Outcomes of acute kidney injury in children and adults in sub-Saharan Africa: a systematic review

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Summary

Background Access to diagnosis and dialysis for acute kidney injury can be life-saving, but can be prohibitively expensive in low-income settings. The burden of acute kidney injury in sub-Saharan Africa is presumably high but remains unknown. We did a systematic review to assess outcomes of acute kidney injury in sub-Saharan Africa and identify barriers to care.

Methods We searched PubMed, African Journals Online, WHO Global Health Library, and Web of Science for articles published between Jan 1, 1990, and Nov 30, 2014. We scored studies, and all were of medium-to-low quality. We made a pragmatic decision to include all studies to best reflect reality, and did a descriptive analysis of extracted data. This study is registered with PROSPERO, number CRD42015015690.

Findings We identified 3881 records, of which 41 met inclusion criteria, including 1403 adult patients and 1937 paediatric patients. Acute kidney injury in sub-Saharan Africa is severe, with 1042 (66%) of 1572 children and 178 (70%) 253 of adults needing dialysis in studies reporting dialysis need. Only 666 (64%) of 1042 children (across 11 studies) and 58 (33%) of 178 adults (across four studies) received dialysis when needed. Overall mortality was 34% in children and 32% in adults, but rose to 73% in children and 86% in adults when dialysis was needed but not received. Major barriers to access to care were out-of-pocket costs, erratic hospital resources, late presentation, and female sex.

Interpretation Patients in these studies are those with resources to access care. In view of overall study quality, data interpretation should be cautious, but high mortality and poor access to dialysis are concerning. The global scarcity of resources among patients and health centres highlights the need for a health-system-wide approach to prevention and management of acute kidney injury in sub-Saharan Africa.

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Introduction

Acute kidney injury is associated with substantial morbidity and mortality worldwide, but data have been conspicuously missing from the Global Burden of Disease study.[1] Acute kidney injury refers to any sudden decline in kidney function, which can be reversible if detected early enough. Acute kidney injury can be community-acquired, resulting from an injury or infection before admission to hospital, or can be hospital-acquired, arising as a complication of hospital admission. Community-acquired acute kidney injury tends to occur in low-income countries, and in young people with few comorbidities, whereas hospital-acquired acute kidney injury tends to occur in high-income settings, and in older people (45–80 years), often with several comorbidities.[2] The burden of acute kidney injury in sub-Saharan Africa is unknown, but mortality is presumably high because of poor access to health care.

In a world meta-analysis,[3] the pooled incidence of acute kidney injury was 21·0% in adults and 33·7% in children, and mortality was 23·3% in adults and 13·8% in children. Only one of 154 included studies was from sub-Saharan Africa.[3] Most studies included patients with hospital-acquired acute kidney injury, contrasting with most acute kidney injury in sub-Saharan Africa, which is community-acquired.[3] Mortality was lower in countries with higher expenditure on health care, reflecting improved access to health care and dialysis in these countries.[3] In an update of this analysis, incidence and outcomes from 62 African studies were summarised in a table, but again excluded from the broader analysis.[2] The generalisability of these global findings to sub-Saharan Africa is therefore unknown.

Despite the absence of data for disease burden, the drive towards providing universal dialysis for acute kidney injury, which can be life-saving, is growing. In much of sub-Saharan Africa, dialysis is paid for out of pocket, at an estimated US$300 per episode of acute kidney injury for a child, and probably more for an adult.[4] In our experience, many patients cannot meet such costs and are forced to decline treatment. If provision of dialysis is to be sustainable in sub-Saharan Africa, data are needed to inform health policy decisions. In view of the present absence of epidemiological data, we have undertaken a systematic review to assess reported outcomes in patients with acute kidney injury in sub-Saharan Africa to highlight the real-world context of

