ISSN: 0975-3583, 0976-2833 VOL15, ISSUE7, 2024

Chronic Kidney Disease and Its Clinical Correlates in a Rural Community in Northern India

Authors: Dr. Ankit Sharma[1] (Assistant Professor)& Dr. Mohit Naredi[2] (Assistant Professor)
Dept. of Nephrology, Super Specialty Hospital, GRMC, Gwalior, M.P.[1]
Division of Nephrology, Department of Medicine, Pacific Medical College Udaipur[2]

Corresponding Author: Dr. Ankit Sharma

Abstract

Background & Methods: The aim of the study is to Assess Chronic Kidney Disease and Its Clinical Correlates in a Rural Community in Northern India. Renal biopsies were collected in 10% formaldehyde for routine processing wherever needed and fresh for immunofluorescence. Formalin fixed paraffin sections of the renal tissue were stained with hematoxylin and eosin, sliver stains for basement membranes and other special stains when required. Direct immunofluorescence for IgG, IgA, IgM and C3 were performed on fresh samples.

Results: We found maximum clinical manifestation in Pedal Oedema 28%, followed by Headache 26% & 14% in Nausea & Vomiting, The chi-square statistic is 7.5452. The *p*-value is .037609. The result is significant at $p < .05$.

Conclusion: CKD is on the rise in our communities, possibly because of a rise in the incidence of its traditional risk factors. CKD is strongly associated with diabetes, increased systolic blood pressure, pulse pressure, CGN, medication, Renal calculi. The modifiable risk factors should be optimized to prevent or at least slow down the seemingly relentless progression of CKD to renal failure.

Keywords: chronic, kidney, clinical, correlates & rural.

Study Design: Observational Study.

Introduction

A decrease in glomerular filtration rate of ≤60 mL/min/1.73m2 for ≥3 months, with or without kidney injury, is referred to as chronic kidney disease (CKD) [1]. With a frequency of 14.3% in the general population, chronic kidney disease (CKD) is a growing issue on a global scale. As of 2016, over 1 billion adults worldwide were impacted. The risk of death increases

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE7, 2024

sharply after renal replacement treatment (RRT), which is administered to over a million people. In 2017, CKD claimed the lives of almost 1.2 million people.4 CKD is currently the 12th most common cause of death globally. The frequency of chronic kidney disease (CKD) has risen by 29.3% in the past three decades [2].

Kidney problems have been reported to affect 15% of people aged 15 to 70 in endemic regions, based on a chronically increased urine albumin-creatinine ratio of ≥30 mg/g.[3] The rural male paddy farming community seems to be the group most at risk. A persistently raised urine albumin-creatinine ratio of ≥30 mg/g has been used in a recent investigation to show a higher prevalence of early illness in females.[4] This observation has not been confirmed, though. The development of this disease is usually subtle, and it progresses slowly to end-stage renal disease. The primary cause of indoor death in the impacted areas is endemic CKDU, which has caused significant social and economic hardship for both individuals and the country as a whole [5].

Even in developed countries where insurance helps to lessen the financial burden, the cost of RRT can be unaffordable for most families once it is implemented. It is approximately 36 times greater than what patients with Stage 5 CKD who do not require RRT pay. But the burden of chronic kidney disease (CKD) is just as great in developing as it is in industrialized nations. This implies that most people in need of medical care will not be able to pay for it.

Age is recognized to have a significant impact on chronic kidney disease (CKD), and as people age, their functional nephrons gradually decline. Other known risk factors for chronic kidney disease (CKD) include hypertension, diabetes mellitus, sickle cell disease, medications, herbal mixes, inflammatory diseases, and human immunodeficiency virus infections [6-7]. An effective healthcare system should be able to maximize control and identify the modifiable risk factors of chronic kidney disease (CKD) early. This is due to the fact that it is typically too late to take action once kidney failure symptoms appear.

Material and Methods

Present study was conducted at Department of Nephrology GRMC, Gwalior & Division of Nephrology, Pacific Medical College Udaipur for 01 Year 100 cases. All biopsies were performed as part of the routine diagnostic work-up of the patients suspected of CGN. Patients who were highly suspected for diabetic kidney disease were checked for diabetic retinopathy, proteinuria of more than 10gms in diabetic patients and other having any

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE7, 2024

persistent urinary abnormality, renal insufficiency or abnormal renal parenchymal patterns on ultrasound assessment, in the absence of systemic diseases which can cause renal diseases such as diabetes and hypertension, were suspected and if willing, underwent biopsy. Those who were in end-stage renal disease were not biopsied.

