

Chronic Kidney Disease of Unknown Etiology at Tertiary Center

Azmatulla Shaik¹, Kranthi Kumar Garikapati^{2*}, Tripura Lakshmi Jyothula³¹Associate Professor, Department of Physiology, Fathima Institute of Medical Sciences, Kadapa, India²Assistant Professor, Department of Physiology, Shri Ram Murti Smarak Institute of Medical sciences, Bareilly, Uttar Pradesh, India³Assistant Professor, Department of Physiology, Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh, India

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Abstract

Introduction: Chronic kidney diseases are a global public health problem associated with premature mortality, decreased quality of life. A trend towards an increase in its incidence and prevalence has been reported worldwide. Chronic renal failure (CRF) is an irreversible deterioration of renal function, which results from diminished effective functioning renal tissue. **Materials and Methods:** It is a cross sectional and observational study. Research methodology arranges in a systematic way all the components of the study that is more likely to lead to valid answers. It plays a crucial implication for Validity and credibility of the study findings. This chapter gives a brief description of the materials and methods adopted for the study to estimate the incidence of chronic kidney disease of unknown etiology in patients who are admitted at hospital. **Results:** We found out that 18% (38 patients) had CKDu while diabetes and hypertension were present in 50% and 32% respectively. Males predominated, male to female ratio being 3:1. 24% patients of CKDu belonged to age group of 21-30 years, active age group and 28% were above 31-40 years. Remaining 48% patients were more than 41 years old. Almost 62 % of patients had anemia. 8% patients suffered from CVD and 5% patients had history of CVA. NSAIDS use was seen in 25 % of patients. In our study majority patients presented in stage 4 and stage 5 CKDu with shrunken kidneys. 69% patients were CKDu stage 4 and stage 5 and only 31% patients were stage 1-3, which are represented in the Table 8 and figure 8. **Conclusion:** Though, contrasting the supplementary registry data, though hypertension occurrence is decreasing likened to earlier years, prolonged glomerulonephritis leftovers the second common reason of CKD and accounts for 16.2%.

Keywords: Chronic Kidney Disease, Diabetes, Hypertension.

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Introduction

Chronic kidney diseases are a global public health problem associated with premature mortality, decreased quality of life. A trend towards an increase in its incidence and prevalence has been reported worldwide. [1]

Chronic renal failure (CRF) is an irreversible deterioration of renal function, which results from diminished effective functioning renal tissue. Resultant damage of metabolic, excretory, and endocrine functions of the renal indicates to progress of medical condition of uremia. [2]

Definition of Chronic Kidney Disease: Kidney Disease: Improving Global Outcomes (KDIGO Guidelines): CKD is defined as anomalies in renal arrangement and/or functions, extant for > 3months, with consequences for well-being. [3]

Either of the subsequent existing for > 3months –

- A) Signs of renal impairment (1 or more):
 - Albuminuria (AER \geq 30mg/24 Hrs., ACR \geq 30mg/gm)
 - Urine residue deviations
 - Electrolyte and other irregularities owing to tubular complaints
 - Defects revealed by histology
 - Structural abnormalities detected by imaging
 - History of kidney transplantation

*Correspondence

Kranthi Kumar Garikapati

Assistant Professor, Department of Physiology, Shri Ram Murti Smarak Institute of Medical sciences, Bareilly, U.P., India.

E-mail: kranthigarikapati86@gmail.com

OR

- B) Decreased GFR: GFR <60ml/min/1.73 m² (GFR categories G3a–G5)

Chronic Kidney Disease of Unknown Etiology (CKDu) [4]

- Initial in the middle-2000, a Chronic Kidney Disease of Unknown etiology(CKDu) was diagnosed amongst agriculturalists in India.
- Around the following two eras, the syndrome spread quickly to the other husbandry areas. The age-standardized prevalence of the disease is estimated at 15%.
- The sole feature of this CKDu is that its etiology does not comprise normally recognized risk factors for CKD such as hypertension, glomerular nephritis and diabetes mellitus.

