

Original Article:**Aetiology of chronic kidney disease in rural patients****M. Sunil Dattu, E. Kiran Kumar, Suresh Krishnamurthy, Y. J. Visweswara Reddy***Department of General Medicine, PESIMSR, Kuppam*

ABSTRACT

Background: End-stage renal disease is a common health problem in India. Chronic kidney disease (CKD) is a burden on the health care system in India.

Methods: During the period November 2012 to October 2013, we studied 160 patients with CKD seen at our teaching hospital.

Results: Their mean age was 49.9 (range 21-87) years; there were 107 males. Most of the patients (n=119; 74.4%) were aged under 60 years. Overall, diabetes mellitus (56.5%) was the leading cause of CKD followed by chronic glomerulonephritis (20.5%) and hypertension (12.5%).

Conclusions: Diabetes mellitus is the leading cause of CKD in our rural population. Males are more affected than females. Most of the younger patients directly presented with CKD with undetermined aetiological cause.

Key words: *Chronic renal insufficiency, Aetiology, India*

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INTRODUCTION

The term chronic kidney disease (CKD) applies to the process of continuing significant irreversible reduction in nephron numbers. The term end-stage renal disease (ESRD) represents a stage of CKD where the accumulation of toxins, fluid, and electrolytes normally excreted by the kidneys results in the uraemic syndrome.¹ Unless the toxins are removed by renal replacement therapy, using dialysis or kidney transplantation, ESRD leads to death.²

MATERIALS AND METHODS

An observational, prospective study was conducted among the patients admitted in medical wards of PES Hospital Kuppam during the period November 2012 to October 2013. The study was approved by the Institutional Ethics Committee. Informed consent was obtained from all participants. The study subjects comprised of patients aged 18 years

or older with CKD stage 5 as per Kidney Disease Outcome Quality Initiative (K/DOQI) guidelines.³ The clinical diagnosis was based on history, clinical examination (including fundus examination), and previous medical records, supported by relevant investigations including complete blood count, electrocardiogram, random blood glucose, glycosylated haemoglobin (HbA1C), blood urea, serum creatinine, calcium, phosphorous estimation, urine analysis, and abdominal ultrasonography. The study group was divided into two groups, Group A (patients aged < 60 years) and Group B (patients aged ≥ 60 years). Patients with diabetes mellitus, detected at least 5 years before the onset of CKD with or without hypertension, were diagnosed to have diabetic nephropathy. Patients who had history of at least two episodes of urinary tract infection (UTI) with the discrepancy of more than 1 cm in size of the kidneys on abdominal

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ultrasonography were diagnosed to have chronic pyelonephritis. Patients aged less than 30 years with a history of CKD and history of hypertension for more than 1 year, were diagnosed to have chronic glomerulonephritis. Patients with onset of hypertension after 40 years of age, having CKD were diagnosed to have Hypertensive nephropathy. Patients with evidence of autosomal dominant polycystic kidney disease (ADPKD) on abdominal ultrasonography or family history of CKD like Alport's syndrome were diagnosed to have CKD due to genetic/familial causes. Patients who did not fit into the above described categories, were considered to have CKD due to "other causes"

RESULTS

During the study period, 160 consecutive patients with CKD admitted to our hospital or were receiving haemodialysis on an out-patient basis were studied. Their mean age was 49.9 years (range 21-87 years), there were 107 males. Out of 160 patients, 119 (74.4%) patients belonged to Group A and the remaining 41 (25.6%) were categorized as Group B.

In Group A, diabetes mellitus was the most common aetiological cause (56.5%) followed

by chronic glomerulonephritis (20.5%), and hypertension (12.5%) (Figure 1). In Group B, diabetes mellitus was the most common cause (58.7%), followed by hypertension (16%) and chronic pyelonephritis (15.3%) (Figure 2). Most of the Group A patients were in CKD stage 5 and chronic glomerulonephritis was considered as a possible aetiology in these patients. Out of 160 patients, 21% were tobacco smokers. Salient laboratory findings included anaemia, (74%), hyperkalemia (47%), hypocalcaemia (54%), hypoalbuminemia (85%), hyperphosphatemia (56%), low-density lipoprotein cholesterol (LDL-cholesterol) (31%). Comparison of aetiological causes of CKD documented in the present study and some other published studies is shown in Table 1.