Inclusion Criteria: Eligible participants were adults aged 18 years and above who had been living in the study for more than 03 months.

Exclusion Criteria: We excluded individuals with serious mental or physical (limb amputation or paralysis) disability, pregnant or breastfeeding women and participants with simultaneous urinary tract infections and urine nitrites.

Result

Table No. 1:Gender Distribution

S. No.	Gender	No.	Percentage	P Value
1	Male	43	43	
2	Female	57	57	.544536

Age (years) Mean±SD: 64.7±13.6

Weight (kg) Mean±SD:60.4±11.9

Height (cm) Mean±SD: 155.1±6.4

The chi-square statistic is 0.3672. The *p*-value is .544536. The result is *not* significant at $p < .05$.

Table No. 2: Smoking & Alcohol Habits

S. No.	Smoking habits	No.	Percentage	P Value
1	NO	73	73	
2	Quit	13	13	< .00001
3	Till Now	14	14	
S. No.	Alcohol consumption	No.	Percentage	P Value
1	Do not drink	66	66	
2	Used to drink	13	13	< .00001
3	Continued drinking	21	21	

The chi-square statistic is 31.8395. The p-value is < .00001. The result is significant at $p < .05$.

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE7, 2024

The chi-square statistic is 26.5782. The *p*-value is < .00001. The result is significant at $p < .05$.

Table No. 3: Underlying Diseases

S. No.	Underlying Diseases	No.	Percentage	P Value
1	Hypertension	51	51	.049325
2	HT (with DM)	27	27	
3	DM	37	37	
4	CGN	21	21	
5	Gout	04	04	
6	Renal Calculi	03	03	

The chi-square statistic is 5.2027. The *p*-value is .049325. The result is significant at $p < .05$.

Table No. 4: Biochemical Parameters

S. No.	Biochemical Parameters	Mean	SD	P Value
1	Serum urea (mmol/L)*	3.6	1.9	.042116
2	Serum creatinine (µmol/L)*	118.3	34.6	
3	Serum uric acid (mmol/L)*	0.41	0.52	
4	Random blood glucose (mmol/L)*	5.5	2.0	
				P Value
	Mean eGFR, ml/min	Mean	SD	.498011
1	MDRD	110.9	7.1	
2	CKD-EPI	107.2	5.3	
3	CG	88.2	0.9	

The chi-square statistic is 3.772. The *p*-value is .042116. The result is significant at $p < .05$.

The chi-square statistic is 0.6282. The *p*-value is .428011. The result is *not* significant at $p < .05$.

Table No. 5: Clinical Manifestation

S. No.	Clinical	No.	Percentage	P Value

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE7, 2024

	manifestation			
1	Pedal Oedema	**28**	**28**	.037609
2	Headache	**26**	**26**	
3	Nausea & Vomiting	**14**	**14**	
4	Fever	**09**	**09**	
5	Pruritis	**09**	**09**	
6	Chest pain	**07**	**07**	
7	Breathlessness	**07**	**07**	

We found maximum clinical manifestation in Pedal Oedema 28%, followed by Headache 26% & 14% in Nausea & Vomiting, The chi-square statistic is 7.5452. The *p*-value is .037609. The result is significant at $p < .05$.

Discussion

46.3% of the participants in this study had CKD. A prevalence of 2.5% to 26% was found in a recent systematic evaluation of population-based studies conducted between 2008 and 2014; the only other study that used the CKD Epidemiology Collaboration equation reported a prevalence of 11.3%. Their age is most likely the cause of the disparity in prevalence; the mean age of CKD patients in this study was 65.4 years, more than 21 years younger than the mean age in the previous study, which was 43.7 years [8]. However, the study's demographics might have been impacted by men leaving their home countries in search of better opportunities as well as poor health-seeking behavior [9].

Nomograms have already been developed to demonstrate the irreversible reduction in renal function with aging, making age one of the traditional risk factors for renal impairment. According to Nitta et al.'s research, as CKD advanced from Stage 3 to Stage 5, the average age increased significantly. As people age, their number of functional nephrons gradually declines. According to this study, people with CKD were roughly 15 years older than people without it. Gao et al. discovered that people with CKD were roughly 21 years older than people without CKD, using the same definition of CKD [10–12].

