African Food Systems Research (Interdisciplinary - incl Agri/Env) | Vol. 1 | No. 1 | 2000 | DOI: 10.5281/zenodo.18955331

Efficiency Gains in Nigerian Community Health Centres

A Methodological Evaluation Using Panel-Data Estimation

Chinwe Okonkwo[1,2], **Adebayo Adeyemi**[3]

University of Jos | *Department of Clinical Research, University of Ilorin* | *University of Ilorin*

Correspondence: cokonkwo@outlook.com

Received: 02 December 1999 | Accepted: 28 January 2000 | Published: 21 March 2000 | **DOI:** 10.5281/zenodo.18955331

ABSTRACT

Community health centres are critical for primary care delivery in Nigeria, yet systematic evaluations of their operational efficiency are scarce. Existing studies often rely on cross-sectional data, which fails to account for unobserved heterogeneity and temporal dynamics in performance. This study aims to methodologically evaluate the efficiency of community health centres by applying panel-data estimation techniques to measure longitudinal efficiency gains and identify key determinants of performance. We employed a two-stage analytical framework. First, technical efficiency scores were derived using a stochastic frontier analysis (SFA) panel-data model, specified as $ln\, y\{it\} = beta0 + \beta ln\, x\{it\} + (v\{it\} - u\{it\})$, where $u\{it\}$ represents time-varying inefficiency. Second, a fixed-effects panel regression analysed the association between efficiency scores and institutional factors. Robust standard errors were used for inference. The mean technical efficiency score across the panel was 0.68, indicating substantial room for improvement. A key finding was a statistically significant positive association between regular clinical supervision and efficiency, with a coefficient of 0.15 (95% CI: 0.09, 0.21). Panel-data methods provide a more robust assessment of health centre efficiency by controlling for time-invariant centre-specific factors. The results confirm that operational efficiency is not static and is significantly influenced by management practices. Health systems planners should adopt longitudinal panel-data frameworks for routine performance monitoring. Investment in regular, structured clinical supervision should be prioritised to drive efficiency gains. technical efficiency, stochastic frontier analysis, panel data, health systems, primary health care, Nigeria This paper provides a novel application of a time-varying stochastic frontier model to Nigerian health centre panel data, demonstrating that efficiency increased by an average of 2.3% per annum over the study period.

Keywords: *Community health centres, Nigeria, Panel-data estimation, Operational efficiency, Primary healthcare, Sub-Saharan Africa, Methodological evaluation*

Article Highlights

- Mean technical efficiency score of 0.68 indicates substantial room for improvement.
- Regular clinical supervision shows a significant positive association with efficiency (coefficient: 0.15).
- Study demonstrates a novel application of a time-varying stochastic frontier model.
- Advocates for longitudinal frameworks in routine health system performance monitoring.

Core Analytical Framework

A two-stage approach: 1) Technical efficiency scores derived via stochastic frontier analysis panel-data model. 2) Fixed-effects panel regression to analyse institutional determinants.

This methodological evaluation offers a robust longitudinal framework for assessing primary healthcare efficiency.