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Bayesian Hierarchical Model for Measuring Clinical Outcomes in Emergency Care Units: A Methodological Evaluation in Uganda

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Abstract

Emergency care units (ECUs) in Uganda face challenges in measuring clinical outcomes accurately due to varying standards and data collection methods. A Bayesian hierarchical model was applied to analyse clinical outcome measures from multiple ECU sites. Data were collected through structured surveys and electronic health records (EHRs). The analysis revealed significant variability in outcomes across different ECUs, with a notable proportion of patients experiencing prolonged hospital stays. The Bayesian hierarchical model demonstrated improved accuracy in measuring clinical outcomes compared to traditional methods, particularly for assessing patient recovery times and resource utilization. ECU managers are advised to implement standardised data collection protocols and utilise the proposed Bayesian model for comprehensive outcome evaluation. Bayesian Hierarchical Model, Emergency Care Units, Clinical Outcomes, Uganda Treatment effect was estimated with $text\{logit\}(\pi) = beta 0 + \vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African healthcare, Bayesian statistics, Hierarchical modelling, Methodology, Outcome measurement, Quantitative analysis, Statistical inference*

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