



A Bayesian Hierarchical Modelling Approach to Clinical Outcomes in Ethiopian Community Health Centres

A Methodological Evaluation

Meklit Abebe¹

¹ Department of Public Health, Hawassa University

Correspondence: mabebe@outlook.com

Published: 12 December 2022
August 2022

Received: 28

Accepted: 06 November 2022 **DOI:**
[10.5281/zenodo.18947241](https://doi.org/10.5281/zenodo.18947241)

Author notes

Meklit Abebe is affiliated with Department of Public Health, Hawassa University and focuses on Medicine research in Africa.

ABSTRACT

Background: Evaluating the performance of community health centres in low-resource settings requires robust statistical methods to handle inherent data complexities, such as clustering and missing observations. Current approaches often lack the flexibility to model these hierarchical structures and quantify uncertainty adequately.

Purpose and objectives: This study aimed to methodologically evaluate a Bayesian hierarchical modelling framework for analysing clinical outcomes data from a network of community health centres. The objective was to assess its utility for performance measurement and comparison under real-world data constraints.

Keywords: *Bayesian hierarchical modelling, clinical outcomes, community health centres, sub-Saharan Africa, health systems evaluation, missing data, Ethiopia*

Article Highlights

- A three-level Bayesian hierarchical model was developed for clinical outcomes data.
- The framework robustly handles clustered data and quantifies uncertainty in performance rankings.
- Parameter estimates for facility-level variation were robust to different prior specifications.
- Provides interpretable, probabilistic outputs to support health system decision-making.

Methodological Contribution

This study demonstrates a novel application of Bayesian hierarchical modelling to evaluate community health centre performance in a low-resource setting, offering a statistically rigorous alternative to conventional methods.

This paper presents a methodological framework, not a clinical trial of an intervention.



ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.



REQUEST FULL PAPER

 **Email:** info@parj.africa

Request your copy of the full paper today!



SUBMIT YOUR RESEARCH

**Are you a researcher in Africa? We
welcome your submissions!**

Join our community of African scholars and share
your groundbreaking work.

 **Submit at:** app.parj.africa



Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global
Knowledge