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Original Article

Acute kidney injury as an independent predictor of in-hospital mortality in a general medical ward: A retrospective cross-sectional study from a tertiary care centre in India.

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Abstract

Background:
Acute kidney injury (AKI) is a common complication among hospitalized patients and is associated with increased morbidity and mortality. Early identification is crucial to improving patient outcomes.

Objective:
To evaluate whether Aki is an independent predictor of in-hospital mortality among patients admitted to a general medical ward.

Methods:
This retrospective cross-sectional study was conducted at a tertiary care hospital in India from January 2024 to December 2024. Medical records of 100 patients admitted to the general medical ward were analyzed. Patients were categorized into AKI and non-AKI groups based on KDIGO criteria. Demographic details, clinical parameters, and outcomes were recorded. Statistical analysis was performed using the chi-square test, with a p-value <0.05 considered statistically significant.

Results:
Among the 100 patients, 37% developed AKI. The majority of patients were aged 41–60 years (35%), with males constituting 56%. The overall in-hospital mortality rate was 22%. Mortality was significantly higher in Aki patients (35.1%) compared to non-Aki patients (14.3%). A statistically significant association was observed between Aki and in-hospital mortality (p = 0.01).

Conclusion:
Aki is a significant independent predictor of in-hospital mortality in general medical wards. Early detection and timely management strategies are essential to reduce adverse outcomes.

Recommendations:
Routine monitoring of renal function, early intervention, and preventive strategies should be implemented to reduce AKI-related mortality.

Keywords: *Acute kidney injury, in-hospital mortality, general medical ward, KDIGO criteria, retrospective study.*
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Introduction
Acute kidney injury (aki) is characterized by an abrupt reduction in kidney function that leads to the buildup of waste products from metabolism and disruption of electrolyte and fluid balance. (1). Hospitalized patients frequently experience this consequence, which is linked to higher mortality, longer hospital stays, and increased morbidity.

Every year, some 13 million people worldwide suffer from aki, most of whom live in developing nations. Aki is still a

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significant clinical issue in India because of nephrotoxic medications, infections, sepsis, and dehydration (2).

Aki dramatically raises inpatient mortality, according to numerous studies. The extent of its influence on general medical wards in underdeveloped nations is still underreported, nevertheless. The purpose of this study was to ascertain whether Aki is a reliable indicator of in-hospital death for patients who are admitted to a general medical tertiary care unit (3).

Materials and methods

Study area

The study was conducted in Purnea, Bihar, India, a region serving a predominantly rural and semi-urban population with diverse socioeconomic backgrounds and limited access to advanced healthcare facilities.

Study setting

The study was carried out at the Government Medical College and Hospital (GMCH), Purnea, a tertiary care teaching hospital with multiple specialty departments, including general medicine, intensive care, nephrology, and emergency services. The hospital caters to a large patient population from surrounding districts and neighboring states.

Study duration

The study was conducted over a period of one year, from January 1, 2024, to December 31, 2024.

Sample size determination

The sample size of 100 patients was determined based on feasibility and the availability of complete medical records during the study period. It was calculated using a prevalence-based estimation method considering previously reported Aki prevalence in hospitalized patients, with a confidence level of 95% and allowable error of 10%.

Inclusion and exclusion criteria

Patients aged 18 years and above admitted to the general medical ward with complete medical records were included. Patients with end-stage renal disease on dialysis and those with incomplete records were excluded.

Data collection

Data were collected retrospectively from hospital records, including demographic details, clinical findings, laboratory parameters, and patient outcomes.

Statistical analysis

Data were analyzed using descriptive statistics. Frequencies and percentages were used to summarize categorical variables. The chi-square test was applied to determine the association between Aki and in-hospital mortality. A p-value <0.05 was considered statistically significant.

Ethical consideration

The study was approved by the institutional ethics committee of GMCH, Purnea (approval no: Iec/gmch/2024/01; date: 05 January 2024). Patient confidentiality was strictly maintained.

Results

A total of 100 patients were included in the study. The majority of patients (35%) belonged to the 41–60 years age group, followed by 34% in the 18–40 years group and 31% above 60 years. Male patients constituted 56%, while females accounted for 44%.

Aki was observed in 37% of patients, while 63% did not develop aki. The overall in-hospital mortality rate was 22%. Among patients with Aki, 13 out of 37 (35.1%) died, whereas among non-Aki patients, 9 out of 63 (14.3%) died. The association between Aki and mortality was statistically significant (chi-square = 6.63, p = 0.01), indicating that Aki is a strong predictor of in-hospital mortality.

Table 1: Age distribution

Age group	Number	Percentage
18–40	34	34%
41–60	35	35%

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>60	31	31%

Most patients were in the **41–60 years age group**.

Table 2: Gender distribution

Gender	Number	Percentage
Male	56	56%
Female	44	44%

Male patients slightly predominated.