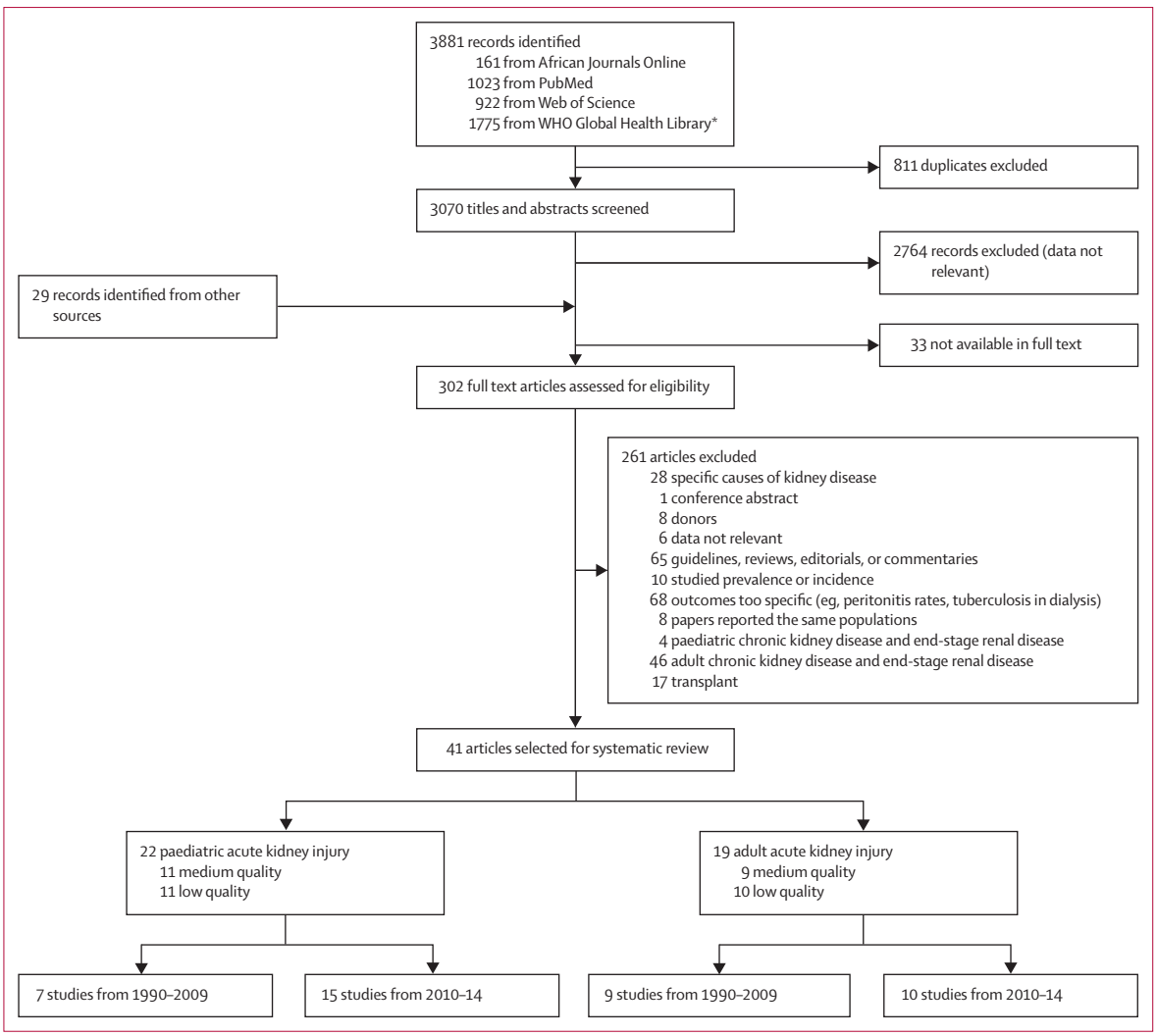

Figure 1: **Study selection**
*WHO Global Health Library includes African Index Medicus.

acute kidney injury in the region and to identify barriers to care that should be tackled to comprehensively address this important problem. This systematic review is highly relevant to understanding the challenges faced in management of acute kidney injury in sub-Saharan Africa, which are a crucial component of the disease burden.

Methods

Search strategy and selection criteria

See Online for appendix

We did a systematic review using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (appendix).[5] We searched PubMed, African Journals Online, the WHO Global Health Library, and Web of Science with relevant medical subject headings (appendix). We selected additional references through bibliographies from identified articles. We restricted the search to articles in English or French, published between Jan 1, 1990, and Nov 30, 2014. Outcomes of interest included access to dialysis, mortality, and recovery of renal function in cohorts of all patients admitted to hospital with acute kidney injury, irrespective of cause. We included variable definitions of acute kidney injury (clinical [oliguria, hyperkalaemia, or metabolic acidosis]; laboratory [urea or creatinine]; standardised diagnostic criteria; and need for dialysis). We excluded articles focusing exclusively on cohorts with single causes of acute kidney injury (eg, malaria), since outcomes would not be generalisable to the broader acute kidney injury population.[2] We excluded case reports. FAA and VAL screened titles and abstracts for eligibility. Articles meeting inclusion criteria and obtainable as full texts were reviewed in detail. This study is registered with PROSPERO, number CRD42015015690.