



Methodological Evaluation of Community Health Centres Systems in Rwanda Using Multilevel Regression Analysis to Measure Risk Reduction,

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Abstract

Community health centres in Rwanda have been established to improve access to healthcare services for underserved populations. This case study evaluates their effectiveness by applying multilevel regression analysis. Multilevel regression analysis was employed to examine variations in healthcare outcomes across different levels of the healthcare system (centre-level and patient-level) using a dataset comprising records from community health centres in Rwanda. Bayesian hierarchical models were used for estimating the parameters. The multilevel regression analysis revealed that reducing barriers at the centre level, such as improving transportation access to these facilities, was associated with a 20% reduction in patient travel time and a corresponding increase in service utilisation by patients. In conclusion, the implementation of evidence-based strategies at community health centres has led to significant improvements in healthcare accessibility and utilisation rates among rural populations. Future research should further investigate the long-term effects of these interventions on patient outcomes and explore additional strategies for enhancing service delivery efficiency and effectiveness. 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: *Geographic, Sub-Saharan, Community Health Centres, Multilevel Regression, Risk Reduction, Hierarchical Analysis, Quantitative Methods*

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