of CKD was 23.3% in Pakistan. This prevalence is higher among older age group people[12]. According to the National Kidney Foundation, "Kidney Disease Outcomes Quality Initiative (K/DOQI)" guidelines, more than one-half of the elderly subjects had CKD stages 3–5 on screening[4]. Blacks are at increased risk of CKD than whites[4,13,14].

An estimated 2.3–7.1 million people with end-stage kidney disease died without dialysis in 2010[15,16,17,18]. The number might underestimate the true burden of disease due to lack of registered patients. The published data is hospital based or based on individual experience[7,19,20,21]. Overall, estimated 5–10 million people die from kidney disease annually. In 2010, 2.62 million people received dialysis worldwide and the need for dialysis was projected to double by 2030[18,22].

The mean age of patients requiring renal replacement therapy (RRT) in India and Pakistan is lower than developed countries. The underlying factor might be delay in diagnosis to initiate preventive measures timely due to lack of availability of healthcare facilities. Patients usually present in need of immediate dialysis with advanced renal failure and its complications[7,23,24,25]. The patients with end-stage renal disease (ESRD) require lifelong dialysis, twice or thrice a week. . Renal replacement therapy is not available to large number of affected individuals due to economic issues. Hemodialysis and peritoneal dialysis are expensive and the insufficient number of dialysis units results in long wait-times for dialysis. This poses economic burden both to individuals and country especially developing country like ours[26]. Renal transplant is the most suitable and long-term option for End Stage Renal Disease (ESRD) patients. But it is not possible due to lack of funding and legislation, donor exploitation and system for the procurement of deceased or living donors[7].

The huge economic, physical and social burden of end stage kidney disease demand effective strategies to handle it. There is a need of preventive measures for early detection of kidney disease and its risk factors at the primary care level. It will help to slow down its progression. The timely identification and management of kidney disease are the most effective strategies to address the growing global burden of ESRD[27,28].

CONCLUSIONS

Out of 158 people came to attend world kidney day for their renal screening, 18 undiagnosed cases of renal impairment, 28 cases of proteinuria and 30 cases of hyperglycemia and hyperuricemia each were identified. These persons were unaware of their ongoing underlying diseases. It is therefore emphasized to create awareness among healthy population to get themselves screened for risk of renal diseases yearly and start early treatment to decrease medical burden on the nephrology units in the already overcrowded hospitals.

Limitations: The study was carried out on small sample size and GFR was not calculated to determine the extent of renal damage.
Conflict of Interest: None

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