Bayesian Hierarchical Model for Evaluating Cost-Effectiveness in Tanzanian District Hospitals Systems: A Longitudinal Study

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Abstract

In Tanzania, district hospitals play a critical role in healthcare delivery, yet their cost-effectiveness is often under scrutiny. A longitudinal study employing a Bayesian hierarchical model to analyse data from multiple districts. The model accounts for both fixed and random effects, ensuring robust inference across different hospitals. The analysis revealed significant variation in cost-effectiveness among district hospitals, with some showing substantial efficiency gains over time. This study provides a nuanced understanding of hospital performance by accounting for the variability inherent in healthcare systems. Policy makers should consider regional differences when allocating resources and implementing interventions to optimise health outcomes. Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \vec{\beta}\,p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Tanzania, Bayesian Hierarchical Model, District Hospitals, Cost-Effectiveness Analysis, Longitudinal Study, Methodological Evaluation, Geographic Epidemiology*

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