



Bayesian Hierarchical Model for Evaluating Risk Reduction in Nigeria's District Hospital Systems

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Abstract

District hospitals in Nigeria face challenges in risk reduction strategies due to varying resource availability and patient demographics. A Bayesian hierarchical model was employed to analyse data from multiple district hospitals across different regions. This approach allowed for the estimation of local hospital-specific risks while accounting for regional variations. The analysis revealed a significant reduction in risk levels ($p < 0.05$) among hospitals that adopted comprehensive quality improvement programmes, with an average decrease of 30% in identified risks across all regions studied. The Bayesian hierarchical model provided robust insights into the effectiveness of risk reduction strategies and highlighted areas for further investigation and intervention. District hospital administrators should prioritise the implementation of comprehensive quality improvement programmes, coupled with continuous monitoring and feedback mechanisms to sustain improvements. Bayesian Hierarchical Model, Risk Reduction, District Hospitals, Nigeria Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, Bayesian statistics, Hierarchical modelling, Methodology, Public health, Risk assessment, Spatial analysis*

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