International Journal of Medicine
pISSN 1468-3814 | eISSN 2667-7008
https://theinternationalmedicine.com/

Original Researcher Article *DOI: 10.61336/im/26-08-62*

Clinical Profile and Treatment Outcomes of Patients Admitted With Acute Kidney Injury in a Tertiary Care Hospital: A Prospective Observational Study.

Dr. Pasum Nagaraju[1], Dr. Rajesh Vanam[2], Dr. Sushanth Vemuganti[3]*.

[1]Assistant Professor, Department of General Medicine, Kakatiya Medical College/ MGM Hospital, Hanumakonda, Telangana, India.
[2]Assistant Professor, Department of General Medicine, Kakatiya Medical College/MGM Hospital, Warangal, Telangana, India.
[3]Assistant Professor, Department of General Medicine, Kakatiya Medical College/ MGM Hospital, Warangal, Telangana, India.

Correspondence:
Dr. Sushanth Vemuganti.
Assistant Professor, Department of General Medicine
Kakatiya Medical College/MGM Hospital, Warangal, Telangana, India.

Email: sushanthv@gmail.com

Received: 14-07-2026
Revised: 24-07-2026
Accepted: 08-08-2026
Published: 11-08-2026

Abstract

Background: Acute kidney injury (AKI) is a frequent clinical syndrome in hospitalized adults and is associated with electrolyte disturbances, requirement for renal replacement therapy, prolonged hospitalization, and mortality. Regional data describing its causes, severity, and short-term renal outcomes remain important for early risk stratification and resource planning. ***Objectives:*** To describe the clinical profile, aetiological spectrum, treatment patterns, and in-hospital outcomes of adults admitted with AKI and to examine the association of AKI severity and sepsis with adverse outcomes. ***Methods:*** This prospective observational study included 80 adults with AKI admitted to the Department of General Medicine, MGM Hospital, Warangal, Telangana, India, from April 2025 to March 2026. AKI was diagnosed and staged using Kidney Disease: Improving Global Outcomes criteria. Demographic characteristics, comorbidities, presenting manifestations, laboratory findings, aetiology, need for haemodialysis and organ support, renal recovery, and in-hospital mortality were recorded. ***Results:*** The mean age was 53.4 ± 15.6 years, and 50 (62.5%) patients were male. Hypertension (48.8%) and diabetes mellitus (35.0%) were common comorbidities. Sepsis was the leading aetiology (30.0%), followed by volume depletion (22.5%). Stage 3 AKI occurred in 42.5% of patients. Haemodialysis was required in 31.3%. Complete renal recovery occurred in 60.0%, partial recovery in 21.3%, dialysis dependence at discharge in 6.3%, and in-hospital mortality in 12.5%. Dialysis requirement increased significantly with AKI stage, while mortality was concentrated in stage 3 disease and sepsis-associated AKI. ***Conclusion:*** AKI in this tertiary-care cohort was predominantly associated with sepsis and volume depletion. Advanced AKI was accompanied by greater dialysis requirement and poorer short-term outcomes, emphasizing timely recognition, correction of reversible causes, and close monitoring of high-risk patients.

Keywords: acute kidney injury; KDIGO; sepsis; haemodialysis; renal recovery; mortality.

INTRODUCTION

Acute kidney injury (AKI) is a heterogeneous clinical syndrome characterized by an abrupt decline in kidney function, resulting in impaired excretion of nitrogenous waste, disturbances of fluid and electrolyte balance, and altered acid-base homeostasis. Contemporary definitions emphasize changes in serum creatinine and urine output because even relatively small acute changes in kidney function are associated with clinically important consequences. The Kidney Disease: Improving Global Outcomes (KDIGO) framework provides a standardized approach for diagnosis and staging and has improved comparability across clinical studies.1 AKI is encountered across emergency departments, medical wards, intensive care units, and perioperative settings, reflecting its diverse precipitating mechanisms and close relationship with systemic illness.2

The global burden of AKI is substantial and unevenly distributed. Meta-analytic evidence has demonstrated considerable variation in incidence across regions, case definitions, and clinical settings, with higher mortality among patients with severe disease.3 In critically ill populations, multinational data have shown that AKI affects a large proportion of patients and that increasing KDIGO stage is associated with progressively worse survival and renal function at discharge.4 Sepsis is particularly important because inflammatory, microcirculatory, haemodynamic, and cellular mechanisms can interact to produce renal dysfunction even when overt renal hypoperfusion is not the sole driver. Septic AKI has consistently been associated with greater illness severity and adverse outcomes compared with non-septic AKI.5

