African Endocrine Surgery

Bayesian Hierarchical Model for Evaluating Cost-Effectiveness in District Hospitals Systems, Rwanda: An Analytical Study

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Abstract

District hospitals in Rwanda face challenges in evaluating cost-effectiveness due to limited data and resource constraints. A Bayesian hierarchical model was applied to analyse hospital expenditure and patient outcomes across different districts. The model accounts for variability in resource allocation and service delivery patterns. The analysis revealed significant variation in cost-effectiveness ratios (CER) among districts, with some showing substantial under-utilization of available resources compared to optimal levels. The Bayesian hierarchical model provides a robust framework for evaluating district hospital systems' efficiency, highlighting areas requiring targeted interventions and resource reallocation. District health authorities should prioritise data collection and analysis to inform evidence-based policy decisions and improve service delivery in underserved regions. Bayesian Hierarchical Model, Cost-Effectiveness Analysis, District Hospitals, Rwanda 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, Rwanda, Hierarchical models, Bayesian statistics, Cost-effectiveness analysis, Resource allocation, Epidemiology*