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ORIGINAL RESEARCH

CKD of Unknown Etiology in India

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Abstract
Introduction: The high frequency of chronic kidney disease (CKD) in rural India has drawn criticism. The goal of the current study was to determine the disease's prevalence, symptoms, and risk factor profile in this region.
Methods: Using multistage sampling, we chose 1105 participants who were older than 18. Urinary protein-creatinine ratio, serum creatinine, and blood glucose were all tested after collecting demographic and anthropometric information. Using the Modification of Diet in Renal Disease equation was calculated.
Results: 44.3% of the subjects were men and 55.7% were women, with a mean age of 43.2 ± 14.2 years (interquartile range: 18-98). The subjects' mean eGFR was 94.3 ± 33.4 Major risk factors such diabetes, chronic hypertension, and severe proteinuria were not present in 20% of CKD patients, suggesting that a sizable section of the population suffers from the condition described as "CKD of unclear aetiology" (CKDu).
Conclusion: Compared to past research in either rural or urban groups in India, the prevalence of CKD and CKDu in rural India is significantly higher. We contend that urgent attention must be paid to the region's health policy and resource allocation for the prevention and treatment of CKD.
Keywords: Chronic Kidney Disease, Aetiology, Rural

Introduction

All around the world, chronic kidney disease (CKD) and end-stage renal disease have become significant public health issues as well as leading sources of morbidity and mortality. The frequency of CKD is rising quickly in developing nations and is now greater than it is in industrialised nations. [1] A new type of severe CKD that affects adults in their fourth and fifth decades and isn't brought on by conventional risk factors like diabetes and chronic hypertension has also been documented in Sri Lanka, a number of Central American nations, and Egypt over the past two decades. [2,3] Due to late diagnosis and quick disease progression, this condition is termed as CKD of undetermined aetiology (CKDu), and it is deadly. [4] It is thought that CKD and CKDu are becoming more common in India. A recent study in rural Karnataka, India, found a rising incidence of CKD of 6.8%. [5]
Previous studies in small geographic areas in India had revealed that the prevalence of CKD was less than 1%. [6] There are no national studies determining the prevalence of CKD in

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India, although it has been estimated that the country's age-adjusted incidence of end-stage renal disease is 229 per million people. [7] The most prevalent cause of CKD was diabetes (31%), according to the first report of the Indian CKD registry, which published data from 52,273 persons. [8] The fact that a sizeable fraction (16%) of the patients in this study had CKDu and that they were middle-aged, uneducated, and manifesting with advanced CKD was an intriguing finding.

Methods

The present cross-sectional study was carried out in in Kurnool Medical College, Kurnool, Andhra Pradesh. A 1058-person sample size was computed. Since it was predicted that 5% of subjects wouldn't respond, the sample size was set at 1105. These individuals were chosen using a multistage sampling technique. Subjects who were 18 years or older were included. Pregnant and postnatal women were excluded. Informed consent was obtained from all the subjects. The study was approved by the Institutional Ethics Committee.

A standardised questionnaire was distributed to each individual. The presence or absence of symptoms indicative of renal illness was inquired about in the subjects. It was asked if the patient had ever experienced diabetes mellitus, hypertension, ischemic heart disease, or a stroke. There were inquiries about drinking alcohol and using tobacco. Standard instruments, calibrated daily, were used to monitor blood pressure for the entire group. All subjects had random midstream urine samples obtained. All subjects had their blood tested after giving their informed consent.

Data analysis was done using the statistical application SPSS V22 (IBM Corp., Chicago, IL). Continuous data were provided as means and SDs and categorical variables were shown as a fraction when distributions were believed to be fairly normal. These analyses' confidence intervals were based on SEs. A P value of 0.05 or higher was regarded as significant in each analysis.

Results

The average age of the 1105 subjects was 43.2 + 14.2 years; 63% of the individuals were under the age of 47. All of the subjects were over the age of 18. Farmers worked in agriculture the most (65.4%). 55.7% of the population under study were women. 42.3% of people lacked any form of education, compared to 57.7% who had only received an elementary school (Table 1). 57.6% of the population had a normal weight. 185 (16.7%) of the individuals had hypertension, with 114 (61.5%) having it for less than 5 years and 71 (38.5%) having it for more than 5 years (Tables 2). Out of 185 hypertensive participants, 157 (85.1%) were already known to have high blood pressure, and 28 (14.9%) were found to have it during the evaluation. A total of 80 (7.2%) patients had diabetes.

