African Pharmacoepidemiology

Bayesian Hierarchical Model for Assessing Adoption Rates in Community Health Centres Systems in Ethiopia,

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Abstract

Community health centres in Ethiopia have been established to provide primary healthcare services, but their adoption rates vary across different regions and levels of service delivery. A Bayesian hierarchical model was employed, incorporating data from multiple sources including administrative records and clinic-level surveys. Data were analysed using Markov Chain Monte Carlo (MCMC) methods to estimate adoption rates with uncertainty quantification. The analysis revealed significant regional variations in adoption rates, with urban areas showing higher adoption compared to rural regions. This study provides a robust method for evaluating community health centre adoption rates, highlighting the importance of considering geographical factors and service delivery levels. Future research should focus on understanding the specific drivers behind regional variations in adoption rates and exploring potential strategies to enhance uptake across all regions. Bayesian hierarchical model, Community health centres, Adoption rate, Ethiopia Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \vec{\beta}\ p\ X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Ethiopia, Bayesian Hierarchical Model, Spatial Analysis, Markov Chain Monte Carlo, Random Effects Models, Geographic Information Systems, Quantitative Methods*

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