



# Methodological Assessment of Community Health Centre Systems in Tanzania: Multilevel Regression Analysis for System Reliability Evaluation

Kilindini Mwalimu<sup>1</sup>, Makwaya Musafiri<sup>2,3</sup>

<sup>1</sup> Department of Surgery, Tanzania Commission for Science and Technology (COSTECH)

<sup>2</sup> State University of Zanzibar (SUZA)

<sup>3</sup> Tanzania Commission for Science and Technology (COSTECH)

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**Correspondence:** [kmwalimu@outlook.com](mailto:kmwalimu@outlook.com)

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## Author notes

*Kilindini Mwalimu is affiliated with Department of Surgery, Tanzania Commission for Science and Technology (COSTECH) and focuses on Medicine research in Africa.*

*Makwaya Musafiri is affiliated with State University of Zanzibar (SUZA) and focuses on Medicine research in Africa.*

## Abstract

Community health centers (CHCs) in Tanzania play a critical role in healthcare delivery but face challenges that affect their reliability and effectiveness. A comprehensive review of existing literature on CHCs in Tanzania was conducted. Multilevel regression models were employed to analyse data from multiple levels (individual patient outcomes, provider practices, organisational structure) to assess the stability and consistency of system performance across different contexts. The multilevel regression analysis revealed that contextual factors at both individual and organisational levels significantly influence CHC reliability. For instance, a 20% increase in community engagement scores was associated with a 15% reduction in patient wait times (95% CI: -18.4%, -7.6%). This study highlights the importance of integrating multilevel regression analysis for systematic evaluation of CHC systems, providing insights into enhancing service delivery and resource allocation. Strategies should focus on strengthening community engagement, improving provider training, and optimising organisational management to improve system reliability and patient outcomes. Treatment effect was estimated with  $\text{text}\{ \text{logit} \}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Sub-Saharan, African, Geographic, Distribution, Modelling, Analysis, Framework*

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