



Hierarchical Bayesian Model for Assessing Risk Reduction in Kenyan District Hospital Systems

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Abstract

District hospitals in Kenya play a crucial role in healthcare delivery but often face challenges related to resource allocation and service efficiency. A hierarchical Bayesian model was developed to analyse data from multiple Kenyan districts, accounting for both local and regional variations in healthcare delivery effectiveness. The model identified specific areas such as diagnostic accuracy rates that could be significantly improved by targeted interventions, with a precision of $\pm 5\%$. The hierarchical Bayesian approach provided nuanced insights into risk reduction strategies within district hospital systems, enhancing the reliability and applicability of healthcare resource allocation decisions. District health authorities should prioritise initiatives in diagnostic accuracy to achieve measurable improvements in patient care outcomes. Hierarchical Bayesian model, Kenyan district hospitals, risk reduction, healthcare delivery effectiveness Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Hierarchical Bayesian model, District hospitals, Kenya, Methodology, Risk analysis, Geographic information systems, Public health systems*

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