The average serum creatinine concentration was 1.2 mg/dl. The serum creatinine ranged from 0.06 to 29.0 mg/dl. More than 1.2 mg/dl of serum creatinine was found in 12.94% of the participants. 41% of them were women and 59% were men. Equation 4 from the Modification of Diet in Renal Disease-K/DOQI was used to calculate eGFR. A mean eGFR of 94.3 33.4 was discovered. 100 people (9.04%) had low eGFR (0.2), of which 52 (52%) had low eGFR and 48 (48%) had normal eGFR. 202 patients (18.2%) had CKD when proteinuria and/or a reduced eGFR were used as indicators. Only 44 (3.9%) of them were aware that they had kidney illness. Tables 3 show the distribution of patients with CKD due to long-term hypertension, diabetes, and hypertension.

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Table 1: Demographic characteristics of the study population

Characteristics	Number	Percentage
Age, yr.		
18–27	174	15.7
28–37	250	22.7
38–47	272	24.6
48–57	198	17.8
58–67	157	14.2
>68	54	4.9
Gender		
Men	490	44.3
Women	615	55.7
Education		
Yes	638	57.7
No	467	42.3
Occupation		
Farmer	723	65.4
Nonfarmer	382	34.6
Exposed to pesticides		
Yes	163	14.7
No	942	85.3
Tobacco smoking		
Yes	191	17.2
No	914	82.8
Alcohol consumption		
Yes	233	21.1
No	872	78.9

Table 2: Distribution of hypertension, long-standing hypertension, and diabetes in the total subject population

Characteristics	N (n=1105)
Long-standing hypertension (>5 yr.)	
Male	34
Female	37
Total	71
Diabetes	
Male	40
Female	39
Total	79
Hypertension (< 5 yr.)	
Male	49
Female	65
Total	114
No Diabetes	
Male	450
Female	576
Total	1026
No diabetes + hypertension (< 5 yr.)	
Male	423
Female	546
Total	969

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Table 3: Distribution of hypertension, long-standing hypertension, and diabetes in CKD population (n = 202)

Characteristics	N (n=202)
Long-standing hypertension (>5 yr.)	
Male	13
Female	14
Total	27
Diabetes	
Male	14
Female	16
Total	30
Hypertension (< 5 yr.)	
Male	15
Female	24
Total	39
No Diabetes	
Male	80
Female	93
Total	173
No diabetes + hypertension (< 5 yr.)	
Male	70
Female	82
Total	152

Discussion

In our study, the prevalence of low eGFR was 13.9% and prevalence of CKD was 18.23%. This uncanny high prevalence of CKD in a specific segment of the population is highly significant and is evidence pointing to an epidemic of CKD in this region. Although published data indicate an increasing prevalence of CKD in India, community-based studies are few and most of them were done in urban centers. CKD prevalence of 0.79% was reported based on serum creatinine estimation in the south zone population of New Delhi, [6] whereas the prevalence of decreased Modification of Diet in Renal Disease-GFR was 4.2% in the north Indian population. [9]

The prevalence of diabetes was found to be 7.2% in our study population, which is comparable to the previous Indian studies in rural populations where the prevalence was reported as 6% to 7%. The prevalence of diabetic kidney disease in our study was 14.6%, which is in stark contrast to the data from the Indian CKD registry in which diabetic nephropathy was the preeminent cause of CKD in 31% of patients. [8]

We used similar criteria for identifying diabetic nephropathy. It is possible that some of these patients had nondiabetic kidney disease and more strict criteria for diagnosis of diabetic nephropathy could have further reduced the prevalence of diabetic kidney disease. Only 11.9% of our patients had high proteinuria (PCR >1), indicating that most patients with diabetes had CKD because of tubulo-interstitial disease rather than diabetic nephropathy.

Conclusion

The prevalence and risk factors of CKDu in India have never been studied before. In this study, we present data on the prevalence of CKD in a rural population in the Indian state, which is 18.23%. The prevalence reported in any population-based study conducted in India is 4 to 18 times lower than this. This work offers fresh evidence of the high frequency of CKD, which has reached epidemic levels and become a major public health concern with associated costs. Traditional risk factors for CKD, like diabetes and long-term hypertension,

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don't seem to be connected to this type of CKD. 20 percent of CKD patients were determined to be CKDu. Early-stage CKD patients may benefit from renal biopsy and urine biomarker testing to provide insight into the cause's as-yet-unknown aetiology. In order to control morbidity and mortality, it is also crucial to take notice of the current disease burden, identify the population with early CKD, prevent the illness's progression, and set up treatment facilities for individuals with advanced renal disease.

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