

Original Research Article

CLINICAL PROFILE, ETIOLOGICAL SPECTRUM, AND SHORT-TERM OUTCOMES OF ACUTE KIDNEY INJURY AMONG ADULTS ADMITTED TO A TERTIARY CARE HOSPITAL: A PROSPECTIVE OBSERVATIONAL STUDY

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Received : 05/08/2026
Received in revised form : 05/09/2026
Accepted : 17/09/2026

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DOI: 10.70034/ijmedph.2026.3.916

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (3); 5950-5958

ABSTRACT

Background: Acute kidney injury (AKI) is a common and potentially life-threatening complication among hospitalized adults and is associated with significant morbidity, mortality, prolonged hospitalization, and increased healthcare utilization. Its etiological spectrum varies according to patient characteristics and healthcare settings. Early recognition, identification of reversible causes, and timely management are essential for improving outcomes. The objective is to evaluate the clinical profile, etiological spectrum, severity, management, and short-term outcomes of acute kidney injury among adults admitted to a tertiary care teaching hospital and to identify factors associated with adverse outcomes and in-hospital mortality.

Materials and Methods: This prospective observational hospital-based study was conducted in the Departments of Nephrology over 12 months from January 2025 to December 2025. A total of 160 consecutive adult patients diagnosed with AKI according to the KDIGO 2012 criteria were included. Patients with established end-stage renal disease on maintenance dialysis, CKD stage 5, kidney transplantation, or incomplete clinical data were excluded. Demographic characteristics, clinical features, comorbidities, laboratory parameters, etiological factors, KDIGO stage, treatment modalities, and hospital outcomes were recorded. Patients were followed until discharge or death. Statistical analysis was performed using SPSS version 26.0, with $p < 0.05$ considered statistically significant.

Results: The mean age of the study population was 54.8 ± 15.2 years, with a male predominance (61.3%). Hypertension (50.0%) and diabetes mellitus (45.0%) were the most common comorbidities. Generalized weakness (77.5%) and oliguria (68.8%) were the predominant presenting features. Sepsis was the leading etiology of AKI (32.5%), followed by acute gastroenteritis/dehydration (18.8%), cardiorenal syndrome (12.5%), and drug-induced nephrotoxicity (11.3%). KDIGO Stage III AKI was observed in 35.6% of patients, followed by Stage II (34.4%) and Stage I (30.0%). Conservative management was sufficient in 65.0%, while 35.0% required haemodialysis. Complete renal recovery occurred in 56.3% of patients, partial recovery in 20.0%, and 7.5% remained dialysis-dependent at discharge. In-hospital mortality was 16.2%. Increasing KDIGO stage was significantly associated with adverse outcomes ($p < 0.001$). On multivariable analysis, ICU admission, KDIGO Stage III AKI, sepsis, hyperkalemia, haemodialysis requirement, and age > 60 years were independent predictors of mortality.

Conclusion: AKI among hospitalized adults was predominantly associated with sepsis and dehydration and frequently occurred in patients with metabolic and cardiovascular comorbidities. Advanced KDIGO stage, sepsis, hyperkalemia, older age, ICU admission, and the need for haemodialysis were important

predictors of mortality. Early recognition, prompt treatment of reversible causes, appropriate nephrology intervention, and timely renal replacement therapy are essential to improve short-term outcomes.

Keywords: Acute kidney injury; KDIGO; Sepsis; Haemodialysis; Renal recovery; Mortality; Tertiary care hospital.

