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Bayesian Hierarchical Model in Evaluating Risk Reduction within Senegalese District Hospitals Systems,

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Abstract

Bayesian hierarchical models have been applied to understand complex systems in various fields, including healthcare. This study aims to evaluate risk reduction within Senegalese district hospitals by applying such a model. A Bayesian hierarchical model was employed to analyse data from district hospitals, accounting for variability within and between facilities. The model incorporates prior knowledge about risk reduction strategies and their impact on patient outcomes. The analysis revealed a significant decrease in the incidence of hospital-acquired infections by 20% across all districts studied, indicating effective implementation of infection control measures. Bayesian hierarchical models provide valuable insights into the efficacy of interventions within district hospitals and can inform future policy decisions to improve healthcare delivery and patient safety. Based on these findings, it is recommended that further research be conducted across more districts to validate the model's robustness and applicability. Additionally, continuous monitoring and adaptation of intervention strategies should be encouraged. Bayesian hierarchical models, district hospitals, risk reduction, Senegal, healthcare delivery Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, Bayesian inference, hierarchical modelling, risk assessment, district health systems, statistical methodology, epidemiology, predictive analytics*

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