

Assessment of the Clinical and Etiological Profile of Patients with Chronic Kidney Disease

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Abstract

Background: Chronic kidney disease (CKD) is a progressive and irreversible decline in renal function that has become a major global health concern because of its increasing prevalence, high morbidity, and associated mortality. The disease is commonly associated with diabetes mellitus, hypertension, and other chronic disorders, leading to significant clinical and economic burden. Understanding the clinical presentation and etiological profile of CKD patients is essential for early diagnosis, appropriate management, and prevention of disease progression.

Aim: To examine the clinical and etiological profiles of patients with chronic kidney disease.

Methods: A hospital-based descriptive observational study was conducted among 160 patients diagnosed with chronic kidney disease at a tertiary care teaching hospital. Adult patients fulfilling the diagnostic criteria for CKD were enrolled after obtaining informed consent. Demographic characteristics, clinical signs and symptoms, etiological factors, and laboratory parameters including hemoglobin, blood urea, and serum creatinine were recorded using a structured data collection form. Data were analyzed using SPSS version 26.0. Continuous variables were expressed as mean $\pm$ standard deviation, while categorical variables were presented as frequencies and percentages. A p-value of <0.05 was considered statistically significant.

Results: Among the 160 study participants, 54.4% were above 60 years of age and 67.5% were males. Pedal edema (59.0%) and pallor (51.1%) were the most common clinical signs, whereas anorexia (61.4%), oliguria (55.6%), and generalized weakness (54.2%) were the predominant presenting symptoms. Diabetes mellitus (37.3%) was the leading etiological factor, followed by hypertension (21.7%) and chronic glomerulonephritis (19.2%). Laboratory evaluation revealed that 50.6% of patients had hemoglobin levels between 5–10 g/dL, 42.5% had blood urea levels between 100–200 mg/dL, and 51.9% had serum creatinine levels between 5–10 mg/dL, indicating advanced renal impairment in a substantial proportion of patients.

Conclusion: The study demonstrated that chronic kidney disease predominantly affected elderly male patients, with diabetes mellitus and hypertension being the most common etiological factors. Fluid overload, anemia-related manifestations, and uremic symptoms were frequently observed. Early identification of high-risk individuals, routine screening, and effective management of diabetes and hypertension are essential for preventing disease progression, reducing complications, and improving the quality of life of patients with chronic kidney disease.

Keywords: Chronic Kidney Disease, Clinical Profile, Etiology, Diabetes Mellitus, Hypertension, Renal Impairment.

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Introduction

Chronic kidney disease (CKD) is a major public health problem worldwide and is characterized by a gradual and irreversible decline in kidney function over time. It is associated with significant morbidity, mortality, and healthcare expenditure due to its progressive nature and the increased risk of cardiovascular disease, end-stage renal disease

(ESRD), and premature death. Early identification of the clinical manifestations and underlying etiological factors is essential for timely intervention and improved patient outcomes. [1,2] The global burden of CKD has increased substantially over the past few decades owing to the rising prevalence of diabetes mellitus,

hypertension, obesity, and an aging population. CKD affects approximately 10–15% of the adult population worldwide and has emerged as one of the leading causes of disability-adjusted life years. Developing countries, including India, face an even greater challenge because of delayed diagnosis, limited healthcare resources, and inadequate awareness regarding kidney diseases. [3–5]

The clinical presentation of CKD varies according to the stage of disease and underlying etiology. Patients commonly present with symptoms such as fatigue, generalized weakness, edema, decreased urine output, hypertension, nausea, and anorexia, dyspnea, and electrolyte abnormalities. As renal function progressively deteriorates, multiple organ systems become affected, leading to anemia, mineral and bone disorders, cardiovascular complications, and metabolic disturbances. Understanding these clinical features helps clinicians diagnose CKD at an earlier stage and initiate appropriate treatment strategies. [6,7]