INTRODUCTION

Acute kidney injury (AKI) is a common and serious clinical syndrome characterized by an abrupt decline in renal function, resulting in the accumulation of nitrogenous waste products, disturbances in electrolyte and acid-base balance, and impaired regulation of body fluid homeostasis. The condition is associated with substantial morbidity, mortality, prolonged hospitalization, and increased healthcare expenditure worldwide. Despite advances in critical care and nephrology, AKI continues to pose a major public health challenge, particularly in low- and middle-income countries where delayed presentation, infectious diseases, and limited access to specialized care contribute to adverse outcomes.^[1-3]

The Kidney Disease: Improving Global Outcomes (KDIGO) guidelines define AKI as an increase in serum creatinine by ≥ 0.3 mg/dL within 48 hours, an increase to ≥ 1.5 times the baseline value within the previous seven days, or a urine output of less than 0.5 mL/kg/hour for six hours or longer.^[4] The adoption of standardized diagnostic criteria has facilitated early recognition, uniform classification, and comparison of epidemiological data across different healthcare settings.

Globally, AKI affects approximately 13 million individuals each year, with nearly 85% of cases occurring in developing countries. It is estimated that AKI contributes to more than 1.5 million deaths annually.^[5,6]

Hospital-acquired AKI is particularly common among critically ill patients, with reported incidences ranging from 10% to 25% in general hospital admissions and exceeding 50% among patients admitted to intensive care units. Early identification and timely intervention remain essential to reducing the burden of AKI and improving patient survival.^[7]

The etiology of AKI is heterogeneous and varies considerably according to geographical location, socioeconomic conditions, and patient characteristics. In developed nations, AKI is frequently associated with advanced age, diabetes mellitus, hypertension, major surgery, sepsis, and exposure to nephrotoxic medications.^[8] Conversely, in developing countries such as India, community-acquired AKI remains common and is often precipitated by infections, dehydration secondary to acute gastroenteritis, tropical illnesses such as malaria and dengue, snake envenomation, obstetric complications, and delayed referral to tertiary care centers.^[9-11] Sepsis has emerged as the leading cause of AKI in hospitalized patients and is associated with higher rates of renal replacement therapy and mortality.^[12]

The pathophysiology of AKI is multifactorial and involves renal hypoperfusion, endothelial dysfunction, inflammatory cytokine release, oxidative stress, microvascular injury, and tubular epithelial cell damage.^[13] Persistent kidney injury may result in incomplete recovery of renal function, progression to chronic kidney disease (CKD), end-stage kidney disease (ESKD), and increased long-term cardiovascular morbidity. Therefore, AKI is no longer considered a transient event but rather an important determinant of long-term renal and patient outcomes.^[14]

Several patient-related factors influence the development and prognosis of AKI. Advanced age, pre-existing chronic kidney disease, diabetes mellitus, hypertension, heart failure, liver disease, malignancy, and exposure to nephrotoxic drugs significantly increase susceptibility to renal injury.^[15,16] Clinical manifestations vary widely depending on the underlying etiology and severity of renal dysfunction and may include oliguria, edema, breathlessness, nausea, vomiting, altered sensorium, electrolyte abnormalities, metabolic acidosis, and fluid overload. Prompt recognition of these features is essential for initiating appropriate therapeutic interventions.^[17]

Management strategies for AKI focus on early diagnosis, identification and correction of reversible causes, optimization of intravascular volume, avoidance of nephrotoxic agents, treatment of underlying infections or systemic illnesses, and timely initiation of renal replacement therapy when indicated.^[18] Although advances in critical care have improved survival, mortality among patients with severe AKI remains high, particularly in those with septic shock, multiorgan dysfunction, or delayed initiation of treatment.^[19]

Recent studies from India have reported considerable variability in the etiological profile and outcomes of AKI because of regional differences in disease patterns, healthcare infrastructure, and referral practices.^[20-22] While sepsis and volume depletion continue to predominate, the increasing prevalence of diabetes mellitus, hypertension, cardiovascular diseases, and drug-induced nephrotoxicity has altered the clinical spectrum of AKI encountered in tertiary care hospitals. Understanding these changing patterns is essential for developing effective preventive strategies and improving patient care.^[22]

Given the significant burden of AKI and the variability in its etiological spectrum across different regions, periodic evaluation of its clinical profile and outcomes is necessary. The present study was therefore undertaken to assess the demographic characteristics, clinical presentation, etiological spectrum, laboratory profile, management practices,

and short-term outcomes of patients with acute kidney injury admitted to a tertiary care teaching hospital. The findings are expected to provide valuable insights into disease patterns and identify factors associated with adverse outcomes, thereby contributing to improved clinical management and resource planning.

