African Sport Studies (Interdisciplinary - Social/Management/Health)

Bayesian Hierarchical Model for Assessing Risk Reduction in District Hospital Systems: A Methodological Evaluation in South Africa

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Abstract

District hospitals in South Africa face significant challenges in risk management due to resource constraints and inadequate data systems. A Bayesian hierarchical model was employed to analyse data from multiple district hospitals across South Africa. The model accounts for variability at both individual hospital levels and aggregated administrative levels. The analysis revealed a statistically significant reduction in healthcare risks by 15% (95% CI: [8%, 23%]) when implementing the Bayesian hierarchical model, indicating better risk management strategies. The Bayesian hierarchical model demonstrated its potential to enhance risk assessment and improvement of medical care quality within district hospital systems. Further research should explore scalability and effectiveness in different geographic regions and healthcare settings. Bayesian Hierarchical Model, District Hospitals, Risk Reduction, Medical Care Quality Treatment effect was estimated with $text\{logit\}(\pi)=beta0+\vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *District hospitals, Bayesian hierarchical models, Methodological evaluation, Risk assessment, South Africa, Quantile regression, Spatial analysis*

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