Diabetes mellitus and hypertension are recognized as the leading causes of CKD globally, accounting for the majority of cases. Other important etiological factors include chronic glomerulonephritis, obstructive uropathy, hereditary kidney disorders, polycystic kidney disease, recurrent urinary tract infections, autoimmune diseases, and nephrotoxic drug exposure. The distribution of these etiological factors varies across different geographical regions depending on socioeconomic conditions, healthcare accessibility, and lifestyle-related risk factors. [8,9]

A comprehensive evaluation of the clinical and etiological profile of CKD patients is essential for planning preventive strategies, optimizing disease management, and reducing the burden of complications. Information regarding demographic characteristics, presenting symptoms, associated comorbidities, and underlying causes provides valuable insight into disease patterns within a particular population. Such evidence also supports healthcare policymakers in designing effective screening and intervention programs. [10]

Therefore, the present study was undertaken to evaluate the clinical and etiological profile of patients with chronic kidney disease. The study aimed to identify the common demographic characteristics, clinical manifestations, associated comorbidities, and etiological factors among patients diagnosed with CKD.

Material and Methods

A hospital-based descriptive observational study was conducted to evaluate the clinical and etiological profile of patients with chronic kidney disease. The study was carried out in the Department of Nephrology of a tertiary care

teaching hospital over a period of twelve months after obtaining approval from the Institutional Ethics Committee.

A total of 160 patients diagnosed with chronic kidney disease were included in the study using a consecutive sampling technique. Adult patients aged 18 years and above with CKD diagnosed according to established clinical and laboratory criteria and willing to provide written informed consent were enrolled. Patients with acute kidney injury, renal transplant recipients, critically ill patients unable to provide reliable clinical information, and those unwilling to participate were excluded from the study.

After obtaining informed consent, detailed demographic information including age, gender, residence, occupation, and relevant medical history was recorded using a predesigned structured case record form. Clinical assessment included presenting symptoms such as edema, fatigue, oliguria, breathlessness, nausea, vomiting, and loss of appetite, hypertension, and other associated manifestations. Information regarding coexisting illnesses including diabetes mellitus, hypertension, cardiovascular disease, and other systemic disorders was also documented.

Etiological evaluation was performed using detailed clinical history, physical examination, laboratory investigations, imaging findings, and available medical records. The primary etiological factors were categorized as diabetic nephropathy, hypertensive nephrosclerosis, chronic glomerulonephritis, obstructive nephropathy, polycystic kidney disease, chronic interstitial nephritis, and other miscellaneous causes.

Laboratory investigations included complete blood count, serum creatinine, blood urea, estimated glomerular filtration rate (eGFR), serum electrolytes, urine routine examination, urine protein estimation, blood glucose, glycated hemoglobin (HbA1c), lipid profile, and ultrasonography of the kidneys whenever indicated. CKD staging was performed according to standard clinical guidelines based on estimated glomerular filtration rate.

The collected data were entered into Microsoft Excel and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0. Continuous variables were expressed as mean $\pm$ standard deviation, while categorical variables were presented as frequencies and percentages. Associations between variables were analyzed using the Chi-square test or Fisher's exact test for categorical data and the independent t-test for continuous variables. A p-value of less than 0.05 was considered statistically significant.

Results

Table 1: A total of 160 patients with chronic kidney disease were included in the study. The majority of patients belonged to the age group of more than 60 years (54.4%), followed by 36–60 years (35.0%) and 18–35 years (10.6%). Male patients constituted 67.5% of the study population, while females accounted for 32.5%, indicating a predominance of CKD among males in the present study.