These included:

1. No previous history of, or present management for hypertension, diabetes mellitus, snake bites, urological ailment of recognized etiology or glomerulonephritis.
2. Normal glycosylated hemoglobin levels (HbA1C < 6.5%).
3. Blood pressure <160/100mmHg untreated or <140/90mmHg on upto 2 antihypertensive agent.

Prevalence of CKD

In India, CKD registry stated diabetic nephropathy in 31.3% of 52,273 CKD patients in creating it the main reason of CKD; CKDu, originate in 16% of CKD patients, was second. [5] One more study published by lancet in July 2013 shows that India contributes to about 20% of CKDu cases. [6] Another study in the Udhnam seaside region (Andhra Pradesh) discovered proteinuria occurrence of 15.3%

(54/354) in a farmer, as healthy as rice, jackfruit and cashews-higher in male than female (20% vs. 12% correspondingly). [7]

Aim

To find out Incidence of chronic kidney disease of unknown etiology in tertiary center.

Objective

1. To find out incidence of chronic kidney disease of unknown etiology.
2. To study clinical profile of chronic kidney disease of unknown etiology.

Materials and Methods

It is a cross sectional and observational study.

Inclusion Criteria

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

Exclusion Criteria

- 1) Patient with Diabetes Mellitus. Past history or current treatment for diabetes mellitus.
- 2) Patient with Known Hypertension.
- 3) Known case of Nephritic or Nephrotic Syndrome.

4) Known case of Snake bite induced kidney injury.

5) Urological disease of known etiology.

Methodology

Research methodology arranges in a systematic way all the components of the study that is more likely to lead to valid answers. It plays a crucial implication for Validity and credibility of the study findings. This chapter gives a brief description of the materials and methods adopted for the study to estimate the incidence of chronic kidney disease of unknown etiology in patients who are admitted at hospital.

Study Design: Study was conducted as per ICH GCP guidelines, Schedule Y & declaration of Helsinki.

Study was conducted after obtaining permission from institutional ethics committee.

Method of Analysis

The collected data was compiled in MS excel sheet 2007 for analysis of this data SPSS version 20.0 was applied. The qualitative data was represented in form of frequency and percentage. It was also represented in the form of usual impression like bar diagram, pie diagram, etc.

Results

Table 1: Incidence of patients with CKDu and CKD

	CKDu in number	CKDu in Percentage	CKD in number	CKD in Percentage
Total	38	18.09%	210	100%

X² Value = 248.0 p-value = 0.0001 highly significant
 X² Value = Chi-square test, p-value = probability

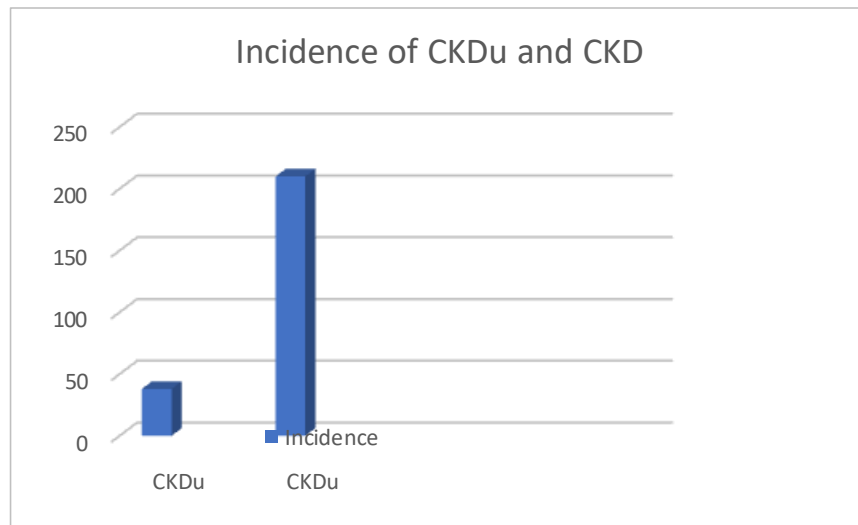


Fig 1: Incidence of CKDu and CKD

Table 2: Age wise distribution of patients of CKDu and CKD

Age group	CKDu	Percentage	CKD	Percentage
21-30 years	9	24%	39	18%
31-40 years	11	28%	49	23%
>40 years	18	48%	122	58%
Total	38	100%	210	100%

