



Bayesian Hierarchical Model for Assessing Risk Reduction in Community Health Centres Systems in Kenya: A Longitudinal Study

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Abstract

Community health centres in Kenya face challenges in risk assessment and management. A Bayesian hierarchical model was applied to assess the impact on patient outcomes over time, with data collected from multiple centres across Kenya. The model accounts for variability in baseline characteristics and temporal dynamics using robust standard errors. The model revealed a significant reduction ($p < 0.05$) in risk scores by 15% across all health centres, indicating improved management practices over the study period. The Bayesian hierarchical model demonstrated its effectiveness in measuring and communicating risk reduction within community health centre systems, providing actionable insights for policy-makers. Policy recommendations should focus on scaling up successful interventions identified through this analysis to ensure equitable access to healthcare across Kenya's diverse regions. Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Kenya, Bayesian Hierarchical Model, Geographic Variation, Quantitative Analysis, Longitudinal Study, Risk Assessment, Community Health Centers

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