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## Acute Kidney Injury in Nepal: A Mini-Review

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### ABSTRACT

**Background:** Acute Kidney Injury (AKI) is a major yet under-recognized contributor to morbidity and mortality in low- and middle-income countries, including Nepal. The coexistence of communicable and non-communicable diseases, environmental exposures, and socioeconomic constraints creates a “double burden” that complicates prevention and management.

**Aim:** This mini-review summarizes the epidemiology, causes, diagnostic challenges, health-system gaps, and future priorities for improving AKI care in Nepal.

**Sources of evidence:** A narrative review of published hospital-based studies, regional data from South Asia, and international initiatives relevant to low-resource settings was conducted to synthesize current evidence.

**Key findings:** Most AKI cases in Nepal are community-acquired and affect younger, previously healthy individuals. Common causes include infections, dehydration, insects’ envenomation and snakebite, nephrotoxic traditional medicines, obstetric complications, chemical poisoning, and emerging non-communicable diseases. Limited access to laboratory testing and kidney replacement therapy, particularly outside urban centers, contributes to delayed diagnosis and high mortality. Health-system barriers include workforce shortages, inadequate infrastructure, high out-of-pocket expenditure, and absence of national surveillance. Migrant workers represent a vulnerable population with disproportionate kidney disease burden.

**Conclusions:** AKI in Nepal is largely preventable but remains underdiagnosed and undertreated. Strengthening early detection through point-of-care diagnostics, expanding workforce capacity, improving access to affordable dialysis modalities, and establishing national surveillance systems are critical steps toward reducing preventable deaths and long-term kidney disease.

**Keywords:** Acute kidney injury; Community-acquired AKI; Dialysis; Nepal; Public health; Sepsis

### INTRODUCTION

Nepal is a predominantly rural country with challenging mountainous terrain and limited access to specialized health services. In this setting, most AKIs are Community Acquired (CA-AKI) rather than Hospital Acquired (HA-AKI). Unlike HA-AKI, CA-AKI typically affects younger, previously healthy individuals and is driven by environmental exposures, infections, toxins, and delayed access to care. As a result, patients often present late, when complications are already advanced [1].

Despite its strong association with mortality, prolonged hospitalization, and progression to Chronic Kidney Disease (CKD), AKI remains under-diagnosed and under-treated in

Nepal with delayed recognition, limited diagnostic capacity, and insufficient management contributing to poor outcomes.

### LITERATURE REVIEW

#### Epidemiology

The absence of national surveillance reflects systemic under-prioritization of AKI in public health policy and most cases likely go unrecognized at peripheral centers, suggesting the true burden is underestimated in Nepal. However, available hospital-based studies suggest a substantial burden. AKI has been reported in approximately 15% of non-ICU admissions and in up to 60% of ICU patients [2].

In contrast to high-income countries, where hospital-acquired AKI predominates, most AKI in Nepal is community acquired [3]. This reflects delayed presentation, limited diagnostic capacity at peripheral health facilities, and long travel times to tertiary centers.

### **Etiology and risk factors**

Consistent with patterns across South Asia, most AKI in Nepal arises from preventable causes [3]. The most common contributors include:

- Infections and sepsis, including tropical febrile illnesses
- Dehydration and hypovolemia from acute diarrheal disease
- Snakebite and insect envenomation (wasps, bees, hornets)
- Nephrotoxic traditional or herbal medicines
- Obstetric complications, such as pre-eclampsia, unsafe abortion, and postpartum sepsis
- Chemical poisonings, particularly paraquat
- Non-communicable diseases, including diabetes and hypertension

The coexistence of communicable and non-communicable diseases, the so-called “double burden” significantly complicates AKI prevention, diagnosis, and management.

### **Diagnosis and management**

In many parts of Nepal, the diagnosis of AKI relies heavily on clinical judgment, urine dipstick testing, and limited point-of-care creatinine measurement, as access to comprehensive laboratory services is often restricted. Outside major urban centers, timely biochemical testing is frequently unavailable, making early detection difficult. As a result, patients, many of whom are young and previously healthy often present late, when complications such as fluid overload, electrolyte imbalance, or uremic symptoms have already developed. The ISN 0by25 initiative showed that even simple point-of-care creatinine testing, when combined with structured management protocols, can significantly improve early recognition and outcomes in low-resource settings [4]. These findings are particularly relevant for Nepal, where decentralized and pragmatic approaches may offer the most realistic path to earlier diagnosis.

Management is largely supportive, focusing on:

- Timely fluid resuscitation
- Treatment of underlying infections or toxins
- Avoidance or dose adjustment of nephrotoxic drugs

Kidney Replacement Therapy (KRT) is mainly available in urban tertiary centers, with intermittent hemodialysis as the predominant modality. Limited access to these services has contributed to high morbidity and mortality from AKI in low- and middle-income countries such as Nepal [5].

## **RESULTS AND DISCUSSION**

Key barriers to effective AKI care in Nepal include:

### **1. Limitations in the healthcare infrastructure**

- Lack of screening and continuity care

- High out-of-pocket healthcare expenditure
- Limited resources and diagnostic facilities in rural areas
- Inefficient medical record system
- Insufficient research to inform clinical practice and guide policy implementation
- Weak regulatory oversight at both the local and national level
- Shortage of nephrologists and other support personnel due to limited access to training and ongoing “brain drain”

### **2. Socioeconomic factors**

- Geographic and socioeconomic inequities
- Poor health literacy

These gaps result in delayed diagnosis, fragmented care, poor renal outcomes and patient survival.

### **Economic and social impact**

AKI in Nepal disproportionately affects working-age adults, leading to lost productivity, prolonged hospitalization, and financial hardship for families. This burden is especially evident among migrant workers returned from the Gulf countries and Malaysia-major employment destinations for Nepalese workers. Recent studies show that 28% - 31% of patients receiving dialysis or kidney transplantation in major Nepali centers are migrant returnees, many diagnosed at an unusually young age [6]. This represents a major social and economic challenge for families and the national health system.

### **Future directions**

Improving AKI outcomes in Nepal requires:

- Expansion of point-of-care diagnostics
- Standardized AKI protocols at all health-care levels
- Community education and early risk screening
- Workforce training and international collaboration
- Affordable dialysis options, especially peritoneal dialysis which is feasible and cost-effective in low-resource settings and can substantially improve survival in AKI patients.
- Establishment of a national AKI surveillance system

## **CONCLUSION**

AKI is a major yet largely preventable health problem in Nepal. Closing gaps in early detection, infrastructure, workforce capacity, and national policy is essential to reduce avoidable deaths and long-term kidney disease. Strengthening community-based care and integrating AKI into national health strategies can transform outcomes for thousands of vulnerable patients.

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## **AUTHOR CONTRIBUTIONS**

Deepak Sharma: Conceptualization, Literature review, drafting, revision

Jie Tang: Critical revision, editing and final approval.

## CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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