



Bayesian Hierarchical Model for Measuring Clinical Outcomes in Urban Primary Care Networks, Ghana

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Abstract

Urban primary care networks in Ghana have been established to improve access to healthcare services, particularly for underserved populations. However, the effectiveness of these networks on clinical outcomes remains underexplored. A Bayesian hierarchical model was employed to analyse data collected from urban primary care clinics across Ghana, accounting for variability at multiple levels (clinic, provider, and patient). The model revealed significant heterogeneity in clinical outcome measures between different clinics, suggesting that network implementation may need tailored interventions to optimise performance. This study provides a robust framework for assessing the impact of urban primary care networks on health outcomes using Bayesian hierarchical modelling. Future research should focus on replication and application to other settings. Health policymakers should consider integrating the findings from this model into network planning and evaluation processes, with a particular emphasis on clinic-specific strategies based on identified disparities. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African Geography, Hierarchical Modelling, Bayesian Statistics, Clinical Outcomes, Primary Care Systems, Quantitative Evaluation, Methodological Research*

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