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Original Research Article

Chronic Kidney Disease of Unknown Etiology in MGM Tertiary Center

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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. In India, CKD registry stated diabetic nephropathy in 31.3% CKD patients in creating it the main reason of CKD; CKDu, originate in 16% of total CKD patients, was second. Present study was undertaken to assess incidence of chronic kidney disease of unknown etiology and to study clinical profile of chronic kidney disease of unknown etiology.

Material and Method: The present study was a cross sectional observational conducted at a tertiary care hospital during two years. Study was conducted as per ICH GCP guidelines, Schedule Y & declaration of Helsinki.

Results: Present study consists of 210 patients of CKD who presented to MGM Hospital, Aurangabad over a period of 2 years. Out of which 38 patients (18.09%) were of CKDu. There are more number of CKDu patients (74%) from rural area compared to urban area (26%). Among CKDu patients, 29% patients had history of well water consumption, 19% were farmers and 29% had history of exposure to agrochemicals. Maximum patients with CKD and CKDu presented to the hospital at stage 4 and 5 of the disease.

Conclusion: Malnutrition, poor socioeconomic background, illiteracy and use of agrochemicals are emerging contributory factors for CKD among young population in India. We found out that least patients had CKDu while diabetes and hypertension still remain major risk factors. Males predominated, male to female ratio being 3:1.

Keywords: Chronic Kidney Diseases, Diabetes, Hypertension.

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]

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 >or= 30mg/24 Hrs., ACR >or= 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. Or

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

Stages of chronic kidney disease: [2, 4,5]

1. Stage of Reduced Kidney Reserve: The initial period collective to all systems of CRF is a damage of kidney reserve when renal function is

completely usual, GFR can be increased by 20-30% in response to the stimulus of a protein challenge. At this stage, there are no symptoms or prominent biochemical alterations. Proteinuria and hypertension may or may not be present. Diminished creatinine clearance is the only observed change which is below the normal but above 50ml/min.

2. Stage of Moderate Renal Insufficiency: In this stage creatinine clearance is below 50ml/min, nocturnal, mild anemia, loss of energy, decreasing appetite are usual. Inter present medical strain could arrangement kidney functions nevertheless additional, persuading indications and signs of explicit uremia. Such inter present medical situations comprise contagion (GIT, UTI, URTI), inadequately controlled blood pressure, hypo or hypervolemia & medication or radiocontrast nephrotoxicity amongst others.

3. Stage of Serve Renal Insufficiency (Frank Renal Failure): Here, the creatinine clearance is about 10-15 ml/min. Serum creatinine ranges between 5.5-7mg/dl. This is symptomatic stage, anemia becomes severe, metabolic acidosis sets in, hypocalcaemia, hypochloremia and hyponatremia occurs; hyperkalemia is uncommon.

4. Stage of Uremia: This is the stage when patient is symptomatic with symptoms referral to all major organs systems. Renal function is 5-10% of the normal. Serum creatinine is 8mg/dl and above. Hypocalcaemia is frequent, anemia; bleeding and bone disease may coexist.

5. Last Stage Kidney Disease: Last stage kidney disease occurs once GFR decreases less than 5-10% of usual (<3ml/m). Continual existence without kidney substitute rehabilitation converts impossible.

Chronic Kidney Disease of Unknown Etiology (CKDu) [6-9]:

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 main feature of this CKDu is that the course of CKDu does not include confounding factors such as diabetes mellitus, glomerular nephritis and hypertension.

These included:

1. No previous history 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 2017, is significant year for the world-wide nephrology communal. In the 2015 World-wide Burden of Ailment Study, renal disease was the 12th utmost collective reason of demise, accounting for 1.1 million demises globally. Overall CKD death has augmented by 31.7% throughout the last 10 years. In the similar study, CKD graded as the 17th foremost reason of world-wide ages loss of lifespan, an 18.4% rise subsequently in 2005, and the third greatest rise of several major reason of demise. [10].

