

A Bayesian Hierarchical Modelling Approach to Maternal Care Facility Performance and Clinical Outcomes in Nigeria

A Case Study

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ABSTRACT

Background: Maternal healthcare facility performance in Nigeria is critical yet difficult to assess due to heterogeneous data and complex, multi-level confounding factors. Traditional evaluation methods often fail to account for this hierarchy and inherent uncertainty, limiting actionable insights for system improvement.

Purpose and objectives: This case study demonstrates the application of a Bayesian hierarchical model to evaluate maternal care facility performance and its association with clinical outcomes. The objective is to provide a robust methodological framework for facility-level assessment that quantifies uncertainty and identifies performance drivers.

Keywords: Bayesian hierarchical modelling, maternal healthcare, Sub-Saharan Africa, clinical outcomes, health systems evaluation, facility performance, Nigeria

Article Highlights

- Bayesian model quantifies facility-level performance variation with statistical rigor.
- Identifies referral integration and clinical audits as key drivers of outcomes.
- Provides a framework to separate systemic signal from data noise for policymakers.
- Enables targeted interventions by benchmarking facilities against national averages.

Methodological Insight

The model uses facility-specific random intercepts to estimate performance while accounting for multi-level confounding, with results expressed as posterior probabilities.

This case study presents a novel analytical framework for health systems evaluation in data-scarce settings.

ABSTRACT-ONLY PUBLICATION

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