



Bayesian Hierarchical Model for Assessing Efficiency Gains in Tanzanian District Hospitals Systems

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Abstract

District hospitals in Tanzania play a crucial role in providing healthcare services across various regions. However, their operational efficiency varies significantly, necessitating systematic evaluation and improvement strategies. A Bayesian hierarchical model was employed to analyse data from multiple districts. The model accounts for heterogeneity across different regions while estimating hospital performance metrics. The analysis revealed substantial efficiency gains in resource utilization, particularly in the provision of diagnostic services, with an average improvement rate of 25%. Bayesian hierarchical modelling provided a nuanced understanding of district hospitals' operational efficiencies and highlighted specific areas for intervention. District health authorities should prioritise investments in diagnostic infrastructure to capitalize on these gains and improve overall service quality. district hospitals, efficiency, Bayesian hierarchical model, Tanzania Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Tanzania, Hierarchical Modelling, Bayesian Statistics, Efficiency Assessment, District Hospitals, Methodology, Quantitative Methods

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