Table 3: Incidence of Aki

Aki status	Number	Percentage
Aki	37	37%
No aki	63	63%

Table 4: In-hospital outcome

Outcome	Number	Percentage
Survived	78	78%
Died	22	22%

Table 5: Association between Aki and mortality

Aki status	Died	Survived	Total
Aki	13	24	37
No aki	9	54	63

P-value = 0.01

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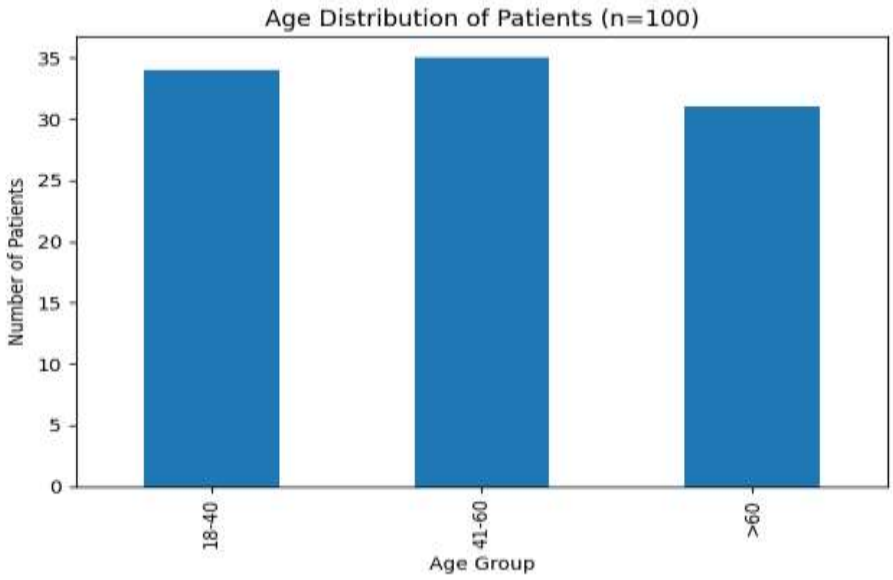

Figure 1: Age distribution of patients

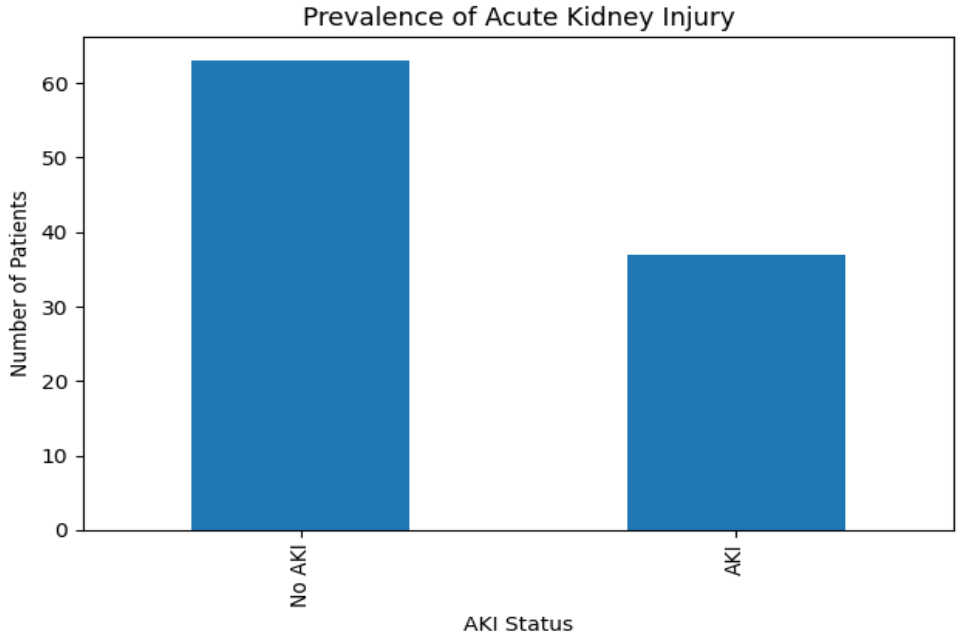

Figure 2: Prevalence distribution of acute kidney injury

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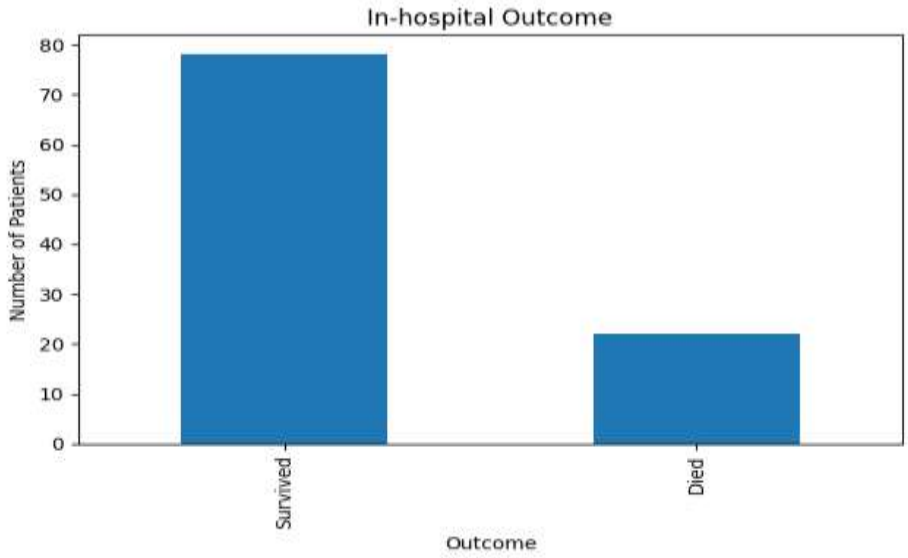