DISCUSSION

In the present study mean age of the patients with CKD was 49.9 years. The youngest patient was 21 years and the oldest was 87 years old. This wide-range highlights the fact that CKD is a major health problem at all age groups. The demographic profile of the present study was similar to that reported in two other studies^{4,5} from India. In the Screening and Early Evaluation of Kidney Disease (SEEK) study,⁴

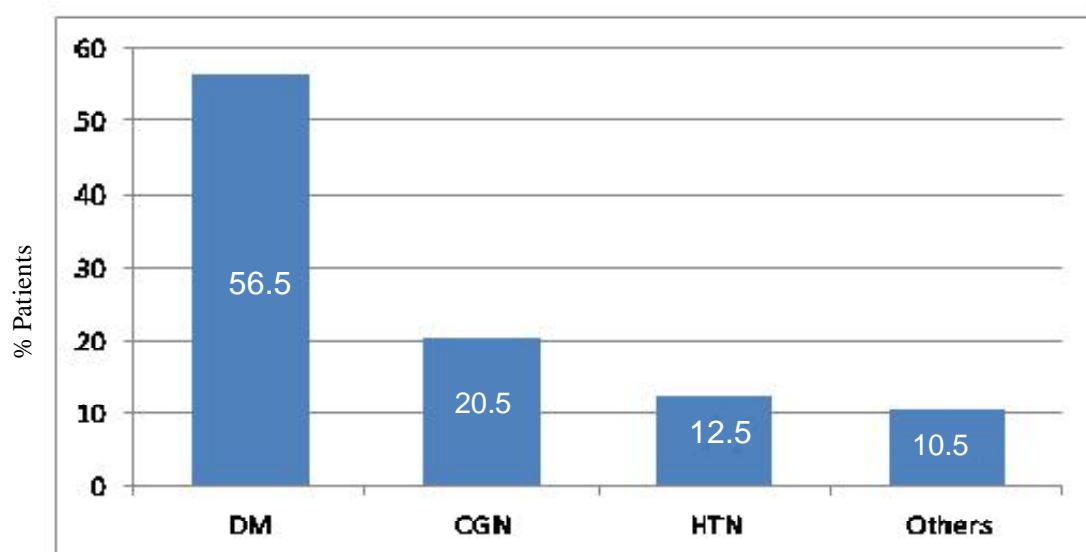


Figure 1: Aetiological causes of CKD in Group A patients

Group A = patients aged < 60 years; DM = diabetes mellitus; CGN = chronic glomerulonephritis; HTN = hypertension

