Acute Kidney Injury in Patients Presenting with Severe Diarrhea at the Outpatient Department of Peshawar Institute of Medical Sciences, Peshawar

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Abstract

Background: Diarrheal diseases remain a major cause of morbidity in low- and middle-income countries, and severe fluid losses can precipitate acute kidney injury (AKI). In resource-limited settings, diarrhea-related AKI contributes to significant morbidity and mortality but remains under-studied in Pakistan.

Methods: A cross-sectional study was conducted from January to July 2025 at the Outpatient Department (OPD) of Peshawar Institute of Medical Sciences. Patients aged ≥15 years presenting with severe acute diarrhea were evaluated for AKI based on Kidney Disease: Improving Global Outcomes (KDIGO) criteria. Demographic, clinical, and laboratory data were recorded. Logistic regression was performed to assess risk factors for AKI.

Results: Of 240 patients enrolled, 58 (24.1%) developed AKI. The mean age of AKI patients was 42.3±17.8 years compared to 34.1±15.6 years in non-AKI patients (p=0.01). Male gender (AOR=1.8; 95% CI: 1.0–3.3), hypotension at presentation (AOR=2.6; 95% CI: 1.4–4.7), and serum sodium <130 mmol/L (AOR=2.2; 95% CI: 1.1–4.3) were independent predictors of AKI.

Conclusion: Nearly one in four patients with severe diarrhea at PIMS developed AKI, highlighting the importance of early fluid resuscitation, electrolyte monitoring, and risk stratification. Strengthening diarrheal care pathways could reduce preventable AKI burden in Peshawar.

Introduction

Diarrheal diseases remain a leading cause of morbidity worldwide, especially in low- and middle-income countries, where inadequate sanitation and limited healthcare access exacerbate risks (1). While the introduction of oral rehydration therapy has markedly reduced mortality, severe diarrhea still causes substantial complications, including acute kidney injury (AKI) (2,3).

AKI is characterized by a sudden decline in renal function, often precipitated by hypovolemia, sepsis, or electrolyte disturbances. According to Kidney Disease: Improving Global Outcomes (KDIGO) criteria, AKI is defined by acute changes in serum creatinine or urine output (4). In resource-limited contexts, diarrhea is a major cause of community-acquired AKI (5).

In Pakistan, diarrhea remains endemic, particularly during summer months and monsoon season. However, local data on the burden of diarrhea-associated AKI are scarce, especially in outpatient settings. Understanding its prevalence and risk factors is critical for guiding timely management.

This study aimed to determine the prevalence and risk factors of AKI among patients presenting with severe diarrhea at the Outpatient Department of Peshawar Institute of Medical Sciences (PIMS).

Methods

Study Design & Setting: Cross-sectional study at the Outpatient Department (OPD) of PIMS, Peshawar, between January and July 2025.

Study Population: Patients aged ≥15 years presenting with severe acute diarrhea (>6 watery stools/day with signs of dehydration).

Sample Size: A total of 240 patients were recruited consecutively.

Data Collection:
- Clinical data: age, sex, blood pressure, hydration status.
- Laboratory data: serum creatinine, electrolytes, urine output.
- AKI was defined using KDIGO criteria: increase in serum creatinine ≥0.3 mg/dL within 48

hours or ≥1.5 times baseline, or urine output <0.5 mL/kg/h for ≥6 hours (4).

Statistical Analysis: SPSS v27 used. Prevalence estimated with descriptive statistics. Chi-square and t-tests compared groups. Logistic regression identified independent predictors of AKI.

Ethics: Ethical approval obtained from Institutional Review Board, PIMS. Informed consent was obtained from participants.

Results

Table 1. Demographic and clinical characteristics of patients (n=240)

Variable	AKI (n=58)	Non-AKI (n=182)	p-value
Age (mean ± SD)	42.3 ± 17.8	34.1 ± 15.6	0.01
Male sex (%)	60.3	48.4	0.12
Hypotension (%)	44.8	21.4	0.002
Sodium <130 mmol/L (%)	31.0	14.3	0.01
Potassium <3.5 mmol/L (%)	22.4	18.1	0.42

Table 2. Logistic regression predictors of AKI

Variable	Adjusted OR (95% CI)	p-value
Male sex	1.8 (1.0–3.3)	0.04
Hypotension at presentation	2.6 (1.4–4.7)	0.002
Sodium <130 mmol/L	2.2 (1.1–4.3)	0.03
Potassium <3.5 mmol/L	1.2 (0.6–2.5)	0.48

Figure 1. Prevalence of AKI among patients with severe diarrhea

Prevalence of AKI among patients with severe diarrhea
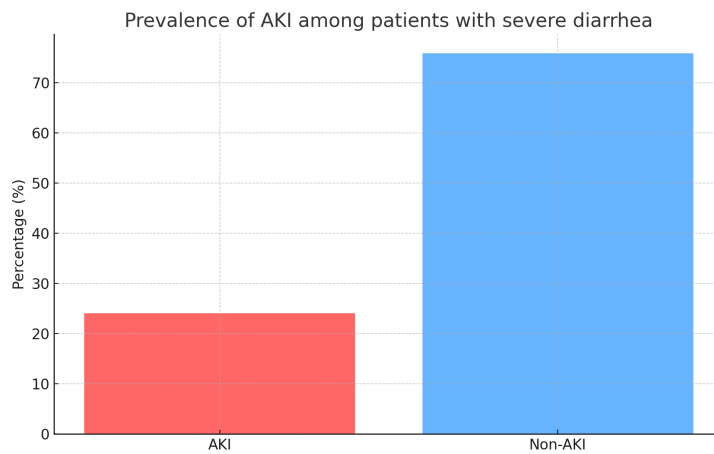
Discussion

This study shows that nearly one in four patients presenting with severe diarrhea at PIMS developed AKI. This prevalence is consistent with reports from South Asia, where dehydration and electrolyte imbalance remain leading causes of community-acquired AKI (5,6).

Independent predictors included male sex, hypotension, and hyponatremia. Hypotension as a strong risk factor aligns with studies from India and Bangladesh, where volume depletion is the most common precipitant of AKI (7,8). Hyponatremia's role emphasizes the importance of electrolyte monitoring in diarrheal patients (9).

Our findings underscore the importance of early identification and management of high-risk patients. Prompt fluid replacement, correction of sodium imbalance, and close monitoring of renal function can prevent progression to severe AKI requiring dialysis.

Strengths: First study from Peshawar assessing diarrhea-associated AKI in an outpatient setting.
Limitations: Cross-sectional design; lack of long-term follow-up; single-center data.

Conclusion

AKI is a common complication of severe diarrhea in Peshawar, affecting about one-quarter of patients. Timely fluid resuscitation and electrolyte correction are essential to reduce preventable renal morbidity. Strengthening diarrheal care protocols in outpatient departments could mitigate the burden of AKI.

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