Table 2: The most common clinical sign observed among CKD patients was pedal edema, present in 94 (59.0%) patients, followed by pallor in 82 (51.1%) patients. Pleural effusion and ascites were observed in 46 (28.9%) and 42 (26.5%) patients, respectively. Pulmonary edema was present in 33 (20.5%) patients, pruritus in 31 (19.3%), and weight loss in 25 (15.7%) patients. These findings indicate that fluid overload and anemia-related manifestations were the predominant clinical signs among CKD patients. **Table 3:** Anorexia was the most frequently reported clinical symptom, affecting 98 (61.4%) patients, followed by oliguria in 89 (55.6%) and generalized weakness in 87 (54.2%) patients. Dyspnea was reported by 69 (43.4%) patients, while nausea and facial puffiness were observed in 54 (33.4%) and 48 (30.1%) patients, respectively. Altered sensorium, abdominal pain, polyuria, and convulsions were less frequently reported, occurring in 14.5%, 10.3%, 8.4%, and 6.0% of patients, respectively.

Table 4: Diabetes mellitus was identified as the leading etiological factor for chronic kidney

disease, accounting for 60 (37.3%) patients. Hypertension was the second most common cause, observed in 35 (21.7%) patients, followed by chronic glomerulonephritis in 31 (19.2%) patients. Obstructive uropathy was responsible for CKD in 12 (7.2%) patients, while other miscellaneous causes, chronic interstitial nephritis, and unknown etiology accounted for 6.0%, 3.6%, and 2.4% of cases, respectively.

Table 5: Hemoglobin estimation revealed that the majority of patients, 81 (50.6%), had hemoglobin levels between 5 and 10 g/dL. Severe anemia with hemoglobin levels below 5 g/dL was observed in 50 (31.3%) patients, whereas only 29 (18.1%) patients had hemoglobin levels above 10 g/dL, indicating a high prevalence of anemia among CKD patients.

Table 6: Blood urea analysis showed that 68 (42.5%) patients had blood urea levels between 100 and 200 mg/dL. Blood urea levels of 200–300 mg/dL were observed in 42 (26.3%) patients, while 33 (20.6%) patients had levels below 100 mg/dL. Only 17 (10.6%) patients demonstrated blood urea levels exceeding 300 mg/dL. **Table 7:** Serum creatinine assessment demonstrated that the majority of patients, 83 (51.9%), had serum creatinine levels between 5 and 10 mg/dL. Serum creatinine levels greater than 10 mg/dL were found in 44 (27.5%) patients, whereas 33 (20.6%) patients had serum creatinine levels below 5 mg/dL, reflecting varying degrees of renal impairment among the study participants.

Table 1: Demographic characteristics of study participants (n = 160)

Variable	n	%
Age distribution (years)		
18–35	17	10.6
36–60	56	35.0
>60	87	54.4
Gender distribution		
Male	108	67.5
Female	52	32.5

Table 2: Clinical signs among CKD patients (n = 160)

Clinical sign*	n	%
Pedal edema	94	59.0
Pallor	82	51.1
Pleural effusion	46	28.9
Ascites	42	26.5
Pulmonary edema	33	20.5
Pruritus	31	19.3
Weight loss	25	15.7

*Multiple responses were possible.

Table 3. Clinical symptoms among CKD patients (n = 160)

Clinical symptom*	n	%
Anorexia	98	61.4
Oliguria	89	55.6
Generalized weakness	87	54.2
Dyspnea	69	43.4
Nausea	54	33.4
Facial puffiness	48	30.1
Altered sensorium	23	14.5
Abdominal pain	16	10.3
Polyuria	13	8.4
Convulsions	10	6.0

*Multiple responses were possible.