Objectives:

Primary Objective:

- To evaluate the clinical profile, etiological spectrum, and short-term outcomes of patients diagnosed with acute kidney injury admitted to a tertiary care teaching hospital.

Secondary Objectives:

1. To study the demographic characteristics and clinical presentation of patients with acute kidney injury.
2. To identify the common etiological factors responsible for acute kidney injury.
3. To assess the severity of acute kidney injury according to the kidney disease: Improving Global Outcomes (KDIGO) staging criteria.
4. To evaluate the laboratory parameters and associated comorbidities among patients with acute kidney injury.
5. To assess the management strategies employed, including conservative treatment and renal replacement therapy.
6. To determine the short-term clinical outcomes, including complete recovery, partial recovery, dialysis dependence, and in-hospital mortality.
7. To identify clinical and laboratory factors associated with adverse short-term outcomes and mortality.

MATERIALS AND METHODS

Study Design: This was a prospective observational hospital-based study conducted to evaluate the clinical profile, etiological spectrum, and short-term outcomes of acute kidney injury among adult patients admitted to a tertiary care teaching hospital.

Study Setting: The study was carried out in the Department of Nephrology of Owaisi Hospital, Deccan College of Medical Sciences (DCMS), Kanchanbagh, Hyderabad, Telangana, India.

Study Duration: The study was conducted over a period of 12 months from January 2025 to December 2025.

Study Population: The study included adult patients admitted with a diagnosis of acute kidney injury during the study period.

Sample Size: A total of 160 consecutive patients fulfilling the eligibility criteria were enrolled in the study.

Inclusion Criteria

- Patients aged 18 years or older.
- Patients diagnosed with acute kidney injury according to the KDIGO 2012 criteria, defined as any one of the following:

- Increase in serum creatinine by ≥ 0.3 mg/dL within 48 hours, or
- Increase in serum creatinine to ≥ 1.5 times the baseline value occurring within the previous seven days, or
- Urine output < 0.5 mL/kg/hour for at least six hours.

- Patients who provided written informed consent or whose legally authorized representatives provided consent when applicable.

Exclusion Criteria

- Patients with established end-stage renal disease receiving maintenance dialysis.
- Patients with known chronic kidney disease stage 5.
- Kidney transplant recipients.
- Patients with incomplete clinical or laboratory data.
- Patients who declined to participate in the study.

Sampling Technique: A consecutive sampling technique was employed, wherein all eligible patients admitted during the study period were included until the required sample size of 160 participants was achieved.

Data Collection: After obtaining approval from the Institutional Ethics Committee and written informed consent from the participants, eligible patients were enrolled consecutively. A detailed clinical history was obtained, including demographic characteristics, presenting complaints, duration of illness, past medical history, drug history, and associated comorbidities such as diabetes mellitus, hypertension, chronic liver disease, cardiovascular disease, and malignancy.

A comprehensive physical examination was performed, including assessment of vital signs, hydration status, urine output, signs of fluid overload, edema, and neurological status.

Laboratory investigations included complete blood count, serum creatinine, blood urea nitrogen, serum electrolytes, liver function tests, blood glucose, serum albumin, arterial blood gas analysis when indicated, urinalysis, urine microscopy, urine protein estimation, and ultrasonography of the kidneys, ureters, and bladder. Additional investigations such as blood cultures, urine cultures, autoimmune markers, viral serology, echocardiography, and radiological imaging were performed whenever clinically indicated to establish the underlying etiology.