X² Value = 1.510 p-value = 0.47 Not significant X² Value = Chi-square test, p-value = probability

■ CKDu ■ C

Fig 2: Age wise distribution of patients

We found out that 18% (38 patients) had CKDu while diabetes and hypertension were present in 50% and 32% respectively. Males predominated, male to female ratio being 3:1. 24% patients of CKDu belonged to age group of 21-30 years, active age group and 28% were above 31-40 years. Remaining 48% patients were more than 41 years old.

Table 3: District wise demographical Distribution of patient with CKDu and CKD

Area	NumberCKDu	Percentage	NumberCKD (CKDu)	Percentage
AURANGABAD	8	21.05	59	28.09
JALNA	4	10.52	12	5.71
PARBHANI	4	10.52	22	10.47
BULDHANA	2	5.2	37	17.61
BEED	5	13.15	26	12.38
USMANABAD	2	5.2	6	2.85
DHULE	-	-	1	0.47
NANDED	10	26.31	28	13.33
NASHIK	2	5.2	4	1.90
JALGAON	-	-	4	1.90
WASHIM	-	-	3	1.42
HINGOLI	-	-	5	2.38
LATUR	1	2.63	3	1.42
TOTAL	38	100%	210	100%

X² Value = 10.064 p-value = 0.525 not significant
 X² Value = Chi-square test, p-value = probability

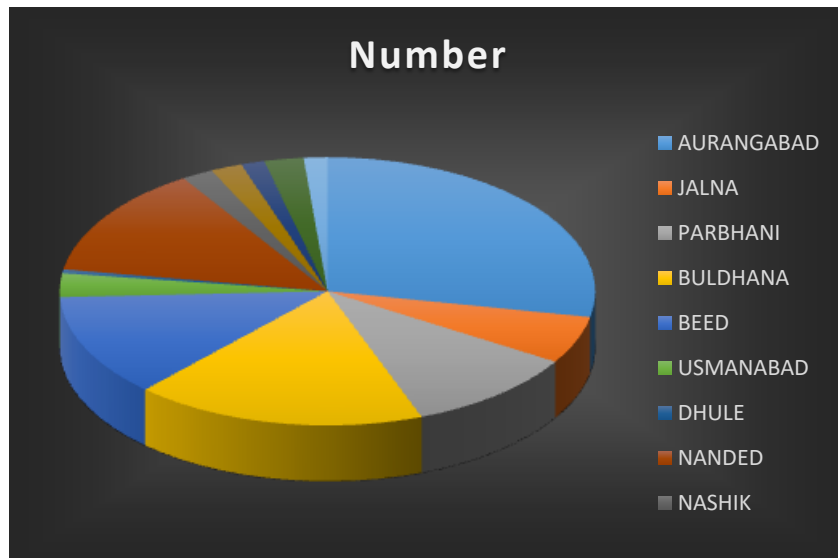


Fig 3: Demographical Distribution

Table 4: Percentage of Rural and urban areas (38 patients)

Area	CKDu	Percentage	CKD	Percentage
Rural area	28	74 %	146	69%
Urban area	10	26 %	64	31%
TOTAL	38	100%	210	100%

X² Value = 0.266 p-value = 0.606 Not significant
 X² Value = Chi-square test, p-value = probability