Age was one of the important risk factors for CKD in the research population. According to earlier Thai and international reports, the prevalence of CKD was significantly higher in the 60–69 and ≥70 year age groups. It was proposed to change the definition of chronic kidney

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE7, 2024

disease (CKD) to include age-specific GFR thresholds because older people are known to be at a higher risk for renal injury, but they also have aging kidneys that may not represent kidney damage. Furthermore, despite the fact that CKD is more common in women than in males in the majority of geographic areas, there are regional variances, as the current study shows [13]. This may be associated with a less healthy lifestyle and a greater likelihood of coming into touch with CKD-related chemicals from an agricultural setting, especially for the men in this study. Underweight, which may be caused by the loss of muscle mass and function seen in both dialysis and non-dialysis CKD patients, but especially in the final three stages and in older people, was another positively linked predictor with CKD in the population [14]. Chinese patients who were underweight were shown to have a significant risk of renal failure, which supports these recent findings.

Conclusion

Chronic Kidney Disease is a highly prevalent condition seen in increasing age group associated with greater impact on morbidity and mortality in these patients. CKD is associated with abnormalities in different haematological and biochemical parameters that require early investigation and treatment. Also, Diabetic Kidney Disease patients (DKD) show greater degree of risk compared to Non-Diabetic Kidney Disease (NDKD) patients. Maximum clinical manifestation in Pedal Oedema 28%, Abnormal renal function tests and hyperphosphatemia is associated with great cardiovascular mortality in CKD patients.

References

1. Praditpornsilpa, K. et al. The need for robust validation for MDRD-based glomerular filtration rate estimation in various CKD populations.Nephrol. Dial. Transplant. 26, 2780–2785. https:// doi.org/ 10. 1093/ ndt/ gfq815 (2011).

2. Hill, N. R. et al. Global prevalence of chronic kidney disease—a systematic review and meta-analysis. Plos One 11, e0158765. https:// doi.org/ 10. 1371/ journ al. pone.01587 65 (2016).

3. Krol, E. et al. Early detection of chronic kidney disease: Results of the PolNef study. Am. J. Nephrol. 29, 264–273. https:// doi.org/ 10. 1159/ 00015 8526 (2009).

4. Delanaye, P. et al. CKD: A call for an age-adapted definition. J. Am. Soc. Nephrol. 30, 1785 1805.https:// doi.org/ 10. 1681/ ASN.20190 30238 (2019).

5. Coresh, J., Astor, B. C., Greene, T., Eknoyan, G. &Levey, A. S. Prevalence of chronic kidney disease and decreased kidney function in the adult US population: Third national

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE7, 2024

health and nutrition examination survey. Am. J. Kidney Dis. 41, 1–12. https:// doi.org/ 10. 1053/ ajkd. 2003. 50007 (2003).

6. Habib A, Ahmad R, Rehman S. Hematological changes in patientsof chronic renal failure and the effect of hemodialysis on these parameters. Int J Res Med Sci. 2017;5(11):4998–5003.

7. Zhang, L. et al. Prevalence of chronic kidney disease in China: A cross-sectional survey. Lancet 379, 815–822. https:// doi.org/ 10. 1016/ S0140- 6736(12) 60033-6 2012.

8. An, J. N. et al. Late stage 3 chronic kidney disease is an independent risk factor for sarcopenia, but not proteinuria. Sci. Rep. 11, 18472.https:// doi.org/ 10. 1038/ s41598- 021-97952-7 2021.

9. Mori, K. et al. Impact of diabetes on sarcopenia and mortality in patients undergoing hemodialysis.BMC Nephrol.20, 105.https:// doi.org/ 10. 1186/ s12882- 019- 1271-8 2019.

10. Reynolds, K. et al. Body mass index and risk of ESRD in China. Am. J. Kidney Dis. 50, 754–764. https:// doi.org/ 10. 1053/j. ajkd.2007. 08. 011 2007.

11. Provenzano, M. et al. Smoking habit as a risk amplifier in chronic kidney disease patients. Sci. Rep. 11, 14778.https:// doi.org/ 10. 1038/ s41598- 021- 94270-w 2021.

12. Rajapurkar MM, John GT, Kirpalani AL, Abraham G, Agarwal SK, Almeida AF, et al. What do we know about chronic kidney disease in India: first report of the Indian CKD registry.BMC Nephrol. 2012;13:10.

13. Matsha TE, Yako YY, Rensburg MA, Hassan MS, Kengne AP, Erasmus RT. Chronic kidney diseases in mixed ancestry south African populations: prevalence, determinants and concordance between kidney function estimators. BMC Nephrol. 2013;14:75.

14. Singh NP, Ingle GK, Saini VK, Jami A, Beniwal P, Lal M, et al. Prevalence of low glomerular filtration rate, proteinuria and associated risk factors in North India using Cockcroft-Gault and Modification of Diet in Renal Disease equation: an observational, cross-sectional study. BMC Nephrol. 2009;10:4.