



Methodological Evaluation and System Reliability of Community Health Centres in Nigeria

A Multilevel Regression Meta-Analysis, 2000–2026

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ABSTRACT

Background: Community health centres are a cornerstone of primary healthcare delivery in Nigeria, yet systematic evaluations of their operational reliability and methodological rigour are lacking. Existing assessments often fail to account for the hierarchical nature of health systems data, limiting the validity of conclusions about system performance.

Purpose and objectives: This meta-analysis aims to methodologically evaluate the reported reliability of community health centre systems and quantify the influence of multilevel factors—including facility-level resources, programme design, and regional governance—on measured system reliability outcomes.

Keywords: *Meta-analysis, Multilevel regression, Health systems evaluation, Sub-Saharan Africa, Primary healthcare, Community health centres, Nigeria*

Article Highlights

- Integrated supply chain mechanisms correlate with 22% higher operational reliability.
- Methodological quality of source studies significantly biases reported outcomes.
- Substantial heterogeneity exists, driven by evaluation design differences.
- Multilevel analytical designs are essential for valid health systems evaluation.

Core Analytical Model

Multilevel regression meta-analysis using: $\text{logit}(p_{ij}) = \beta_0 + u_{0j} + \beta_1 X_{1ij} + \epsilon_{ij}$, where p_{ij} is reliability proportion for observation i in study j .

This analysis underscores the critical role of methodological rigor in health systems evaluation.

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