



Bayesian Hierarchical Model Assessment of Clinical Outcomes in Uganda's Community Health Centres Systems

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Abstract

The clinical outcomes of patients in Uganda's community health centres (CHCs) are influenced by various factors including service delivery, patient adherence to treatment regimens, and socio-economic conditions. A Bayesian hierarchical model was employed to analyse clinical data from multiple CHCs across Uganda. The model incorporated random effects to reflect heterogeneity among CHCs and fixed effects to capture common factors affecting outcomes. The analysis revealed significant variability in clinical outcomes between different CHCs, with some showing improved treatment success rates compared to others. The Bayesian hierarchical model effectively captured the complex interplay of variables influencing healthcare delivery and patient outcomes within Ugandan CHCs. Future research should consider implementing targeted interventions for CHCs with lower treatment success rates based on this model's findings. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta^T X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: African geography, Bayesian statistics, Hierarchical modelling, Intervention efficacy, Outcome assessment, Quantitative methods, Random effects models

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