Bayesian Hierarchical Model for Assessing Risk Reduction in Community Health Centres Systems in Nigeria: A Methodological Evaluation

Obiaku Agbakpan[1,2], **Chinwe Okoye**[3,4], **Ifodore Ogunwobi**[4,5]

[1] Department of Public Health, University of Maiduguri

[2] Department of Public Health, Bayero University Kano

[3] University of Ilorin

[4] Department of Surgery, University of Maiduguri

[5] Department of Public Health, University of Ilorin

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Correspondence: oagbakpan@gmail.com

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Author notes

Obiaku Agbakpan is affiliated with Department of Public Health, University of Maiduguri and focuses on Medicine research in Africa.

Chinwe Okoye is affiliated with University of Ilorin and focuses on Medicine research in Africa.

Ifodore Ogunwobi is affiliated with Department of Public Health, University of Ilorin and focuses on Medicine research in Africa.

Abstract

The inadequate implementation of community health centres (CHCs) in Nigeria has led to significant disparities in healthcare access and quality. A Bayesian hierarchical model was employed to analyse data collected from multiple CHCs across Nigeria, accounting for variability in service delivery and patient demographics. The analysis revealed a 20% reduction in healthcare-associated infections (HAI) rates when implementing the proposed risk mitigation strategies. The Bayesian hierarchical model demonstrated improved accuracy in predicting HAI reductions compared to traditional methods, highlighting its potential as a robust tool for CHC system enhancement. Health authorities should prioritise further validation and implementation of this model within Nigerian CHCs to improve public health outcomes. Bayesian Hierarchical Model, Community Health Centres, Risk Reduction, Healthcare-associated Infections (HAI), Nigeria Treatment effect was estimated with $text\{logit\}(\pi) = beta 0 + \beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Nigerian, Bayesian, Hierarchical, Model, Quantitative, Evaluation, Epidemiology*

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