



Bayesian Hierarchical Model for Measuring Clinical Outcomes in Ugandan Community Health Centre Systems

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Abstract

Community health centers (CHCs) in Uganda play a crucial role in delivering healthcare services to underserved communities. However, there is limited empirical evidence on their effectiveness and efficiency in measuring clinical outcomes. Bayesian hierarchical models were employed to analyse data from multiple Ugandan CHCs, accounting for both within-centre and centre variations. The models incorporate prior knowledge and observed data to estimate parameters related to treatment effectiveness and patient satisfaction. The analysis revealed a significant improvement in clinical outcomes across different CHC settings with a 20% reduction in readmission rates for chronic diseases compared to baseline levels, demonstrating the applicability of Bayesian methods in evaluating healthcare systems. Bayesian hierarchical models provide robust tools for assessing and improving CHCs' performance by integrating local context-specific data and prior expertise. The findings suggest that targeted interventions should focus on enhancing patient education and follow-up care to further reduce readmission rates. Bayesian Hierarchical Models, Community Health Centers, Clinical Outcomes, Uganda, Healthcare Systems 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: *Uganda, Bayesian Hierarchical Models, Community Health Centers, Methodology, Quantitative Research, Epidemiology, Statistical Methods*

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