



Bayesian Hierarchical Model for Measuring Adoption Rates in Community Health Centers Systems in Nigeria: A Methodological Evaluation

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Published: 28 October 2001 | **Received:** 25 July 2001 | **Accepted:** 23 September 2001

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DOI: [10.5281/zenodo.18725524](https://doi.org/10.5281/zenodo.18725524)

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Abstract

Community health centers in Nigeria face challenges in adopting evidence-based interventions to improve patient outcomes. A Bayesian hierarchical model was applied to data collected from Nigerian community health centers. The model accounts for heterogeneity among centers by incorporating random effects that reflect differences in local contexts and resource availability. The analysis revealed significant variation in adoption rates across different health centers, with some reaching nearly 80% but others below 50%. The Bayesian hierarchical model provided a nuanced understanding of the factors influencing adoption rates, offering insights for policymakers aiming to improve service delivery. Policymakers should prioritise resources and support in health centers with low adoption rates, considering local context-specific strategies. Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^{-1} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: African geography, Bayesian hierarchical model, Intervention study, Methodological evaluation, Nigeria, Quantitative methods, Random effects analysis

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