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A Randomised Field Trial of Emergency Care Systems in Ghana

Evaluating Clinical Outcomes and Operational Efficacy

Kwame Aboagye[1]

[1] *Department of Pediatrics, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi*

Correspondence: kaboagye@gmail.com

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Author notes

Kwame Aboagye is affiliated with Department of Pediatrics, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi and focuses on Medicine research in Africa.

ABSTRACT

Emergency care systems in sub-Saharan Africa are underdeveloped, with significant gaps in evidence regarding the impact of structured emergency care units (ECUs) on patient outcomes and health system efficiency. This study aimed to evaluate the clinical and operational efficacy of a standardised ECU protocol compared to usual care in a regional hospital setting. We conducted a pragmatic, parallel-group randomised field trial. Twelve district hospitals were randomly allocated to implement the new ECU protocol or continue usual care. The primary outcome was 30-day all-cause mortality for acute, life-threatening presentations. Secondary outcomes included length of stay and complication rates. Analysis used an intention-to-treat approach with a mixed-effects logistic regression model: $logit(P(Y\{ij\} = 1)) = beta0 + beta1\, X\{ij\} + uj$, where $Y\{ij\}$ is mortality for patient i in hospital j, $X\{ij\}$ is the intervention indicator, and uj is a hospital-level random intercept. The intervention significantly reduced 30-day mortality (adjusted odds ratio 0.76, 95% CI 0.62 to 0.93). The absolute risk reduction was 3.2 percentage points. Length of stay was also shorter in intervention hospitals (mean difference -1.8 days, $p<0.01$). Implementation of a structured ECU protocol improved clinical outcomes and operational efficiency in the studied context. Health policy should prioritise the rollout of standardised emergency care protocols, supported by dedicated training and resource allocation, across comparable settings. Emergency medical services, health systems, randomised trial, mortality, sub-Saharan Africa, implementation science This study provides the first experimental evidence from a multi-site randomised trial demonstrating the effectiveness of a standardised emergency care unit system in a resource-constrained African setting.

Keywords: *Emergency care systems, Sub-Saharan Africa, Randomised controlled trial, Clinical outcomes, Health services research, Ghana*

Article Highlights

- Structured ECU protocol reduced 30-day mortality with an adjusted odds ratio of 0.76.
- Absolute risk reduction of 3.2 percentage points for acute,

Study Design

Pragmatic, parallel-group randomised field trial across 12 district hospitals in Ghana, comparing a standardised ECU protocol to usual care.

life-threatening presentations. • Intervention hospitals demonstrated a mean reduction in length of stay of 1.8 days. • Provides first multi-site randomised trial evidence for ECU efficacy in sub-Saharan Africa.	*This trial offers robust evidence for health system strengthening in comparable resource-constrained settings.*

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