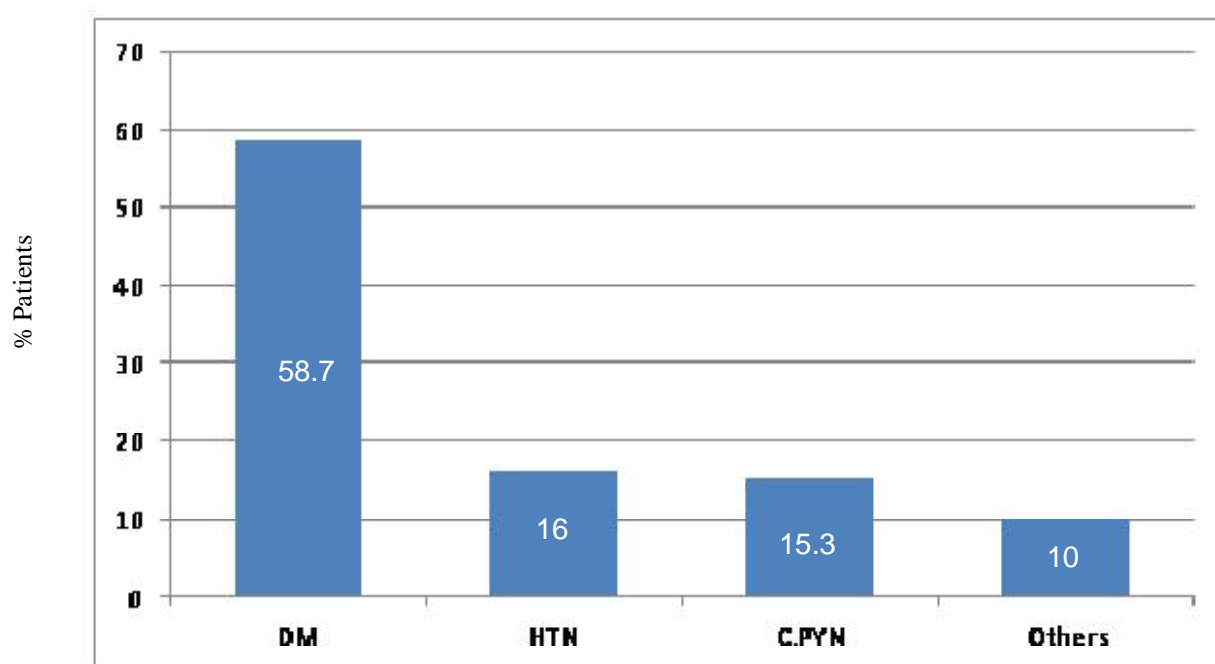


Figure 2: Aetiological causes of CKD in Group B patients

Group B = patients aged ≥ 60 years; DM = diabetes mellitus; HTN = hypertension; C.PYN = chronic pyelonephritis

the mean age was 45.2 years and male: female ratio was 1.2:1. In the Indian CKD registry report,⁵ the mean age was 50.1 years and male: female ratio was 2.3:1. Out of the 18 studies analysed by the National Kidney Foundations K/DOQI,⁶ 17 reported that the male gender was more at risk for CKD and 14 studies had showed that the male gender was associated with a faster rate of progression to CKD.

Present study showed that the prevalence of CKD as a result of hypertension and diabetes mellitus is far lower in adult patients above the age of 30 years. In contrast, the prevalence of urinary tract abnormalities, congenital

tubular disorders and chronic glomerulonephritis were far more common in patients under 30 years of age. The present study findings are similar to the observations documented in the SEEK study,⁴ the Indian Kidney registry study⁵ and those studies reported by the National Kidney Foundations K/DOQI subgroup on children and adolescents⁶

The aetiological causes noted in the present study were similar to that reported in the Indian CKD registry study⁵ where diabetic nephropathy (31%), glomerulonephritis (14%) and hypertensive nephropathy (13%) were the common causes. In the present study a higher

Table 1: Aetiology of CKD in comparison to other studies*

Aetiological cause	Rajapurkar et al ⁵ (2012)	Dash et al ⁷ (2006)	Present study	
			Group A (< 60 years)	Group B (≥ 60 years)
Diabetic nephropathy	31	37	56.5	58.7
Glomerulonephritis	14	17	20.5	-
Hypertensive nephropathy	13	16	12.5	16
Others	4	3	10.5	25.3

* data are shown as percentage

incidence of chronic glomerulonephritis (20.5%) was probably because all the patients who presented with CKD and shrunken kidneys were considered to have chronic glomerulonephritis and renal biopsy was not done to establish exact cause in them. Similar observations were reported in the study conducted at the All India Institute of Medical Sciences, New Delhi.⁷ Similar trends were also documented in American population. However, in another study⁸ the number of patients with diabetic nephropathy was almost 50% of the study group.

The aetiological data also shows that the burden of chronic glomerulonephritis (22%) seen in the present study is similar to the observations reported in studies done in other developing countries like Egypt and Bolivia.^{9,10}

In India, the Indian Society of Nephrology (ISN) has developed a CKD registry wherein epidemiological data of CKD patients are collected and analysed. A recent report of this registry showed that most patients first presented to a nephrologists in stage V (47.5%), followed by stage IV in (25.5%) stage III (19.6%), stage II (4.9%) and stage I (2.5%). Diabetic nephropathy was the most common cause (31%), followed by CKD of undetermined aetiology (16%), chronic glomerulonephritis (14%) and hypertensive nephrosclerosis (13%). Most patients who presented in stage V were younger than those in stages III-IV.

Diabetic nephropathy patients were older, more likely to present in earlier stages of CKD and had a higher frequency of males; whereas those with CKD of unexplained aetiology were younger, had more females and more frequently presented in Stage V. Patients in lower income groups had more advanced CKD at presentation. Patients presenting to public sector hospitals were poorer, younger, and more frequently had CKD of unknown aetiology.

Our observations suggest that diabetes mellitus is the leading cause of CKD even in rural

population. Men are more frequently affected than women. Most of the younger patients directly presented in CKD stage with an undetermined aetiological cause.

Early recognition of kidney disease will go a long way in minimizing morbidity and bring down the number of patients reporting with CKD.

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