



Bayesian Hierarchical Model for Evaluating Clinical Outcomes in Urban Primary Care Networks in Rwanda: A Methodological Study

Kizito Mukashimwe¹

¹ African Leadership University (ALU), Kigali

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Correspondence: kmukashimwe@outlook.com

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Author notes

Kizito Mukashimwe is affiliated with African Leadership University (ALU), Kigali and focuses on Medicine research in Africa.

Abstract

Urban primary care networks (PCNs) in Rwanda are being evaluated for their effectiveness in improving clinical outcomes. A Bayesian hierarchical model was employed to analyse clinical data from urban primary care networks, considering both individual patient variability and network-level effects. The analysis revealed significant variations in treatment effectiveness among different PCN sites, with some showing substantial improvements in patient recovery rates compared to baseline levels. The Bayesian hierarchical model provided a nuanced understanding of the impact of urban primary care networks on clinical outcomes, highlighting areas for improvement and scalability. Further research should focus on implementing targeted interventions within PCNs to optimise treatment effectiveness and standardise patient outcomes across different sites. 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, Primary care networks, Bayesian statistics, Hierarchical modelling, Clinical outcomes, Quantitative methods, Random effects models*

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