



Bayesian Hierarchical Model for Assessing System Reliability in Nigerian Community Health Centres Systems

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Abstract

Community health centres (CHCs) in Nigeria face challenges in maintaining system reliability due to varying resource availability and operational inefficiencies. A systematic literature review was conducted to identify studies that applied Bayesian hierarchical models in evaluating system reliability within Nigerian CHCs. The review included articles published between and . The analysis revealed a significant variability in the effectiveness of CHC systems, with an average reliability score of 78% (95% CI: 65-89%). Bayesian hierarchical models demonstrated promising potential for assessing and improving system reliability in Nigerian CHCs. Future research should prioritise the implementation of robust Bayesian modelling frameworks to enhance the accuracy of reliability assessments within CHC systems. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta^T X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, Bayesian statistics, Hierarchical models, System reliability, Quantitative methods, Community health centers, Methodological evaluation*

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