The etiology of acute kidney injury was classified into prerenal, intrinsic renal, and postrenal causes based on clinical assessment and appropriate diagnostic investigations. Patients were staged according to the KDIGO classification into Stage I, Stage II, and Stage III.

Treatment was provided according to standard institutional protocols. Conservative management included optimization of fluid balance, correction of electrolyte and acid-base disturbances, discontinuation of nephrotoxic medications,

antimicrobial therapy for infections, and supportive care. Renal replacement therapy in the form of intermittent hemodialysis was initiated when clinically indicated, including refractory hyperkalemia, severe metabolic acidosis, pulmonary edema, uremic complications, or persistent oliguria/anuria.

Patients were followed throughout their hospital stay until discharge or death. Short-term outcomes were categorized as complete renal recovery, partial renal recovery, dialysis dependence at discharge, or in-hospital mortality.

Outcome Measures:

Primary Outcome:

- Short-term clinical outcome of acute kidney injury, including complete recovery, partial recovery, dialysis dependence, and in-hospital mortality.

Secondary Outcomes:

- Clinical presentation of acute kidney injury.
- Etiological spectrum.
- Distribution according to KDIGO staging.
- Requirement for renal replacement therapy.
- Length of hospital stay.
- Predictors of adverse outcomes and mortality.

Ethical Considerations: The study protocol was reviewed and approved by the Institutional Ethics Committee before commencement of the study. Written informed consent was obtained from all participants or their legally authorized representatives. Patient confidentiality and anonymity were maintained throughout the study, and all procedures conformed to the ethical principles outlined in the Declaration of Helsinki.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0 (IBM Corp., Armonk, NY, USA). Continuous

variables were expressed as mean $\pm$ standard deviation (SD) or median with interquartile range where appropriate, while categorical variables were presented as frequencies and percentages. Comparisons between groups were performed using the independent Student's t-test or Mann-Whitney U test for continuous variables and the Chi-square test or Fisher's exact test for categorical variables. Variables showing statistical significance in univariate analysis were entered into multivariable logistic regression to identify independent predictors of adverse outcomes and mortality. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated. A p-value <0.05 was considered statistically significant.

RESULTS

[Table 1] summarizes the demographic profile and baseline comorbid conditions of the 160 patients included in the study. The mean age of the participants was 54.8 ± 15.2 years. The largest proportion of patients belonged to the 46–60 years age group (36.2%), followed by those aged >60 years (30.0%), indicating that acute kidney injury (AKI) predominantly affected middle-aged and elderly individuals. Males constituted 61.3% of the study population, while females accounted for 38.7%, yielding a male-to-female ratio of approximately 1.6:1. Among the associated comorbidities, hypertension was the most common (50.0%), followed by diabetes mellitus (45.0%). Coronary artery disease was present in 17.5% of patients, chronic heart failure in 12.5%, chronic liver disease in 8.8%, and malignancy in 6.3%. These findings suggest that cardiovascular and metabolic disorders were frequently associated with AKI in the present study.

Table 1: Demographic Characteristics and Baseline Comorbidities of the Study Population (n=160)

Variable	Frequency (n)	Percentage (%)
Age group (years)		
18–30	18	11.3
31–45	36	22.5
46–60	58	36.2
>60	48	30
Mean age (years)	54.8 ± 15.2	
Gender		
Male	98	61.3
Female	62	38.7
Comorbidities		
Diabetes mellitus	72	45
Hypertension	80	50
Chronic liver disease	14	8.8
Coronary artery disease	28	17.5
Chronic heart failure	20	12.5
Malignancy	10	6.3

Table 2: Clinical Presentation at Admission (n=160)

Clinical feature	Frequency (n)	Percentage (%)
Oliguria/anuria	110	68.8
Fever	82	51.3
Vomiting	60	37.5
Generalized weakness	124	77.5

Shortness of breath	52	32.5
Pedal edema	58	36.3
Altered sensorium	30	18.8
Hypotension	48	30

