



# Methodological Evaluation of Community Health Centres Systems in Ethiopia Using Multilevel Regression Analysis for Risk Reduction Assessment

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**Published:** 06 April 2001 | **Received:** 25 December 2000 | **Accepted:** 13 February 2001

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**DOI:** [10.5281/zenodo.18727870](https://doi.org/10.5281/zenodo.18727870)

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## Abstract

Community health centers (CHCs) play a pivotal role in healthcare delivery in Ethiopia, yet their effectiveness and sustainability remain under scrutiny. A mixed-methods approach incorporating quantitative data from health records and qualitative insights through interviews will be employed. Multilevel regression models will be used to analyse data, accounting for both individual and contextual factors. Analysis revealed a significant improvement in CHC performance metrics when adjusting for community-level variables, indicating the need for tailored system enhancements. The multilevel regression analysis provided insights into the modifiable environmental factors affecting CHC performance, offering actionable recommendations for policy makers and practitioners. Strategic investments should focus on improving referral processes and enhancing supply chain logistics to mitigate risks identified in the study. Treatment effect was estimated with  $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *African geography, community health centers, multilevel modelling, randomized controlled trials, risk assessment, qualitative methods, evaluation studies*

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