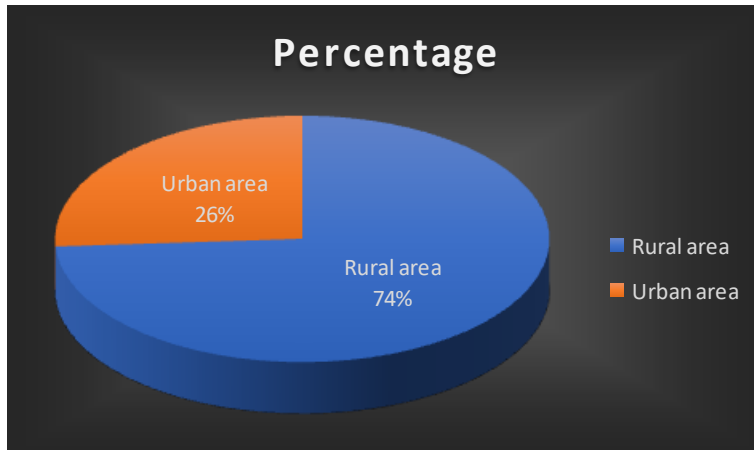


Fig 4: Areas of 74% patients were from rural area and 26% patients were from urban area

Table 5: Percentage of patient uncertain etiology risk factor (38 patients)

	CKDu	Percentage	CKD	Percentage
Well water	11	28 %	44	21%
Occupation (Farmer)	7	18 %	54	26%
Family History	4	10 %	42	20 %
Agrochemical use	11	30 %	44	21%
Heat stress	3	8 %	21	10%
Dietary exposure	2	6 %	5	2 %
Total	38	100 %	210	100 %

X² Value = 3.609 p-value = 0.307 Not significant
 X² Value = Chi-square test, p-value = probability

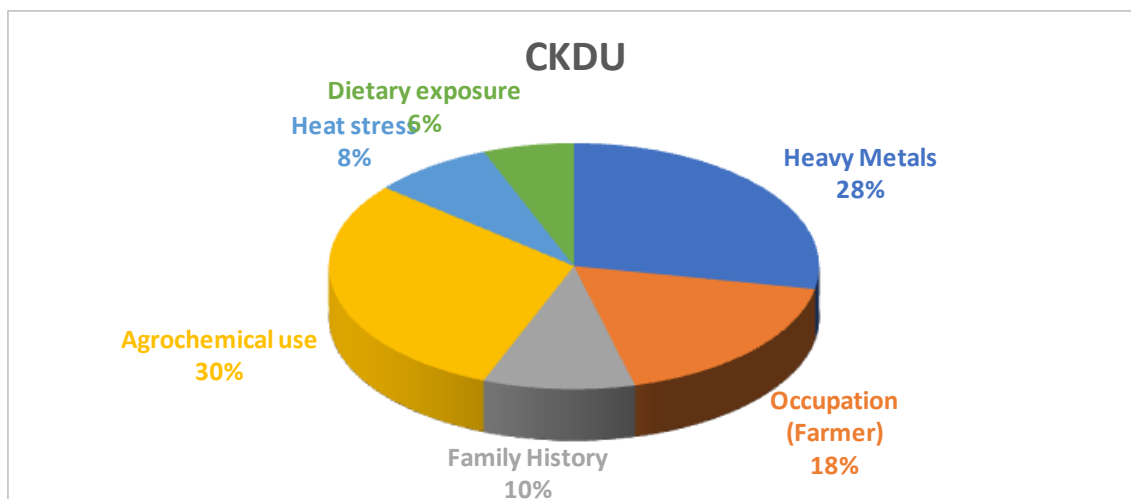


Fig 5: Percentage of patients were uncertain etiology risk factors

Table 6: Percentage of patients consumed Tobacco, alcohol and illiterate (38 patients)

	CKDu	Percentage	CKD	Percentage
Illiterate	16	43 %	87	41%
Consumed Tobacco	14	36 %	81	39%
Consumed Alcohol	8	21 %	42	20 %
Total	38	100%	210	100%

X² Value = 0.46, p-value = 0.021 significant
 X² Value = Chi-square test, p-value = probability