[Table 2] depicts the clinical manifestations of patients at the time of hospital admission. Generalized weakness was the most frequent presenting symptom, observed in 77.5% of patients, followed by oligouria/anuria in 68.8%. Fever was reported in 51.3%, reflecting the high burden of infective etiologies. Vomiting was present in 37.5%, while pedal edema and shortness of breath were

observed in 36.3% and 32.5% of patients, respectively. Hypotension was documented in 30.0% of patients, indicating significant hemodynamic compromise in a substantial proportion of cases. Altered sensorium occurred in 18.8% representing severe renal dysfunction, was observed in 13.8% of patients. Overall, the clinical presentation reflected both systemic illness and impaired renal function.

Table 3: Etiological Spectrum and KDIGO Staging of Acute Kidney Injury (n=160)

Variable	Frequency (n)	Percentage (%)
Etiology		
Sepsis	52	32.5
Acute gastroenteritis/dehydration	30	18.8
Cardiorenal syndrome	20	12.5
Drug-induced nephrotoxicity	18	11.3
Obstructive uropathy	16	10
Snake bite	8	5
Acute glomerulonephritis	7	4.4
Leptospirosis/Dengue	5	3.1
Others	4	2.5
KDIGO Stage		
Stage I	48	30
Stage II	55	34.4
Stage III	57	35.6

[Table 3] illustrates the underlying etiologies and severity of AKI according to the KDIGO classification. Sepsis emerged as the leading cause, accounting for 32.5% of cases, followed by acute gastroenteritis with dehydration (18.8%) and cardiorenal syndrome (12.5%). Drug-induced nephrotoxicity contributed to 11.3% of cases, whereas obstructive uropathy accounted for 10.0%.

Less common causes included snakebite, acute glomerulonephritis, leptospirosis/dengue, and other miscellaneous conditions. Based on KDIGO staging, 35.6% of patients presented with Stage III AKI, 34.4% with Stage II, and 30.0% with Stage I disease. The relatively high proportion of Stage III cases indicates that many patients presented with advanced renal impairment requiring intensive management.

Table 4: Laboratory Parameters at Admission (n=160)

Laboratory parameter	Mean $\pm$ SD
Hemoglobin (g/dL)	10.2 $\pm$ 2.1
Serum creatinine (mg/dL)	4.21 $\pm$ 2.03
Blood urea (mg/dL)	92.8 $\pm$ 36.5
Serum sodium (mEq/L)	134.8 $\pm$ 6.4
Serum potassium (mEq/L)	5.48 $\pm$ 1.02
Serum bicarbonate (mEq/L)	18.9 $\pm$ 4.8
Serum albumin (g/dL)	3.12 $\pm$ 0.56

[Table 4] presents the baseline laboratory profile of the study population. The mean hemoglobin concentration was 10.2 $\pm$ 2.1 g/dL, indicating the presence of mild-to-moderate anemia among many patients. The mean serum creatinine level at admission was 4.21 $\pm$ 2.03 mg/dL, while the mean blood urea level was 92.8 $\pm$ 36.5 mg/dL, reflecting

significant impairment of renal function. The average serum potassium concentration was 5.48 $\pm$ 1.02 mEq/L, suggesting frequent electrolyte disturbances, whereas the mean serum bicarbonate level of 18.9 $\pm$ 4.8 mEq/L indicated the presence of metabolic acidosis in several patients. The mean serum albumin level was 3.12 $\pm$ 0.56 g/dL.

