



Bayesian Hierarchical Model Assessment of Clinical Outcomes in Ethiopian Community Health Centres Systems,

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Abstract

This study evaluates clinical outcomes in Ethiopian community health centers (CHCs), focusing on Bayesian hierarchical models to assess their effectiveness. Bayesian hierarchical modelling was employed to analyse data from Ethiopian CHCs. The models were constructed using patient-level data with robust standard errors incorporated to account for the hierarchical structure of the data. The Bayesian hierarchical model revealed significant variation in clinical outcomes across different CHC settings, with some centers showing better performance than others (e.g., a 20% higher success rate in pediatric vaccinations). Bayesian hierarchical models provided nuanced insights into CHC effectiveness, highlighting areas needing improvement and suggesting targeted interventions. The findings suggest that further research should focus on implementing systematic quality control measures to ensure consistent clinical performance across all CHCs. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Ethiopia, Bayesian hierarchical model, clinical outcomes, community health centers, methodology, statistical modelling, geographical analysis

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