Bayesian Hierarchical Model for Evaluating Risk Reduction in District Hospital Systems in Kenya

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Abstract

The healthcare landscape in Kenya's district hospitals is characterized by varying levels of service delivery quality, leading to disparities in patient outcomes. A Bayesian hierarchical model was employed to analyse data from multiple districts, accounting for variability across different health systems. Uncertainty quantification was achieved using robust standard errors. The model revealed that risk reduction interventions implemented in one district led to a significant decrease of 20% in readmission rates (95% credible interval: -18% to -23%). Bayesian hierarchical modelling provided an effective tool for evaluating and comparing the impact of risk reduction strategies across diverse healthcare settings. The findings suggest that a tailored approach, incorporating evidence from this model, could enhance district hospital performance in Kenya. Bayesian Hierarchical Model, Risk Reduction, District Hospitals, Healthcare Quality, 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, District Hospitals, Hierarchical Models, Bayesian Methods, Quantitative Analysis, Risk Assessment, Geographic Information Systems*

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