Table 5: Treatment Modalities and Supportive Care (n=160)

Variable	Frequency (n)	Percentage (%)
Conservative management only	104	65
Haemodialysis required	56	35
ICU admission	48	30
Mechanical ventilation	22	13.8
Vasopressor support	38	23.8
Blood transfusion	28	17.5
Broad-spectrum antibiotics	94	58.8

[Table 5] summarizes the therapeutic interventions administered during hospitalization. The majority of patients (65.0%) were managed with conservative treatment, including fluid optimization, correction of electrolyte imbalance, treatment of underlying etiological factors, and supportive care. Haemodialysis was required in 35.0% of patients, reflecting the severity of renal dysfunction in a considerable proportion of cases. Nearly one-third

(30.0%) required admission to the intensive care unit, while 23.8% required vasopressor support because of circulatory instability. Mechanical ventilation was necessary in 13.8% of patients, and 17.5% received blood transfusions. Broad-spectrum antibiotics were administered to 58.8% of patients, corresponding with the predominance of sepsis as the principal cause of AKI.

Table 6: Short-Term Clinical Outcomes (n=160)

Outcome	Frequency (n)	Percentage (%)
Complete renal recovery	90	56.3
Partial renal recovery	32	20
Dialysis-dependent at discharge	12	7.5
In-hospital mortality	26	16.2
Mean hospital stay (days)	9.8 ± 4.6	

[Table 6] shows the short-term outcomes of patients during their hospital stay. Complete recovery of renal function was achieved in 56.3% of patients, making it the most frequent outcome. Partial recovery was observed in 20.0%, while 7.5% remained dialysis-dependent at the time of discharge. The overall in-

hospital mortality was 16.2%, highlighting the serious nature of AKI despite appropriate treatment. The mean duration of hospitalization was 9.8 ± 4.6 days, indicating that AKI was associated with prolonged hospital stay and increased healthcare utilization.

Table 7: Association Between KDIGO Stage and Clinical Outcome

KDIGO Stage	Complete Recovery	Partial Recovery	Dialysis Dependent	Death	Total	p value
Stage I (n=48)	40	6	0	2	48	<0.001
Stage II (n=55)	34	14	0	4	52	
Stage III (n=57)	16	12	12	20	60	
Total	90	32	12	26	160	

[Table 7] demonstrates the relationship between the severity of AKI and patient outcomes. Patients with Stage I AKI had the most favorable prognosis, with 83.3% achieving complete renal recovery and only 4.2% mortality. Among those with Stage II AKI, complete recovery decreased to 61.8%, while partial recovery and dialysis dependence became more frequent. Patients with Stage III AKI experienced the

poorest outcomes. Only 28.1% achieved complete recovery, whereas 35.1% died during hospitalization and 15.8% remained dialysis-dependent at discharge. The association between KDIGO stage and clinical outcome was highly statistically significant ($\chi^2 = 42.87$, $p < 0.001$), indicating that increasing AKI severity was strongly associated with adverse outcomes and mortality.

Table 8: Predictors of In-Hospital Mortality: Multivariable Logistic Regression

Variable	Adjusted Odds Ratio (AOR)	95% Confidence Interval	p value
Age >60 years	2.34	1.12–4.91	0.021
Sepsis	3.86	1.82–8.16	<0.001
Diabetes mellitus	1.52	0.71–3.24	0.274
KDIGO Stage III	4.92	2.08–11.63	<0.001
Serum potassium >5.5 mEq/L	2.81	1.27–6.24	0.009
Haemodialysis requirement	2.58	1.18–5.64	0.017
ICU admission	5.74	2.51–13.08	<0.001

[Table 8] presents the results of multivariable logistic regression analysis identifying independent predictors of in-hospital mortality. ICU admission was the strongest predictor of death, increasing the risk by nearly 5.7-fold (AOR = 5.74, $p < 0.001$). Patients with KDIGO Stage III AKI had approximately 4.9 times higher odds of mortality compared with those in lower stages (AOR = 4.92, $p < 0.001$). Similarly, sepsis significantly increased mortality risk by almost 3.9-fold (AOR = 3.86, p

<0.001). Hyperkalemia (serum potassium >5.5 mEq/L) (AOR = 2.81, $p = 0.009$), requirement for haemodialysis (AOR = 2.58, $p = 0.017$), and age greater than 60 years (AOR = 2.34, $p = 0.021$) were also significant independent predictors of mortality. Although diabetes mellitus was associated with a higher odds ratio, the relationship did not reach statistical significance ($p = 0.274$). These findings indicate that advanced age, severe AKI, sepsis, electrolyte disturbances, critical illness, and dialysis

requirement are major determinants of poor short-term outcomes in patients with AKI.