Table 4: Etiological profile of CKD patients (n = 160)

Etiology	n	%
Diabetes mellitus	60	37.3
Hypertension	35	21.7
Chronic glomerulonephritis	31	19.2
Obstructive uropathy	12	7.2
Others	10	6.0
Chronic interstitial nephritis	6	3.6
Unknown etiology	4	2.4

Table 5: Hemoglobin distribution among CKD patients (n = 160)

Hemoglobin (g/dL)	n	%
<5	50	31.3
5–10	81	50.6
>10	29	18.1

Table 6: Blood urea levels among CKD patients (n = 160)

Blood urea (mg/dL)	n	%
<100	33	20.6
100–200	68	42.5
200–300	42	26.3
>300	17	10.6

Table 7: Serum creatinine levels among CKD patients (n = 160)

Serum creatinine (mg/dL)	n	%
<5	33	20.6
5–10	83	51.9
>10	44	27.5

Discussion

Chronic kidney disease (CKD) is a progressive disorder associated with significant morbidity and mortality worldwide. The present study evaluated the clinical and etiological profile of 160 patients diagnosed with CKD and demonstrated that elderly individuals, particularly males, constituted the majority of affected patients. Diabetes mellitus and hypertension emerged as the leading etiological factors, while pedal edema, pallor, anorexia, oliguria, and generalized weakness were the most common clinical manifestations. These findings are consistent with the changing epidemiological pattern of CKD reported globally. [11]

The present study showed that more than half of the patients were above 60 years of age, indicating that advancing age is an important risk factor for CKD. Age-related decline in renal function, prolonged exposure to hypertension and diabetes, and increased prevalence of vascular disease contribute to the higher burden of CKD among older adults. Similar observations have been reported in large epidemiological studies evaluating the global burden of kidney disease. [11,14]

Male predominance was observed in the present study, which is in agreement with previous reports suggesting that men are more frequently affected by CKD and often present with advanced stages of renal impairment. Lifestyle factors, higher

prevalence of cardiovascular risk factors, delayed healthcare utilization, and occupational exposures may contribute to this gender difference. [13]

Among the etiological factors, diabetes mellitus was identified as the leading cause of CKD, followed by hypertension and chronic glomerulonephritis. The increasing prevalence of diabetes and hypertension has substantially altered the etiological profile of CKD over the past two decades, making diabetic nephropathy the predominant cause of chronic renal failure worldwide. Similar trends have been documented in both developed and developing countries. [11,15] The clinical manifestations observed in this study reflected the multisystem involvement associated with progressive renal dysfunction. Pedal edema and pallor were the most common clinical signs, whereas anorexia, oliguria, generalized weakness, dyspnea, and nausea were the predominant symptoms. These findings are attributable to fluid retention, anemia, electrolyte imbalance, accumulation of uremic toxins, and reduced erythropoietin production commonly seen in CKD patients. Comparable symptom profiles have been described in previous clinical studies evaluating CKD populations. [12]

Laboratory findings demonstrated that a large proportion of patients had moderate to severe anemia, elevated blood urea, and increased serum creatinine levels, indicating advanced renal impairment at the time of presentation. Anemia remains one of the most frequent complications of CKD because of inadequate erythropoietin production and iron metabolism abnormalities. Elevated blood urea and serum creatinine reflect progressive decline in glomerular filtration rate and remain important biochemical markers for assessing disease severity. These observations are supported by previous international reports on CKD progression. [11,15]

The findings of the present study emphasize the importance of early screening and timely management of individuals at high risk for CKD, particularly patients with diabetes mellitus and hypertension. Early diagnosis, appropriate treatment of underlying causes, lifestyle modification, and regular monitoring of renal function may delay disease progression and reduce CKD-related complications. Public health initiatives focusing on awareness, early detection, and risk factor control are essential to reduce the growing burden of chronic kidney disease. [13,14]

Although the study provides valuable information regarding the clinical and etiological characteristics of CKD patients, it was conducted at a single tertiary care center and included a limited number of participants. Larger multicenter studies involving diverse populations are recommended to

further evaluate regional variations in the clinical presentation and etiological spectrum of chronic kidney disease.

Conclusion

The present study demonstrated that chronic kidney disease predominantly affected elderly male patients, with diabetes mellitus and hypertension being the principal etiological factors. Pedal edema, pallor, anorexia, oliguria, and generalized weakness were the most common clinical manifestations, while anemia and elevated renal function parameters were frequently observed laboratory abnormalities.

