African Health Informatics (Clinical focus)

Bayesian Hierarchical Model for Assessing Clinical Outcomes in Urban Primary Care Networks, Ethiopia: A Methodological Evaluation

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Abstract

Urban primary care networks (UPCNs) in Ethiopia are crucial for delivering accessible healthcare services to underserved populations. However, their effectiveness in improving clinical outcomes remains underexplored. A Bayesian hierarchical regression model was employed to analyse data from urban primary care sites. The model accounts for variability between sites while estimating treatment effects and their uncertainties. The analysis revealed significant heterogeneity in clinical outcome measures among the UPCNs, with some achieving outcomes comparable to national averages while others showed lower effectiveness. This study highlights the importance of site-specific factors influencing clinical performance within urban primary care networks. The model provides a robust framework for assessing and improving these systems. Future research should consider integrating additional contextual data to refine the hierarchical model, particularly focusing on patient demographics and local healthcare resource availability. Treatment effect was estimated with $text\{logit\}(\pi) = beta 0 + \beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geographic, Primary care, Hierarchical modelling, Bayesian statistics, Spatial analysis, Quantitative methods, Evaluation studies*

ABSTRACT-ONLY PUBLICATION

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