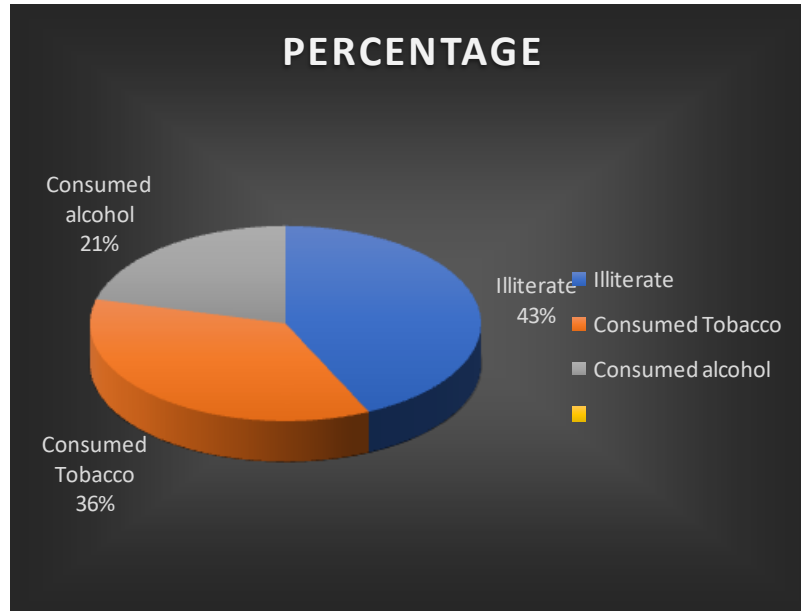


Fig 6: 43% patients were illiterate, 36% used tobacco and 21% consumed alcohol.

Table 7: Percentage of patients with anemia, IHD, CVA, NSAIDs (38 patients)

	CKDU	Percentage	CKD	Percentage
Anemia	24	62 %	105	50%
Ischemic heart disease	3	8 %	21	10%
CVA	2	5 %	13	6%
NSAIDS	9	25 %	71	34%
Total	38	100%	210	100%

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

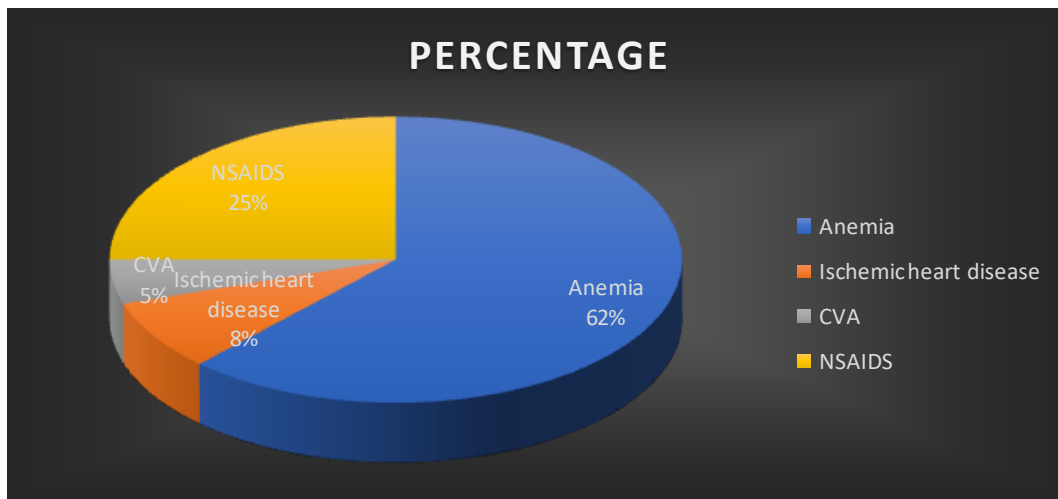


Fig 7: Distribution of percentage of patients

Almost 62 % of patients had anemia. 8% patients suffered from CVD and 5% patients had history of CVA. NSAIDS use was seen in 25 % of patients

Table 8: Stage of Disease Wise Distribution of patients

	CKDu	Percentage	CKD	Percentage
Stage 1-3	12	31%	42	20%
Stage 4 and Stage 5	26	69%	168	80%
Total	38	100%	210	100%