The aetiological pattern of AKI in India remains clinically diverse. Infections, hypovolaemia, nephrotoxic exposure, obstructive uropathy, tropical illnesses, and cardiorenal disorders contribute in varying proportions depending on geography, referral patterns, season, and level of care. Indian tertiary-care studies have also documented substantial heterogeneity in dialysis requirements, renal recovery, and hospital mortality.6-13 These differences are relevant because many precipitating factors are potentially reversible when recognized early. Conversely, delayed presentation, severe sepsis, persistent hypotension, electrolyte disturbances, and advanced AKI increase the likelihood of renal replacement therapy and death.11,12 Short-term recovery is also important beyond hospital discharge, as incomplete recovery after an AKI episode identifies patients at continued risk of chronic kidney disease and subsequent adverse renal events.14

Warangal serves a large and clinically varied patient population, and prospective information on the profile and immediate outcomes of AKI in adults admitted under General Medicine can assist clinicians in recognizing dominant local patterns. The present study was therefore undertaken to describe AKI in a tertiary-care medical setting using standardized severity classification and predefined short-term outcomes. The objectives were to evaluate the demographic and clinical profile of patients admitted with AKI, determine the principal aetiologies and KDIGO stages, describe treatment including haemodialysis and organ support, assess renal recovery and in-hospital mortality, and examine the association of AKI severity and sepsis with adverse in-hospital outcomes.

METHODOLOGY

Study design, setting and period: This hospital-based prospective observational study was conducted in the Department of General Medicine, Mahatma Gandhi Memorial (MGM) Hospital,Warangal, Telangana, India, from April 2025 to March 2026. Adults admitted to medical wards or medical critical-care areas who fulfilled diagnostic criteria for AKI were screened prospectively. AKI was diagnosed and staged according to KDIGO criteria using serum creatinine and/or urine-output changes.1

Study population and eligibility: Patients aged 18 years or older with newly diagnosed AKI were eligible. Patients receiving maintenance dialysis for end-stage kidney disease, renal-transplant recipients with established graft failure, patients in whom an acute change in kidney function could not be established from available information, those with incomplete essential outcome data, and patients who declined participation were excluded. Eligible patients were enrolled consecutively.

Sample size and sampling: A previous prospective Indian study reported in-hospital mortality of approximately 24% among patients with AKI.10 Using the single-proportion formula $n = Z^2p(1-p)/d^2$, with 95% confidence, an expected proportion of 0.24, and absolute precision of 10%, the minimum sample was approximately 70. Allowing for incomplete observations and adequate subgroup description, the target was rounded to 80 participants. Consecutive sampling continued until this number was reached.

Data collection and clinical assessment: Demographic details, presenting symptoms, comorbidities, suspected precipitating factors, blood pressure, urine output, and relevant clinical findings were recorded using a structured case-record form. Laboratory evaluation included serum creatinine, blood urea, electrolytes, and investigations directed by the clinical condition. Aetiology was assigned after review of history, examination, laboratory results, imaging, and treating-team diagnosis. Patients were classified into KDIGO stages 1, 2, and 3. Treatment variables included conservative management, antimicrobial therapy, vasopressor support, mechanical ventilation, and haemodialysis. Dialysis indications included refractory hyperkalaemia, severe metabolic acidosis, pulmonary oedema or fluid overload, and symptomatic uraemia.

Outcome definitions and bias control: Complete renal recovery was defined as dialysis independence with serum creatinine returning to within 25% of the documented or clinically accepted baseline by discharge; partial recovery indicated dialysis independence with persistent creatinine elevation beyond this threshold; and dialysis dependence denoted an ongoing requirement for renal replacement therapy at discharge.14 In-hospital death was all-cause mortality during the index admission. Prospective collection, consecutive enrolment, uniform KDIGO staging, predefined outcomes, and verification of laboratory results were used to limit bias.

Statistical analysis and ethics: Continuous variables were summarized as mean ± standard deviation and categorical variables as frequency and percentage. Associations were examined using the chi-square test or Fisher's exact/Fisher-Freeman-Halton test when expected cell counts were small. A two-sided p value <0.05 was considered statistically significant. Statistical software and version should be inserted by the authors. The protocol was approved by the Institutional Ethics Committee before enrolment (approval number to be inserted), and written informed consent was obtained from participants or legally authorized representatives.

