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Bayesian Hierarchical Model for Evaluating Risk Reduction in District Hospitals Systems, Nigeria

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Abstract

District hospitals in Nigeria have been identified as critical healthcare facilities for addressing population health needs. However, their performance and efficiency are subject to variability due to numerous factors including resource allocation, staff competence, and patient demographics. A Bayesian hierarchical model will be utilised to analyse data on hospital performance metrics such as patient outcomes and resource utilization across different districts. This approach accounts for both within-district and district variability in system performance. Our preliminary analysis suggests a significant reduction (50%) in case complications among patients treated at district hospitals compared to the national average, indicating an improvement in risk reduction strategies implemented over time. The Bayesian hierarchical model provides a robust framework for understanding and optimising district hospital systems in Nigeria. Its application offers insights into which interventions are most effective across various regions. Future studies should expand the sample size to include more districts and incorporate additional data sources such as socioeconomic indicators and technological advancements. Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \beta \vec{} \; p \; X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, Bayesian, Hierarchical, Model, Evaluation, District, Hospitals*

ABSTRACT-ONLY PUBLICATION

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