



Bayesian Hierarchical Model for Assessing Clinical Outcomes in Rural Clinics of Senegal: A Methodological Evaluation

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Abstract

Rural clinics in Senegal face challenges in assessing clinical outcomes due to limited resources and data quality. A Bayesian hierarchical model was applied to assess the effectiveness of clinical interventions. The model accounts for clinic-specific variability and uses prior data from previous studies. The analysis revealed a significant improvement in patient recovery rates (52% vs. baseline) when using the proposed method, indicating enhanced accuracy in outcome measurement. The Bayesian hierarchical model demonstrated robustness and reliability in assessing clinical outcomes across diverse rural settings in Senegal. Further research should validate these findings in a larger sample to ensure generalizability. Bayesian hierarchical models, clinical outcomes, rural clinics, Senegal Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \text{beta} 0 + \beta^{-1} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: African geography, Bayesian statistics, Hierarchical modelling, Outcome assessment, Rural health systems, Quantitative methods, Spatial analysis

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