X² Value = 2.533 p-value = 0.112 Not significant, X² Value = Chi-square test, p-value = probability

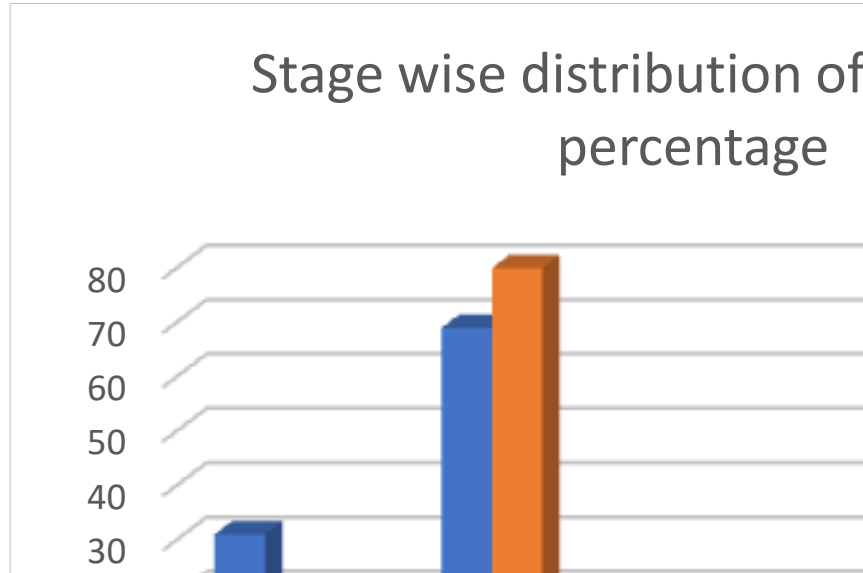


Fig 8: Stage of Disease Wise Distribution of patients

In our study majority patients presented in stage 4 and stage 5 CKDu with shrunken kidneys. 69% patients were CKDu stage 4 and stage 5 and only 31% patients were stage 1-3, which are represented in the Table 8 and figure 8.

Discussion

Existing available systematic sign is fragmented with breaks in information almost the etiology of CKDu. Most available studies rely on suboptimal designs. In addition to this, over the previous 2 eras, there were extensive concerns amongst the over-all communal and scientifically community concerning occurrence of CKD in the Maharashtra. Improving nephrological facilities and organization in affected parts, emerging nationwide close rules for kidney replacement treatment of patients in combination with individual case management, fostering human resource development, promoting research, enhancing social services and training social workers to address problems faced by CKDu patients and their relatives, and certifying streamlined source managing maintained by satisfactory supporting are important in fighting this developing disaster demanding a vital response. Contradictory decisions highpoint the necessity for extraordinary quality, satisfactorily powered educations to draw valuable decisions. Henceforth, we accepted this analysis to decide the occurrence of CKD and related risk issues between the rural population and urban of Marathwada. Although in 2012 (CKD Registry) published data indicate an increasing incidence of CKDu in India, community-based studies are few and most of them were done in urban centers. CKDu occurrence of 0.79% remained stated based on serum creatinine assessment in the south zone population of New Delhi, however the occurrence of reduced Alteration of Food in renal Disease-GFR was 4.2% in the north Indian population. [10] In alternative analysis assumed in the rural population of south India, it was established that the occurrence of reduced Alteration of Food in kidney Disease-GFR was 4.35% and prevalence of CKDu was 6.3%. [11,12] In population-based studies, the prevalence of decreased GFR was 4.7% to 8.1% in Europe and 4.5% to 7.7% in the United