DISCUSSION

The present prospective observational study evaluated the clinical profile, etiological spectrum, and short-term outcomes of 160 patients with acute kidney injury (AKI) admitted to a tertiary care teaching hospital. The findings indicate that AKI occurred predominantly among middle-aged and elderly individuals, with a male predominance, and that sepsis was the leading etiological factor. Furthermore, advanced KDIGO stage, need for hemodialysis, intensive care admission, and electrolyte abnormalities were significantly associated with adverse clinical outcomes. These observations are consistent with findings reported from several tertiary care centres across India.^[23-26]

In the present study, the mean age of the patients was 54.8 ± 15.2 years, and most patients belonged to the 46–60-year age group. Males constituted 61.3% of the study population. Similar demographic findings were reported by Vairakkani et al., who studied AKI patients at a tertiary care centre in South India and observed that the majority of patients were middle-aged males with multiple associated comorbidities.^[23] Likewise, Tarachandani et al. reported a predominance of male patients and increasing incidence of AKI with advancing age in community-acquired AKI, attributing these findings to the higher prevalence of chronic illnesses and delayed healthcare utilization among older adults.^[24] These observations suggest that increasing age remains an important determinant for the occurrence of AKI in the Indian population.

Hypertension (50.0%) and diabetes mellitus (45.0%) were the most frequent comorbidities observed in our patients. Similar findings have been reported by Sharma et al., who demonstrated that diabetes and hypertension were the predominant underlying disorders among hospitalized AKI patients and significantly influenced disease severity and recovery.^[25] The increasing burden of non-communicable diseases in India has contributed substantially to the growing incidence of AKI among hospitalized adults.

Generalized weakness and oliguria were the most common presenting complaints in the present study, followed by fever, vomiting, pedal edema, and breathlessness. Comparable clinical presentations were described by Priyamvada et al., who observed that oliguria and constitutional symptoms were the predominant manifestations among critically ill AKI patients admitted to a tertiary care centre.

Sepsis accounted for 32.5% of AKI cases in the present study, making it the leading etiological factor, followed by dehydration and cardiorenal syndrome. Similar findings were reported by Vairakkani et al., in whom sepsis was responsible for more than half of AKI cases and represented the principal cause of

hospital-acquired AKI.^[23] Tarachandani et al. also demonstrated that infections constituted the major cause of community-acquired AKI in India and were significantly associated with poor renal recovery and mortality.^[24] These findings highlight that infectious diseases continue to be a major contributor to AKI in developing countries despite advances in critical care and antimicrobial therapy.

The present study demonstrated that 35.6% of patients had KDIGO Stage III AKI at admission. A similar predominance of severe AKI was observed by Vairakkani et al., who reported that more than half of their study population presented with Stage III disease because of delayed referral and advanced illness at presentation.^[23] Severe AKI at admission is likely to reflect delayed healthcare access, referral bias, and the complex clinical profile of patients treated at tertiary care centres.

Laboratory investigations in our study showed markedly elevated serum creatinine and blood urea levels with frequent hyperkalemia and metabolic acidosis, reflecting severe renal dysfunction. Comparable biochemical abnormalities have been reported by Tarachandani et al., who observed that electrolyte disturbances and metabolic acidosis were common among patients with severe community-acquired AKI and were associated with adverse outcomes.^[24] Hyperkalemia in particular remains an important indication for urgent renal replacement therapy and contributes significantly to morbidity and mortality.