RESULTS

A total of 86 patients with suspected AKI were assessed for eligibility during the study period. Six were excluded because they did not fulfil the predefined eligibility criteria or lacked complete essential baseline information. The remaining 80 patients were enrolled and included in the final analysis. The mean age was 53.4 ± 15.6 years (range, 18-82 years); 50 (62.5%) were male and 30 (37.5%) were female. Hypertension was the most frequent comorbidity, followed by diabetes mellitus. Oliguria was the commonest presenting manifestation. Baseline demographic and clinical characteristics are summarized in Table 1.

Table 1. Baseline demographic and clinical characteristics of patients with acute kidney injury

Characteristic	Value
Total participants	80
Age, years, mean ± SD	53.4 ± 15.6
Age range, years	18-82
Age ≤40 years	18 (22.5%)
Age 41-60 years	32 (40.0%)
Age >60 years	30 (37.5%)
Male	50 (62.5%)
Female	30 (37.5%)
Hypertension	39 (48.8%)
Diabetes mellitus	28 (35.0%)
Ischaemic heart disease	10 (12.5%)
Oliguria	46 (57.5%)
Fever	35 (43.8%)
Vomiting/diarrhoea	26 (32.5%)
Peripheral oedema	22 (27.5%)
Hypotension	18 (22.5%)
Dyspnoea	17 (21.3%)
Altered sensorium	8 (10.0%)

Comorbidities and presenting manifestations were not mutually exclusive. SD, standard deviation.

Sepsis-associated AKI was the leading aetiology, accounting for 24 (30.0%) patients, followed by volume depletion in 18 (22.5%), nephrotoxic drug exposure in 12 (15.0%), and obstructive uropathy in 10 (12.5%). Stage 3 AKI was the most frequent severity category, affecting 34 (42.5%) patients. Mean admission serum creatinine was 4.1 ± 2.2 mg/dL and mean blood urea was 104.6 ± 46.8 mg/dL. Hyperkalaemia occurred in 21 (26.3%) patients, while 19 (23.8%) had metabolic acidosis requiring active correction. The aetiological and severity profile is presented in Table 2.

Table 2. Aetiological, laboratory, and KDIGO severity profile

Variable	Value
Sepsis-associated AKI	24 (30.0%)
Volume depletion	18 (22.5%)
Nephrotoxic drug exposure	12 (15.0%)
Obstructive uropathy	10 (12.5%)
Cardiorenal causes	7 (8.8%)
Acute glomerular disease	5 (6.3%)
Other causes	4 (5.0%)
Serum creatinine at admission, mg/dL, mean ± SD	4.1 ± 2.2
Blood urea, mg/dL, mean ± SD	104.6 ± 46.8
Hyperkalaemia	21 (26.3%)
Metabolic acidosis requiring active correction	19 (23.8%)
KDIGO stage 1	24 (30.0%)
KDIGO stage 2	22 (27.5%)
KDIGO stage 3	34 (42.5%)

AKI, acute kidney injury; KDIGO, Kidney Disease: Improving Global Outcomes; SD, standard deviation.

Fifty-five (68.8%) patients were managed without renal replacement therapy, whereas 25 (31.3%) required haemodialysis. Intravenous antimicrobial therapy was administered to 38 (47.5%) patients, vasopressor support to 17 (21.3%), and mechanical ventilation to 11 (13.8%). Among the 25 dialysed patients, refractory hyperkalaemia was the most frequent

primary indication, followed by pulmonary oedema or refractory fluid overload, severe metabolic acidosis, and symptomatic uraemia. Treatment characteristics are shown in Table 3.

Table 3. Treatment characteristics of the study population

Treatment characteristic	n (%)
Conservative/non-dialytic management	55 (68.8)
Haemodialysis	25 (31.3)
Intravenous antimicrobial therapy	38 (47.5)
Vasopressor support	17 (21.3)
Mechanical ventilation	11 (13.8)
Primary indication for dialysis (n = 25)	
Refractory hyperkalaemia	8 (32.0)
Pulmonary oedema/refractory fluid overload	7 (28.0)
Severe metabolic acidosis	6 (24.0)
Symptomatic uraemia	4 (16.0)

At discharge, 48 (60.0%) patients had complete renal recovery and 17 (21.3%) had partial recovery. Five (6.3%) remained dialysis-dependent, while 10 patients died, giving an in-hospital mortality of 12.5%. Complete recovery declined progressively with increasing AKI stage, from 91.7% in stage 1 to 32.4% in stage 3. All dialysis-dependent survivors were in stage 3. Stage-wise outcomes are detailed in Table 4.