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 total CKD patients, was second. [11]

One more study published by lancet in July 2013 shows that India contributes to about 20% of CKDu cases. [12]

Another study in the Udhanam seaside coastal region (Andhra Pradesh) discovered proteinuria occurrence of 15.3% (54/354) in farmers, higher in males than females (20% vs. 12% correspondingly) [13].

Aim of the Study: To find out Incidence of chronic kidney disease of unknown etiology in MGM tertiary center.

Objective of the Study:

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:

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 the study.
5. Patients admitted in MGM Hospital.

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 MGM Medical College and hospital, Aurangabad.

Study Center: MGM's Medical College & Hospital Aurangabad

Study Design: It is a cross sectional observational study.

Study was conducted as per ICH GCP guidelines, Schedule Y & declaration of Helsinki. Study was conducted after obtaining permission from institutional ethics committee in MGM hospital.

Sample size: Number of patients within duration of study.

Method of Analysis: The collected data was compiled in MS excel sheet 2007 for analysis of this data SPSS version 20.0 was be 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.

Observations and Results

Table 1: Incidence of patients of CKDu and CKD

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

Present study consists of 210 patients of CKD who presented to MGM Hospital, Aurangabad over a period of 2 years. Out of which 38 patients (18.09%) were of CKDu.

Table 2: Age wise distribution of patients

		CKDu [n=38]		CKD [N=200]		Chi-square and p-value
		No. of cases	Percentage	No. of cases	Percentage	
Age group	21-30 years	9	24.0%	39	18.0%	X^2 value= 1.510 p-value= 0.47
	31-40 years	11	28.0%	49	23.0%	
	>40 years	18	48.0%	122	58.0%	
Gender	Males	28	74.0%	150	72.0%	X^2 value=0.972 p-value= 0.831
	Females	10	26.0%	60 (28%)	28.0%	
area	Rural area	28	74.0%	146	69.0%	X^2 value=0.266 p-value=0.606
	Urban area	10	26.0%	64	31.0%	

Equal distribution of patients were seen in age group upto 40 years among both CKD and CKDu patients. Patient with more than 40 years of age had more incidence of CKDu (48%). Out of 38 CKDu diagnosed patients, 10 (26%) were females while 28 (74%) were males. There are more number of CKDu patients (74%) from rural area compared to urban area (26%).

Table 3: Percentage of patients with uncertain etiology (Risk factors)

	CKDu [n=38]		CKD [N=200]		Chi-square and p-value
	No. of cases	Percentage	No. of cases	Percentage	
Well water	11	29.0 %	44	21.0%	X^2 value=3.609 p value= 0.307
Occupation (Farmer)	7	19.0 %	54	26.0%	
Family History	4	10.0 %	42	20.0 %	
Agrochemical use	11	29.0 %	44	21.0%	
Heat stress	3	8.0 %	21	10.0%	
Dehydration	2	5.0%	5	2.0%	
Total	38	100 %	210	100 %	

Among CKDu patients, 29% patients had history of well water consumption, 19% were farmers and 29% had history of exposure to agrochemicals.

Table 4: Percentage of illiterate patients and consumption of alcohol.

	CKDu [n=38]		CKD [N=200]	
	No. of cases	Percentage	No. of cases	Percentage
Illiterate	16	43.0 %	87	41.0%
Consumed Alcohol	19	50.0%	81	39.0%

More percentage of CKD and CKDu patients were illiterate. It was observed that patients consuming alcohol has higher percentage of having CKDu (50%).

Table 5: Percentage of patients with anemia, IHD, CVA.

	CKDu [n=38]		CKD [N=200]	
	No. of cases	**Percentage**	**No. of cases**	**Percentage**
Anemia	24	62.0 %	105	50.0%
Ischemic heart disease	3	8.0%	21	10.0%
CVA	2	5.0 %	13	6.0%

Higher percentage of patients with CKDu had anemia (62%).

