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Chronic Kidney Disease of Unknown Etiology in A Tertiary Care Center at Tertiary Care Teaching Hospital

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ABSTRACT

Background: Unknown etiology chronic kidney disease (CKDu) is a kind of chronic kidney disease (CKD) that is common in certain rural communities worldwide. It is unique due to its multifactorial origin and clinicopathologic features, which are mostly associated with many environmental contaminants. A thorough definition is required in order to precisely identify the instances, aid in clinical diagnosis, and make it easier to screen individuals in impacted regions.

Methods: It is a two-year prospective observational research conducted at the Tertiary Care Teaching Hospital's Department of General Medicine. Research technique organizes all the study's components in a manner that makes sense and increases the likelihood of producing reliable results. It has a significant impact on the validity and reliability of the study's conclusions.

Results: Out of 90 patients, 30 qualified candidates were found. Anemia affected around 66.6% of the patients. 6.7% of patients had a history of CVD, and 6.7% had a history of CVA. Of the patients, 20% used NSAIDS. The majority of the patients in our research had shrinking kidneys and were in stages 4 and 5 of CKDu. Just 30% of patients were in stages 1-3 of the CKDu, which are depicted, while 70% of patients were in stages 4 and 5.

Conclusion: In conclusion, chronic kidney disease is becoming more and more of a health concern in India as it is realized that those without traditional risk factors like diabetes mellitus and hypertension are frequently affected by the condition.

Key-words: Chronic kidney disease, Glomerular filtration rate, Clinicopathologic features

INTRODUCTION

Chronic kidney disease is a rapidly growing worldwide public health issue, with a reported incidence of 11%–13%. [1] Although exact figures from these nations are not readily accessible, the frequency is rising not just in developed but also in low- and middle-income nations. [2] In most nations, diabetes mellitus and hypertension are the two main causes of CKD.

However, in some nations, CKD is linked to unclear reasons that are referred to be "nontraditional." [3]

It is difficult to comprehend CKDu since there isn't a clear description that covers every aspect of the illness. Once all known causes of CKD have been ruled out, a patient is classified as having CKDu in a clinical setting. To distinguish CKDu from other recognized causes of CKD, there are a few shared clinical characteristics. [5] In all documented geographical regions, the illness mostly affects young to middle-aged men who undertake physically demanding jobs like manual labor and agriculture. [6] There is little to no proteinuria in the patients. Most people with CKDu do not have diabetes and either have normal blood pressure or very mild hypertension. [7] Over many months, the condition progresses to stage 5, CKD, which requires renal

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replacement treatment. Few individuals have had kidney biopsies, which have shown variable degrees of interstitial fibrosis with inflammatory cells and tubular atrophy. [8]

The illness starts slowly, and unless it is very severe, there are either no symptoms at all or very few. Several of the markers that might detect CKD early are not widely distributed. [11] When it comes to CKDu, the majority of the first symptoms are linked to tubular abnormalities and changes in urine sediment before there is a decline in glomerular filtration rate (GFR) or proteinuria/albuminuria that is clinically noticeable. [12] There are other challenges in accurately calculating GFR, and even in that case, the illness would have been manifestly advanced and incurable by the time there is a discernible decline in estimated glomerular filtration rate (eGFR). These are a few of the issues with CKDu diagnosis. [13]

MATERIALS AND METHODS

It is a prospective observational study done in the Department of General Medicine at Tertiary Care Teaching Hospital over two years.

Inclusion Criteria

1) All chronic kidney disease patients.
2) Age= 18 years and above.
3) Belonging to both genders.
4) Patient willing to participate in the study.

Exclusion Criteria

1) Individuals having type 1 diabetes. Diabetes mellitus therapy, either past or present.
2) A person with established hypertension.
3) Nephrotic or nephritic syndrome instance that is known.

RESULTS

Out of the 90 patients, 30 were found to be qualified. Thirty patients had CKDu, of which thirty had thirty percent; fifty-two patients had hypertension, and twenty-three percent had diabetes. With a 3:1 male-to-

4) Kidney damage brought on by a snake bite is documented.
5) An aetiologically recognized urinary illness.

Methodology- The utilisation of the research procedure facilitates the logical organisation of all study components and enhances the probability of obtaining dependable outcomes. It significantly affects the study's results' validity and dependability. This chapter provides a brief overview of the instruments and methods utilized in the study to determine the incidence of hospitalized patients' chronic renal illness with an unknown cause.
The Helsinki Declaration, Schedule Y, and ICH GCP criteria were followed during conducting the study. After receiving approval from the institutional ethics committee, the study was carried out.

Statistical Analysis- The data was arranged using a Microsoft Excel 2010 (Microsoft® Corp., Redmond, WA) spreadsheet, and the analysis was done using SPSS version 27.0 (IBM Corp., Armonk, NY). Frequency and percentage were used to represent the qualitative data. Additionally, it was displayed using typical images like bar diagrams and pie charts.

Ethics, consent and permissions- After approval from the Institutional Ethics Committee for Medical Research at the Hospital, the study was initiated. All the patients were provided written, vernacular, informed consent to participate in the study. The study was conducted as per the Declaration of Helsinki, ICH Good Clinical Practice (GCP) guidelines and the ICMR guidelines for Biomedical Research on Human Subjects, 2006.

female ratio, men ruled. 33.3% of CKDu patients were older than 31–40 years, whereas 23.3% of patients were in the active age bracket of 21–30 years. 43.3% of the remaining patients were older than 41 (Table 1).

