



Bayesian Hierarchical Model for Evaluating Clinical Outcomes in Community Health Centres, Tanzania

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Abstract

Clinical outcomes in community health centres (CHCs) have been a focus for improving healthcare delivery in Tanzania. However, evaluating these outcomes often involves complex data structures and statistical challenges. A Bayesian hierarchical linear regression model was employed to analyse the data collected from multiple CHCs in Tanzania. The model incorporates random effects to account for unobserved heterogeneity among facilities. The analysis revealed significant differences in clinical outcomes between CHCs, with some facilities achieving higher patient satisfaction scores (mean difference of 15% in satisfaction rates). This study demonstrates the effectiveness of Bayesian hierarchical models in assessing and comparing clinical performance across multiple healthcare settings. The findings suggest that targeted interventions should be implemented to improve CHCs with lower satisfaction scores, thereby enhancing overall service quality. Bayesian Hierarchical Model, Community Health Centres, Clinical Outcomes, Tanzania Treatment effect was estimated with $\text{text}\{ \text{logit} \}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, Bayesian statistics, Hierarchical modelling, Clinical outcomes, Community health centers, Epidemiology, Statistical methods*

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