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A Systematic Review of Ambient Temperature and Acute Kidney Injury Incidence in Outdoor Manual Labourers: Evidence from Khartoum, Sudan

Fatimata Ousmane[1], **Jean-Baptiste Ngbokoli**[1,2]

[1] University of Bangui

[2] Department of Clinical Research, University of Bangui

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Correspondence: fousmane@aol.com

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Author notes

Fatimata Ousmane is affiliated with University of Bangui and focuses on Medicine research in Africa.
Jean-Baptiste Ngbokoli is affiliated with Department of Clinical Research, University of Bangui and focuses on Medicine research in Africa.

Abstract

Outdoor manual labourers in hot climates face an increased risk of heat-related illnesses. Acute kidney injury (AKI) is a serious potential consequence of occupational heat exposure. The specific association between ambient temperature and AKI in Sudan's extreme climate, particularly in Khartoum, has not been systematically reviewed. This systematic review aimed to synthesise and critically appraise the existing evidence on the association between ambient temperature and the incidence of AKI among outdoor manual labourers in Khartoum, Sudan. A systematic search of multiple electronic databases was conducted following a pre-defined protocol. Studies were included if they investigated AKI incidence in relation to ambient temperature in outdoor manual labourers within Khartoum. Data extraction and quality assessment were performed independently by two reviewers. No primary empirical studies meeting the inclusion criteria were identified. A narrative synthesis of relevant contextual evidence was therefore undertaken. A key theme from related literature was the strong biological plausibility of a positive association, with heat stress and dehydration cited as primary causal pathways. There is a critical lack of direct epidemiological research quantifying this relationship in the specified population and setting. The evidence on the association between ambient temperature and AKI among outdoor manual labourers in Khartoum is currently absent. The identified gap highlights a significant deficit in the local public health evidence base. Targeted primary research, particularly robust longitudinal studies with direct health monitoring, is urgently needed. Concurrently, public health initiatives should promote occupational heat stress prevention programmes based on precautionary principles. These could include hydration strategies and adapted work-rest schedules. heat stress, occupational health, climate change, renal disease, dehydration, Sudan, workforce This review is the first to systematically map the evidence on this topic in Sudan. It identifies a critical research gap and provides a foundation for guiding future studies and interim public health protections for a vulnerable workforce.

Keywords: *occupational heat exposure, acute kidney injury, manual labourers, Sudan, epidemiology, climate, environmental health*

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