



Bayesian Hierarchical Model for Measuring Adoption Rates in Ghanaian Community Health Centres Systems: A Systematic Literature Review

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Abstract

Bayesian hierarchical models have been increasingly applied in various fields to analyse complex data structures. This systematic literature review aims to evaluate the use of such models for measuring adoption rates within community health centres (CHCs) in Ghana. A comprehensive search strategy was employed using multiple databases including PubMed, Scopus, and Web of Science. Studies were selected based on predefined inclusion criteria focusing on adoption rates, Bayesian hierarchical models, and CHCs in Ghana. Data extraction and synthesis were conducted following PRISMA guidelines. The analysis revealed that Bayesian hierarchical models provided robust estimates for adoption rates with a median uncertainty interval suggesting high precision in predictions across various CHC settings. This review underscores the potential of Bayesian hierarchical models as a powerful tool for understanding and improving healthcare intervention uptake in Ghanaian CHCs. Future research should explore model scalability and external validity. Researchers are encouraged to adopt this methodological approach, particularly when dealing with heterogeneous data from multiple locations. Further studies should aim at validating these findings across different types of interventions and settings. 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: *African geography, Bayesian hierarchical models, community health centres, methodological evaluation, adoption rates, complex data structures, geographic term*

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