Table 4. Treatment outcomes according to KDIGO stage

Outcome	Stage 1 (n = 24)	Stage 2 (n = 22)	Stage 3 (n = 34)	Total (n = 80)
Complete renal recovery	22 (91.7%)	15 (68.2%)	11 (32.4%)	48 (60.0%)
Partial renal recovery	2 (8.3%)	6 (27.3%)	9 (26.5%)	17 (21.3%)
Dialysis-dependent at discharge	0	0	5 (14.7%)	5 (6.3%)
In-hospital death	0	1 (4.5%)	9 (26.5%)	10 (12.5%)

Values are n (% within KDIGO stage), except the total column, which represents percentage of the entire cohort.

The requirement for haemodialysis increased significantly with AKI severity: 2 of 24 (8.3%) stage 1 patients, 5 of 22 (22.7%) stage 2 patients, and 18 of 34 (52.9%) stage 3 patients required dialysis ($\chi^2 = 14.06$, $p < 0.001$). In-hospital mortality also differed across stages, occurring in 0%, 4.5%, and 26.5% of stage 1, stage 2, and stage 3 patients, respectively (Fisher-Freeman-Halton exact $p = 0.005$). Among patients with sepsis-associated AKI, 7 of 24 (29.2%) died compared with 3 of 56 (5.4%) with non-septic aetiologies (Fisher's exact $p = 0.007$).

DISCUSSION

The present prospective study describes the clinical spectrum and short-term outcomes of 80 adults admitted with AKI to a tertiary-care General Medicine service. Patients were predominantly middle-aged or older, with a mean age of 53.4 years, and nearly two-thirds were men. Hypertension and diabetes were frequent comorbidities, emphasizing the background cardiovascular and metabolic vulnerability commonly encountered in hospitalized adults with acute renal dysfunction. Indian tertiary-care studies have likewise reported substantial comorbidity and wide variation in clinical presentation, reflecting differences in referral profile and underlying disease burden.6-10. Sepsis was the leading aetiology in this cohort, accounting for 30.0% of cases, followed by volume depletion, nephrotoxic exposure, and obstructive uropathy. This distribution is clinically plausible in a general medical population and is consistent with Indian studies in which infection, hypovolaemia, toxins, and tropical or systemic illnesses constitute major contributors to AKI.6-10 The prominence of sepsis is particularly important because septic AKI has distinct inflammatory and haemodynamic mechanisms and carries a worse prognosis than many uncomplicated prerenal causes. Bagshaw et al. demonstrated that septic AKI in critically ill patients was associated with greater illness severity and adverse outcomes.5 In the present study, mortality among patients with sepsis-associated AKI was 29.2%, compared with 5.4% among those with non-septic causes, supporting the clinical importance of early infection control and organ-support strategies.

A notable finding was the high proportion of advanced disease: 42.5% of patients were classified as KDIGO stage 3. Dialysis was required in 31.3% overall and increased from 8.3% in stage 1 to 52.9% in stage 3. This stage-dependent increase was statistically significant. Multinational AKI-EPI data similarly established a graded relationship between AKI severity and adverse outcomes.4 Indian studies have also shown that advanced AKI, metabolic acidosis, hyperkalaemia, hypotension, and need for organ support identify patients at increased risk.8,11 The dialysis requirement in our cohort was higher than the 24% reported by Bhattacharya et al.,10 which could reflect differences in disease severity, referral timing, and the proportion of stage 3 AKI. Renal recovery was favourable in a majority of patients: 60.0% achieved complete

recovery and another 21.3% achieved partial recovery by discharge. Nevertheless, 6.3% remained dialysis-dependent and 12.5% died. Mortality was concentrated in stage 3 AKI, where 26.5% died, compared with one death in stage 2 and none in stage 1. The observed overall mortality was lower than the 24% reported in the prospective Northeastern Indian study10 and the 28.4% reported by Saxena and Meshram among medicine-ICU patients,11 probably because the present cohort included patients across general medical wards and critical-care areas rather than an exclusively ICU population. Recovery after AKI remains clinically meaningful because incomplete renal recovery is associated with subsequent chronic kidney disease and long-term morbidity.14 These findings reinforce the value of rapid identification of reversible causes, severity-based monitoring, timely dialysis when indicated, and structured renal follow-up after discharge.

LIMITATIONS

This study has several limitations. It was conducted at a single tertiary-care centre with a modest sample of 80 patients, limiting the generalizability of the findings to other settings. Follow-up ended at hospital discharge, so long-term kidney function, recurrent AKI, chronic kidney disease, and post-discharge mortality were not evaluated. Detailed multivariable modelling of mortality predictors was also constrained by the number of outcome events.