Table 1: Age-Distribution Of CKD And CKDu Patients

Age group	CKDu	Percentage (%)	CKD	Percentage (%)
21-30 years	7	23.3	15	16.7
31-40 years	10	33.3	23	25.6

>40 years	13	43.3	52	57.7
Total	30	100	90	100

p-value was 0.47 and X2 value = 1.510. Not important

Chi-square test value (X2) and probability (p-value)

Table 2: Patient Uncertain Aetiology Risk Factor Percentage (38 Patients)

	CKDu	Percentage (%)	CKD	Percentage (%)
Well water	9	30	18	20
Occupation (Farmer)	5	16.7	23	25.6
Family History	3	10	18	20
Agrochemical use	8	26.7	18	20
Heat stress	3	10	11	12.2
Dietary exposure	2	6.7	2	2.2
Total	30	100	90	100

p-value = 0.307; X2 Value = 3.609 Not important

Chi-square test value (X2) and probability (p-value)

Anaemia affected about 66.6% of the patients. 6.7% of patients had a history of CVD, and 6.7% had a history of CVA. Of the patients, 20% used NSAIDS (Table 3).

Table 3: Amount of Patients (38 Patients) With anaemia, IHD, CVA, and NSAIDS

	CKDu	Percentage	CKD	Percentage
Anemia	20	66.6	45	50
Ischemic heart disease	2	6.7	9	10
CVA	2	6.7	5	5.6
NSAIDS	6	20	31	34.4
TOTAL	30	100	90	100

Significant X2 Value = Chi-square test, p-value = probability, X2 Value = 2.287, p-value = 0.041

Most of the patients in our study had stages 4 and 5 of CKDu and were experiencing renal shrinkage. Only 30% of patients were in stages 1-3 of the CKDu, according to Table 4. 70% of patients were in stages 4 and 5 (Table 4).

Table 4: Patient Distribution By Disease Stage

	CKDU	Percentage	CKD	Percentage
STAGE 1-3	9	30	18	20
STAGE 4 AND STAGE 5	21	70	72	80
TOTAL	30	100	90	100

p-value is 0.112, and X2 is 2.533. Value (X2) and probability (p-value) of the Chi-square test are not significant

DISCUSSION

Though there has been much talk, no published research on specific environmental risk factors for CKD has been done in India. There have been ideas put out regarding significant concentrations of silica and other heavy metals in water, prolonged dehydration, heat stress, usage of nonsteroidal anti-inflammatory medications, traditional remedies, and excessive pesticide use. Epidemiological evidence is still needed to build a strong evidence basis, even if many of these hypotheses have

sound foundations and even some data from other regions of the world. [14]

The most prevalent theory holds that tainted drinking water exists. The water has been examined by several organisations and research teams, with a focus on heavy metals, but no persistent anomalies have been found. One research found that the Uddanam area's water samples had a noteworthy silica content. [15] According to hydrochemical data from another study, the groundwater in Uddanam is less mineralized than in other areas. In the Andhra, The drinking water in the Pradesh district of Uchapally was found to contain high levels of silica and strontium by Levey *et al.*[16] However, there is no solid evidence linking any of them to renal damage. Recent findings of high levels of total dissolved solids in Uddanam water samples suggest that excessive salinity results from seawater seeping into freshwater aquifers, which might account for the high rates of proteinuria and/or hypertension.[17] The present research's results were consistent with the earlier study report. Nevertheless, we did not assess the levels of heavy metals in the portable water sample that the study participants drank.

In the non-agricultural Delhi population with CKDu diagnoses, Ghosh et al. found a negative correlation between blood levels of organochlorine pesticides and GFR. [18] Few pesticides used in India and other parts of the world have been linked to CKD. Researching has been difficult because of the disease's many risk variables and remote exposure relative to outcomes. [19] The results of this study suggest that insecticide exposure may be a contributing factor to CKDu. Earlier research studies made this observation. There is an ecological connection between air pollution and CKD in Taiwan and the US. [19] Among the 30 most polluted cities in the world are located in India. Both in rural and urban areas, burning crops and plastic waste results in air pollution. [20] In rural Indian families, biomass-fueled cooking stoves are prevalent. In India, air pollution has yet to be considered as a contributor to CKD. Based on the findings of the current investigation, the same conclusion was reached. [21]

CONCLUSIONS

In conclusion, kidney disease (CKD) is becoming more and more of a health concern in India as it is realized that those without traditional risk factors like diabetes mellitus and hypertension are frequently affected by the condition. All patients were found to have anemia and azotaemia. Insecticide exposure, natural medication, and NSAIDs without consultation with medical practitioners are the risk factors for CKD in this study. Also, the vulnerable population was homemakers and farmers and the socioeconomic status of the victims belonged to the upper-lower and lower class.

CONTRIBUTION OF AUTHORS

Research concept- Jairaj V. Bomman, Krupali
Research design- Jairaj V. Bomman, Krupali
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Materials- Krupali, Shivaraj S Hanchinal
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Data analysis and Interpretation- Jagadish Chandra Benur
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Critical review- Jagadish Chandra Benur
Article editing- Jairaj V. Bomman, Krupali
Final approval- Jagadish Chandra Benur

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