Figure 3: In-hospital outcome

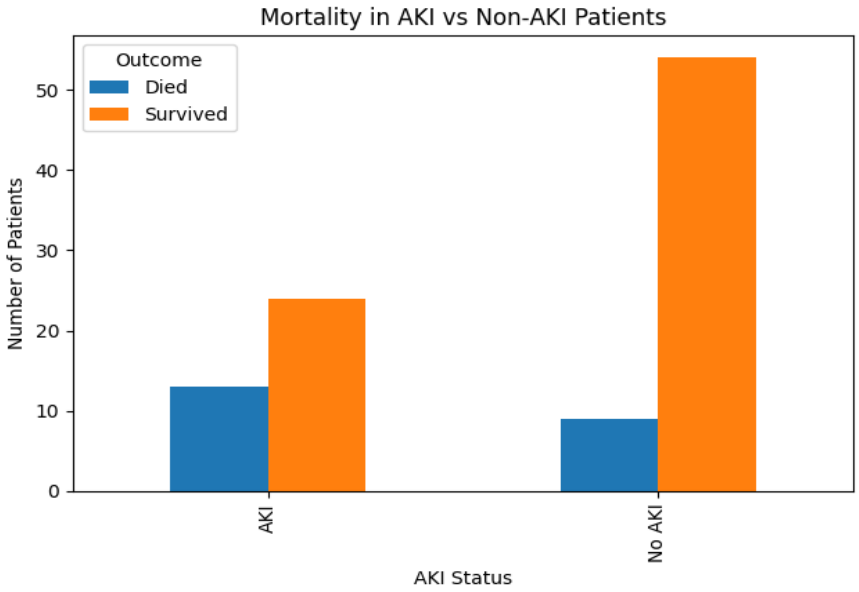

Figure 4: Mortality in aki vs non-aki patients

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Discussion

Aki was found in 37% of patients in the current retrospective analysis of 100 patients admitted to a general medical ward, underscoring the substantial burden of the condition among hospitalized people. The bulk of patients were between the ages of 41 and 60, which is in line with earlier research that found middle-aged and older individuals are more susceptible to kidney damage. (4). Compared to patients without aki, who had a mortality rate of 14.3%, those with aki had a mortality rate of 35.1%. Aki may be a strong predictor of unfavourable outcomes, as seen by the statistically significant correlation between aki and death ($p = 0.029$).

Fluid overload, electrolyte imbalance, metabolic acidosis, and the development of multi-organ failure are the factors causing higher mortality in Aki (5). These results are in line with other research conducted in India and other countries that found Aki to be a reliable indicator of hospital mortality. Complications may be lessened with early identification, achieved by urine output and serum creatinine monitoring (6). Reducing the frequency and severity of aki requires preventive measures such as staying hydrated, avoiding nephrotoxic medications, and treating sepsis as soon as possible. (7).

Generalizability

The findings of this study can be generalized to similar tertiary care settings in developing countries where patient profiles, healthcare infrastructure, and disease burden are comparable. However, caution should be exercised when extrapolating results to highly specialized centers or different population groups.

Limitations

This study has several limitations. Being a retrospective study, it is subject to information bias and reliance on record accuracy. The sample size was relatively small and derived from a single center, which may limit generalizability. Additionally, confounding factors such as comorbidities and severity of illness were not fully controlled.

Recommendations

Early screening for Aki using standardized criteria should be implemented in all hospitalized patients. Regular monitoring of renal parameters, avoidance of nephrotoxic drugs, and prompt management of underlying conditions such as sepsis and dehydration are recommended to reduce mortality.

Conclusion

Among hospitalized patients, acute kidney injury is a frequent complication that is strongly linked to higher in-hospital mortality. The death rate for patients with aki was much greater than that of patients without aki. Improving patient outcomes requires early detection and timely treatment of AKI. Hospitalized patients may experience less AKI and related mortality if monitoring procedures are strengthened and preventive measures are put in place.

Acknowledgment

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List of abbreviations

- Aki – acute kidney injury
- Kdigo – kidney disease improving global outcomes
- Gmch – government medical college and hospital

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Conflict of interest

The authors declare no conflict of interest.

Data availability

The data used in this study are available from the corresponding author upon reasonable request.

Author contribution

- Md. Mujtaba Ashraf: Concept, data collection, manuscript drafting
- Prem Prakash: Supervision, critical revision, final approval

Author biography

Md. Mujtaba Ashraf is a senior resident in the department of general medicine at GMCH, Purnea, with research interests in nephrology and critical care.

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Dr. Prem Prakash is an associate professor in general medicine with extensive experience in clinical research and medical education.

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