CONCLUSION

Acute kidney injury in this tertiary-care General Medicine cohort predominantly affected middle-aged and older adults with a high burden of hypertension and diabetes. Sepsis was the leading aetiology, followed by volume depletion and nephrotoxic exposure. A substantial proportion presented with KDIGO stage 3 disease, and dialysis requirement increased significantly with advancing AKI severity. Most patients achieved complete or partial renal recovery; however, mortality and dialysis dependence were concentrated among patients with severe AKI. Sepsis was also associated with markedly higher in-hospital mortality. Early recognition, prompt correction of reversible causes, aggressive treatment of infection, careful fluid and electrolyte management, and timely renal replacement therapy are essential to improve short-term outcomes.

REFERENCES

1. Kellum JA, Lameire N; KDIGO AKI Guideline Work Group. Diagnosis, evaluation, and management of acute kidney injury: a KDIGO summary (Part 1). Crit Care. 2013;17(1):204. doi:10.1186/cc11454.
2. Lameire NH, Bagga A, Cruz D, De Maeseneer J, Endre Z, Kellum JA, et al. Acute kidney injury: an increasing global concern. Lancet. 2013;382(9887):170-9. doi:10.1016/S0140-6736(13)60647-9.
3. Susantitaphong P, Cruz DN, Cerda J, Abulfaraj M, Alqahtani F, Koulouridis I, et al. World incidence of AKI: a meta-analysis. Clin J Am Soc Nephrol. 2013;8(9):1482-93. doi:10.2215/CJN.00710113.
4. Hoste EAJ, Bagshaw SM, Bellomo R, Cely CM, Colman R, Cruz DN, et al. Epidemiology of acute kidney injury in critically ill patients: the multinational AKI-EPI study. Intensive Care Med. 2015;41(8):1411-23. doi:10.1007/s00134-015-3934-7.
5. Bagshaw SM, Uchino S, Bellomo R, Morimatsu H, Morgera S, Schetz M, et al. Septic acute kidney injury in critically ill patients: clinical characteristics and outcomes. Clin J Am Soc Nephrol. 2007;2(3):431-9. doi:10.2215/CJN.03681106.
6. Vairakkani R, Fernando ME, Sujith S, Harshavardhan TS, Raj TY. Acute kidney injury in a tertiary care center of South India. Indian J Nephrol. 2022;32(3):206-15. doi:10.4103/ijn.IJN_481_20.
7. Kaaviya R, Vadivelan M, Balamurugan N, Parameswaran S, Thabah MM. Community acquired AKI: a prospective observational study from a tertiary level hospital in Southern India. Indian J Nephrol. 2019;29(4):254-60. doi:10.4103/ijn.IJN_238_18.
8. Priyamvada PS, Jayasurya R, Shankar V, Parameswaran S. Epidemiology and outcomes of acute kidney injury in critically ill: experience from a tertiary care center. Indian J Nephrol. 2018;28(6):413-20. doi:10.4103/ijn.IJN_191_17.
9. Vikrant S, Gupta D, Singh M. Epidemiology and outcome of acute kidney injury from a tertiary care hospital in India. Saudi J Kidney Dis Transpl. 2018;29(4):956-66. doi:10.4103/1319-2442.239633.
10. Bhattacharya PK, Roy A, Jamil M, Barman B, Murti SV, Marak PR. Clinical profile and determinants of short-term outcome of acute kidney injury: a hospital-based prospective study from Northeastern India. J Lab Physicians. 2019;11(1):5-10. doi:10.4103/JLP.JLP_135_18.
11. Saxena A, Meshram SV. Predictors of mortality in acute kidney injury patients admitted to medicine intensive care unit in a rural tertiary care hospital. Indian J Crit Care Med. 2018;22(4):231-7. doi:10.4103/ijccm.IJCCM_462_17.
12. Jaryal A, Vikrant S, Gupta D. Epidemiology and outcomes of dialysis requiring acute kidney injury: a single-center study. Ther Apher Dial. 2022;26(3):594-600. doi:10.1111/1744-9987.13739.
13. Kaul A, Sharma RK, Tripathi R, Suresh KJ, Bhatt S, Prasad N. Spectrum of community-acquired acute kidney injury in India: a retrospective study. Saudi J Kidney Dis Transpl. 2012;23(3):619-28. doi:10.4103/1319-2442.95859.
14. Forni LG, Darmon M, Ostermann M, Oudemans-van Straaten HM, Pettilä V, Prowle JR, et al. Renal recovery after acute kidney injury. Intensive Care Med. 2017;43(6):855-66. doi:10.1007/s00134-017-4809-x.