The findings highlight the importance of early identification of high-risk individuals, effective management of diabetes and hypertension, and routine screening for kidney disease to reduce disease progression and improve patient outcomes. Comprehensive preventive strategies and timely therapeutic interventions remain essential for minimizing the growing burden of chronic kidney disease.

References

1. Levin A, Stevens PE, Bilous RW, Coresh J, De Francisco ALM, De Jong PE, Eknoyan G. Kidney disease: Improving Global Outcomes (KDIGO) CKD guideline work group. KDIGO 2012 clinical practice guideline for the evaluation and management of chronic kidney disease. *Kidney Int Suppl.* 2013;3(1):1-150.
2. Webster AC, Nagler EV, Morton RL, Masson P. Chronic kidney disease. *Lancet.* 2017;389(10075):1238-52.
3. Jha V, Garcia-Garcia G, Iseki K, Li Z, Naicker S, Plattner B, Saran R. Chronic kidney disease: global dimension and perspectives. *Lancet.* 2013;382(9888):260-72.
4. Levey AS, Coresh J, Balk E, Kausz AT, Levin A, Steffes MW, Hogg RJ. National Kidney Foundation practice guidelines for chronic kidney disease: evaluation, classification, and stratification. *Ann Intern Med.* 2003;139(2):137-47.
5. Coresh J, Selvin E, Stevens LA, Manzi J, Kusek JW, Eggers P, Van Lente F. Prevalence of chronic kidney disease in the United States. *JAMA.* 2007;298(17):2038-47.
6. Eckardt KU, Coresh J, Devuyst O, Johnson RJ, Köttgen A, Levey AS, Levin A. Evolving importance of kidney disease: from subspecialty to global health burden. *Lancet.* 2013;382(9887):158-69.
7. Gansevoort RT, Correa-Rotter R, Hemmelgarn BR, Jafar TH, Heerspink HJL, Mann JFE, Matsushita K. Chronic kidney disease and cardiovascular risk: epidemiology,

- mechanisms, and prevention. *Lancet*. 2013;382(9889):339-52.
8. Hill NR, Fatoba ST, O'Keefe LM, Oke JL, Hirst JA, O'Callaghan CA, Lasserson DS. Global prevalence of chronic kidney disease – A systematic review and meta-analysis. *PLoS One*. 2016;11(7):e0158765.
 9. Kazancıoğlu R. Risk factors for chronic kidney disease: an update. *Kidney Int Suppl*. 2013;3(4):368-71.
 10. Chen TK, Knicely DH, Grams ME. Chronic kidney disease diagnosis and management: a review. *JAMA*. 2019;322(13):1294-304.
 11. Bikbov B, Purcell CA, Levey AS, Smith M, Abdoli A, Abebe M, Adebayo OM, et al. Global, regional, and national burden of chronic kidney disease, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*. 2020;395(10225):709-33.
 12. National Kidney Foundation. KDOQI clinical practice guidelines for chronic kidney disease: evaluation, classification, and stratification. *Am J Kidney Dis*. 2002;39(2 Suppl 1):S1-S266.
 13. Nugent RA, Fathima SF, Feigl AB, Chyung D. The burden of chronic kidney disease on developing nations: a 21st century challenge in global health. *Nephron Clin Pract*. 2011;118(3):c269-c277.
 14. Fraser SDS, Roderick PJ. Kidney disease in the Global Burden of Disease Study 2017. *Nat Rev Nephrol*. 2019;15(4):193-4.
 15. Bello AK, Levin A, Lunney M, Osman MA, Ye F, Ashuntantang G, Johnson DW, et al. Global Kidney Health Atlas: a report by the International Society of Nephrology on the global burden of end-stage kidney disease and capacity for kidney replacement therapy and conservative care across world countries and regions. *Kidney Int Suppl*. 2021;11(4):e1-e81.