Bayesian Hierarchical Model for Evaluating Clinical Outcomes in Emergency Care Units in Kenya: A Methodological Study

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Abstract

Emergency care units (ECUs) in Kenya face significant challenges in managing clinical outcomes efficiently and effectively. Current evaluation methods often lack robust statistical frameworks that can account for variability across different ECUs, leading to suboptimal decision-making. The study will employ a Bayesian hierarchical linear regression model to analyse data from multiple ECUs. This approach allows for capturing both fixed effects (e.g., treatment efficacy) and random effects (e.g., unit-specific variations). A preliminary analysis suggests that the variability in clinical outcomes across different ECUs is substantial, with some units demonstrating significantly higher success rates than others. The Bayesian hierarchical model offers a promising method for enhancing understanding of clinical performance within Kenyan ECUs and could guide policy decisions aimed at improving care delivery. Implementing the proposed model in routine evaluations will require careful calibration to ensure its effectiveness across different contexts. Future research should explore ways to integrate external data sources into the model for broader applicability. Bayesian hierarchical models, clinical outcomes, emergency care units, Kenya Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \beta^{\rightarrow}\,p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Kenya, Bayesian, Hierarchical, Model, Epidemiology, Clinical, Outcome*

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