Conservative treatment was adequate in 65.0% of patients, whereas 35.0% required hemodialysis. Similar dialysis requirements have been reported by Vairakkani et al., who documented renal replacement therapy in approximately one-fourth of patients admitted with AKI.^[23] Likewise, Sharma et al. observed that dialysis requirement increased significantly with worsening KDIGO stage and was independently associated with prolonged hospitalization and poor renal recovery.^[25]

In the present study, 56.3% of patients achieved complete recovery of renal function, whereas 16.2% died during hospitalization. These findings compare favorably with those of Tarachandani et al., who reported satisfactory renal recovery in a majority of survivors but identified substantial mortality among patients presenting with severe AKI.^[24] Vairakkani et al. reported an even higher short-term mortality, particularly among patients with baseline chronic kidney disease, severe sepsis, and multiorgan dysfunction.^[23] The relatively lower mortality observed in the present study may be attributable to early recognition of AKI, prompt correction of reversible causes, and timely initiation of renal replacement therapy.

The present study demonstrated a highly significant association between KDIGO stage and clinical outcome. Patients with Stage I AKI experienced excellent recovery, whereas those with Stage III disease showed markedly increased dialysis dependence and mortality. Similar observations have

been reported by Vairakkani et al., who identified AKI severity as one of the strongest predictors of adverse renal outcomes and mortality.^[23] These findings reaffirm the prognostic value of KDIGO staging in routine clinical practice.

Multivariable logistic regression in our study identified ICU admission, Stage III AKI, sepsis, hyperkalemia, hemodialysis requirement, and age greater than 60 years as independent predictors of mortality. Similar predictors have been described by Tarachandani et al., who found hypotension, mechanical ventilation, thrombocytopenia, and anuria to be independently associated with mortality among patients with community-acquired AKI.^[24] Priyamvada et al. also reported that multiorgan dysfunction, vasopressor requirement, and severity of illness significantly influenced short-term survival among critically ill AKI patients.^[26] These observations emphasize that mortality in AKI is determined not only by renal dysfunction but also by the severity of the underlying systemic illness. Overall, the findings of the present study are in agreement with recent Indian literature demonstrating that sepsis remains the predominant cause of AKI in tertiary care hospitals, while advanced KDIGO stage, need for dialysis, and critical illness are the principal determinants of poor short-term outcomes. Early diagnosis, prompt treatment of reversible causes, optimization of hemodynamic status, and timely nephrology referral remain essential strategies for improving survival and preserving renal function in patients with AKI.

CONCLUSION

Acute kidney injury remains a significant cause of morbidity and mortality among hospitalized adults, particularly in tertiary care settings where patients often present with advanced disease and multiple comorbidities. In the present study, AKI predominantly affected middle-aged and elderly individuals, with a male predominance. Sepsis emerged as the leading etiological factor, followed by dehydration, cardiorenal syndrome, and drug-induced nephrotoxicity, highlighting the continuing burden of infectious and preventable causes of renal injury in the Indian population.

More than one-third of the patients presented with KDIGO Stage III AKI, reflecting delayed presentation and severe renal impairment at the time of hospital admission. Although more than half of the patients achieved complete renal recovery with appropriate management, a substantial proportion required hemodialysis, and in-hospital mortality remained considerable. Advanced AKI stage, sepsis, hyperkalemia, intensive care unit admission, older age, and the requirement for renal replacement therapy were identified as important predictors of adverse short-term outcomes and mortality.

The findings underscore the importance of early recognition of AKI, prompt identification and

treatment of reversible etiological factors, optimization of hemodynamic status, avoidance of nephrotoxic agents, and timely initiation of renal replacement therapy when indicated. Strengthening infection prevention strategies, improving early referral systems, and increasing awareness among healthcare professionals can contribute to reducing the burden of AKI and improving patient outcomes. Further multicentric studies with larger sample sizes and long-term follow-up are warranted to evaluate renal recovery, progression to chronic kidney disease, and long-term survival, thereby facilitating the development of evidence-based strategies for the prevention and management of acute kidney injury in the Indian healthcare setting.

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