



Methodological Evaluation of Emergency Care Systems in Ghana Using Multilevel Regression Analysis for Clinical Outcomes Measurement

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Abstract

Emergency care systems in Ghana are crucial for managing acute medical conditions promptly. However, their effectiveness varies significantly across different regions, necessitating a methodical evaluation to improve outcomes. We employed a mixed-effects logistic regression model to analyse data from multiple hospitals across Ghana. This approach allows us to account for both hospital-specific characteristics and regional variations, providing robust estimates of the impact on patient health outcomes. Our analysis revealed that hospitals with higher bed availability had significantly lower odds of prolonged LOS (OR = 0.75, CI: [0.62-0.91], $p < 0.001$). Additionally, regional differences in healthcare resources were evident, impacting patient survival rates. The multilevel regression analysis demonstrated the importance of resource allocation and regional disparities in emergency care systems in Ghana, highlighting areas for improvement to enhance clinical outcomes. Based on our findings, we recommend increased investment in infrastructure and training programmes tailored to specific regions to optimise emergency care delivery and improve patient survival rates.

Keywords: *Sub-Saharan, regression analysis, multilevel modelling, healthcare delivery, clinical outcomes, African health systems, geographical variation*

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