



Methodological Evaluation of Emergency Care Systems in Uganda Using Multilevel Regression Analysis

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Abstract

Emergency care systems in Uganda are crucial for managing critical health events efficiently. However, their effectiveness varies significantly across different regions and healthcare facilities. A multilevel regression model was employed to analyse data collected from 10 ECUs across Uganda. Data on patient demographics, health conditions, treatment provided, and clinical outcomes were used. Hierarchical modelling was applied to account for both individual-level (patient) and unit-level (ECU) variations. The multilevel regression analysis revealed significant differences in recovery rates between rural and urban ECUs, with an estimated coefficient of -0.51 (95% CI: -0.72, -0.30) indicating a lower likelihood of positive outcomes in rural settings compared to urban. This study provides evidence that regional disparities exist within the Ugandan emergency care system and highlights the need for targeted interventions to improve patient recovery rates in underserved areas. Policy recommendations include prioritising resource allocation towards ECUs in rural regions, enhancing training programmes for healthcare providers, and implementing telemedicine solutions to bridge geographical gaps. Treatment effect was estimated with $\text{text}\{logit\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Uganda, Multilevel Regression, Health Services Research, Emergency Medicine, Spatial Analysis, Hierarchical Modelling, Outcome Measures*

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