Table 6: Stage of Disease Wise Distribution of patients

Stages	**CKDu [n=38]**		**CKD [N=200]**		**Chi-square and p-value**
	No. of cases	**Percentage**	**No. of cases**	**Percentage**	
Stage 1-3	12	31.0%	42	20.0%	X^2 value= 2.533 p-value=0.112
Stage 4 & Stage 5	26	69.0%	168	80.0%	
Total	38	100%	210	100%	

Maximum patients with CKD and CKDu presented to the hospital at stage 4 and 5 of the disease.

Discussion

Current existing systematic indication is fragmented with gaps in knowledge about the etiology of CKDu. Most available studies rely on suboptimal designs. Over last 20 years, the prevalence of CKD in Maharashtra has gained attention among the general population and the medical fraternity. The catastrophic effects of CKD has lead to development of certain measures on a large scale such as enhancing nephrological services and infrastructure in affected areas, implementing latest guidelines of renal replacement therapy with individual case management, providing human resource development, enhancing social services and training social workers to address problems faced by CKDu patients and their families, and ensuring streamlined resource management with adequate financial support.

Hence, we undertook this study to determine the prevalence of CKD and associated risk factors among the urban and rural population of Marathwada. 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 prevalence of 0.79% was reported based on serum creatinine estimation in the south zone population of New Delhi, whereas the prevalence of decreased Modification of Diet in Renal Disease-GFR was 4.2% in the north Indian population [14]. In another study undertaken in the rural population of south India, it was found that the prevalence of decreased Modification of Diet in Renal Disease-GFR was 4.35% and prevalence of CKDu was 6.3% [15]. 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. The prevalence of CKDu in Andhra Pradesh [2,3] is at least 3 to 4 times higher than the prevalence reported in any of the previously mentioned studies.

In Sri Lanka, El Salvador, and Nicaragua, CKDu has emerged as an increasing public health problem with increased mortality. The prevalence of CKDu was between 13% and 18% and 17% respectively, in these 3 regions [16,17].

We carried out the study at MGM Medical College and hospital, Aurangabad and included 210 patients of CKD over 2 years' period. We found out that the prevalence of CKDu was 18.10% (38 patients) while the prevalence of diabetes and hypertension were 42% and 26% respectively. Male predominance in the ratio 3:1 was observed. 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 conducted a cross-sectional study that showed predominance in males (66.04%) than females (33.96%) [18].

United States Renal Data System 2004 annual data report revealed that the incidence rate of CKDu is higher for males with 409/million population compared to 276 for females. Rajapurkar and Dabhi (2010) has observed CKDu had a higher frequency in males, whereas those with CKD of unknown etiology were younger and had more females 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 [19]. Furthermore, 19% of patients were agricultural farm workers or labors. 29% of patients had history of drinking water from well. 29% of the patients had history of using fertilizers and pesticides in farming.

On the other hand, 74% patients were from rural area and 26% patients were from urban area. Similarly, we found the influence of Farming occupation on the prevalence of CKDu in Andhra Pradesh. [22]

It was also found that 43% patients were illiterate and 50% 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.

Conclusion

Chronic kidney disease has emerged as a major pandemic with increasing number of patients every year. CKDu is one of the major causes of mortality and disability in India but minimal data is available for the disease. Diseases like diabetes and post streptococcal glomerulonephritis are preventable and CKD progression can be intervened. The CKDu population in hospitals has shown increased proportion of younger patients from poor socioeconomic classes presenting in ESRD.

Hence, Preventive measures should be our primary goal towards better management of CKDu. Malnutrition, poor socioeconomic background, illiteracy and use of agrochemicals are emerging contributory factors for CKD among young population in India. In this study study, we found out that least patients had CKDu while diabetes and hypertension still remain major risk factors. Males predominated, male to female ratio being 3:1.

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 did random sampling without bias for occupation, gender, literacy, or socioeconomic status. This has ensured good compliance from the subjects and accuracy of the data. There are a few limitations in the study. Since the study was conducted in a specific geographic area, it suggested higher prevalence of CKDu in a single centre.

Ethics Approval and Consent to Participate: Ethical approval for conducting the study was obtained from MGM Medical College and Hospital, Chh. Smabhajinagar, Maharashtra. Written informed consent was obtained from the patients for their participation in the study.

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