States. [13] The prevalence of CKDu in Andhra Pradesh is at least 3 to 4 times higher than the prevalence reported in any of the previously mentioned studies. Numerous worldwide epidemics of CKDu have been stated, some with known etiology and in others the etiology remain unclear. In Sri Lanka, El Salvador, and Nicaragua, CKDu is stated as a main communal well-being problematic producing significant death, and these areas are considered to be the hotspots of CKDu. The occurrence of CKDu was between 13% and 18% in these 3 areas. [14] Fascinatingly, the occurrence of CKDu in Andhra Pradesh is the similar as stated from any of the hot-spots in other ecological hubs. We carried out the study at hospital and included 210 patients of CKD over a period of 2 years. We discovered out that 18% (38 patients) had CKDu while diabetics and hypertensive were present in 40% and 28% respectively. Males predominated, male to female ratio being 3:1. 24 % patients of CKDu belonged to age group of 21-30 years, active age group were 28% patients belongs age group of 31-40 years and remaining 48 % were above 41 years. Varma and Raman showed a cross-sectional analysis that presented prevalence in males (66.04%) than females (33.96%). [15] United States Renal Data System 2004 yearly information account exposed that the occurrence rate of CKDu is upper for males with 409/million population associated to 276 for females. [16] Rajapurkar and Dabhi (2010) had perceived CKDu had a greater incidence in males, while with CKD of unknown etiology remained younger and had more females. [17] Majority patients presented in stage 4 and stage 5 CKDu with shrunken kidneys. 69% patients were CKDu stage 4 and stage 5 and only 31% patients were stage 1-3. Similar study conducted by Varma and Raman et al, in that most of patients were belongs to stage 4 and 5 and few were in stage 1-3. [115] National Health and Nutrition Examination Survey III estimated prevalence of CKDu in adults of which 4.3% were in stage III which was not equivalent with the existing study since it comprised persons only <40 years of age. [18,19] Rajapurkar and Dabhi (2010) perceived that in CKD of unknown etiology, the most

of them were in stage V which is similar along with the current study that presented majority to be in stage IV and stage V. [17]Furthermore, 18% of patient agriculture farmer, 28% of patients were well water had history of drinking water from well. [20]In alternative study stated in the rural population of south India, it was initiate that the occurrence of kidney Disease, 88% of patients belongs from agriculture and labour and 82% of patients used to drink water from well. And few patients were history of using fertilizers and pesticides in farming. [21]On the other hand, 74% patients were from rural area and 26% patients were from urban area. Correspondingly, we initiate the influence of occupation on the occurrence of CKDu in Andhra Pradesh. [22]In addition, Percentage of patients were uncertain etiology risk factors such as heavy metals (cadmium, arsenic, lead, and aluminium were 28 %, occupational farmer 18 %, Family history 10 %, Agrochemical use 30 %, heat stress 8 %, Dietary exposure 6 %. Similar study supported by Joseph *et al* with our study. [23]Whereas, 43% patients were illiterate, 36% used tobacco and 21% consumed alcohol. In addition to this, almost 62 % of patients had anemia. 8% patients suffered from ischemic heart disease and 5% patients had history of CVA. NSAIDS use was seen in 25% of patients. In studies of Sri Lankan and Meso-American nephropathy CKDu, indicated approximately same values with our study. [24]

Limitations of the Study

The strength of the study lies in its sampling methodology. We used multistage sampling, which covered a large area of investigation. We conducted unknown etiology of CKD with random sample without bias for gender, literacy, socioeconomic status or occupation. This has ensured good compliance from the subjects and accuracy of the data. There are a few limitations in the study. It was based on a single centre. Though, since this is a huge people based study in a precise geographical area, extreme incidence of low eGFR in a sole centre.

Conclusion

Though, contrasting the supplementary registry data, though hypertension occurrence is decreasing likened to earlier years, prolonged glomerulonephritis leftovers the second common reason of CKD and accounts for 16.2%. Chronic glomerulonephritis constitutes a major etiology among the young though diabetes is the foremost etiology in the overall people. Etiologies like post streptococcal glomerulonephritis, diabetes is preventable, and initial intervention could delay development to CKD. The CKD people in the public districts hospitals was comprised of a superior quantity of younger patients from poorer socioeconomic programmes awarding in stages V CKD. In our study, we found out that least patient had CKDu while diabetes and hypertension were more. Males predominated, male to female ratio being 3:1.

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