African Rehabilitation Medicine

Bayesian Hierarchical Model for Evaluating Clinical Outcomes in District Hospitals Systems in Kenya

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Abstract

District hospitals in Kenya play a crucial role in primary healthcare delivery but often face challenges in maintaining optimal clinical outcomes. A Bayesian hierarchical model was employed to analyse data from multiple district hospitals across Kenya. The model accounts for hospital-specific variability by incorporating random effects that vary according to geographical regions. The analysis revealed significant heterogeneity in clinical outcomes between different regions, with some areas showing a 20% improvement in treatment efficacy compared to others. Bayesian hierarchical models provide a robust framework for understanding and enhancing the performance of district hospitals in Kenya. District hospital management should focus on regional-specific interventions based on model findings to optimise clinical outcomes. 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, clinical outcomes, district hospitals, methodological evaluation, randomized controlled trials*

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