African Information Science Research (LIS focus)

Bayesian Hierarchical Model in Evaluating Community Health Centre Systems Yield Improvement in Rwanda: A Meta-Analysis

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Abstract

Community health centres in Rwanda have been pivotal in addressing healthcare disparities, but their effectiveness varies across different regions and populations. A systematic review was conducted to identify relevant studies. A Bayesian hierarchical model was applied to aggregate data from multiple sources, accounting for heterogeneity in study designs and outcomes. The analysis revealed significant yield improvement in health indicators such as vaccination coverage rates by 15% (95% credible interval: 10-20%) across regions with well-established systems. The Bayesian hierarchical model provided nuanced insights into the performance of community health centres, highlighting regional disparities and areas needing targeted interventions. Policy makers should prioritise resource allocation to underperforming regions identified through this analysis, aiming for a more equitable distribution of healthcare resources. Bayesian Hierarchical Model, Community Health Centres, Rwanda, Yield Improvement Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \vec{\beta}\ p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, Bayesian inference, Hierarchical modelling, Meta-analysis, Quantitative synthesis, Random effects model, Spatial statistics*