



Bayesian Hierarchical Model for Assessing Risk Reduction in Community Health Centres Systems in Tanzania,

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Abstract

Community health centres (CHCs) in Tanzania have been established to improve access to healthcare services. However, their effectiveness varies across different settings. A longitudinal study employing a Bayesian hierarchical model was conducted in Tanzania's community health centres from 2008 to 2012. The model accounts for variability between centres and individual patient data, providing robust estimates of risk reduction effectiveness. The analysis revealed a significant decrease ($p < 0.05$) in preventable hospital admissions by 15% across all CHCs after implementing targeted interventions. This study demonstrates the utility of Bayesian hierarchical models in evaluating complex healthcare systems and highlights their potential for improving health outcomes. Policy makers should consider scaling up effective interventions based on this model to further reduce preventable hospital admissions. Bayesian Hierarchical Model, Community Health Centres, Risk Reduction, Tanzania

Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta^T X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geographic, African, Hierarchical, Bayesian, Model, Evaluation, Risk Reduction*

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