Bayesian Hierarchical Model for Evaluating Risk Reduction in Community Health Centres Systems in Senegal

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Abstract

In Senegal, community health centres play a critical role in addressing urban health issues. However, their effectiveness and efficiency require rigorous evaluation. A Bayesian hierarchical model was employed to assess the impact of interventions targeting risk factors within communities. The model accounts for variability across different health centres and temporal trends over time. The analysis revealed that specific interventions significantly reduced maternal mortality rates by approximately 15%, with a 95% credible interval (CI) [8.2%, 21.4%]. The Bayesian hierarchical model provided nuanced insights into the effectiveness of health centre interventions, highlighting areas for further improvement. Future studies should consider expanding intervention scope and duration to ensure sustained benefits. 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 hierarchical model, Community health centres, Epidemiology, Methodological evaluation, Risk assessment, Statistical inference*

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