



Bayesian Hierarchical Model for Measuring Adoption Rates of Community Health Centres in Rwanda: A Methodological Evaluation

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Abstract

Community health centres (CHCs) play a crucial role in Rwanda's public healthcare system. However, their adoption and impact have not been systematically evaluated. Bayesian hierarchical models were employed to estimate adoption rates across different geographical regions and socio-economic groups, accounting for variability within and between these areas. The analysis revealed significant regional variations in CHC adoption rates, with urban areas showing higher uptake compared to rural settings. A Bayesian hierarchical model provided robust estimates of these variation components. Bayesian hierarchical models offer a flexible framework for understanding complex healthcare systems and can inform future policy decisions regarding CHC deployment. Further research should explore the specific factors influencing CHC adoption rates in Rwanda, particularly addressing disparities between urban and rural areas. 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: Rwanda, Bayesian hierarchical model, adoption rates, spatial analysis, randomized controlled trials, Monte Carlo methods, geographic information systems

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