



Multilevel Regression Analysis of Emergency Care Systems in Uganda: A Methodological Evaluation of Clinical Outcomes

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Abstract

Emergency care systems in Uganda are crucial for managing acute health crises efficiently. Despite their importance, there is a lack of comprehensive methodological evaluations quantifying clinical outcomes. A mixed-methods approach involving quantitative data from ECUs across different regions and qualitative interviews with healthcare providers was employed. Multilevel regression models were used to analyse the impact of various factors including geographical location, staffing levels, and equipment availability on clinical outcomes. Analysis revealed significant variations in patient survival rates between ECUs located in rural versus urban areas ($p < 0.05$). Additionally, a multilevel regression model estimated that for every additional nurse per 100 beds, there was an increase of approximately 2% in diagnostic accuracy. The study underscores the need for targeted interventions to improve clinical outcomes and resource allocation within Uganda's emergency care systems. The findings provide evidence that supports more nuanced understanding of ECU performance. Immediate policy recommendations include increasing nurse-to-bed ratios, enhancing training programmes for healthcare staff, and implementing standardised protocols across all regions to ensure uniform quality of care. Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African healthcare, Multilevel modelling, Outcome measurement, Quantitative methods, Regression analysis, Service evaluation, Uganda*

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