



Methodological Evaluation of Community Health Centres Systems in Ethiopia Using Multilevel Regression Analysis for Efficiency Gains,

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Abstract

This study evaluates the operational efficiency of community health centers (CHCs) in Ethiopia, focusing on their performance and resource allocation over a decade. A multilevel regression model was employed to analyse data from CHCs, considering both individual health centre performance and contextual factors at the district level. Robust standard errors were used to account for potential heterogeneity in observed outcomes. CHC performance varied significantly across districts, with some showing substantial improvements in service delivery efficiency over time. The multilevel regression analysis revealed that contextual factors such as funding levels and infrastructure quality had a significant impact on CHC efficiency. Strategic investments in capacity building programmes for health workers and enhanced community engagement initiatives are recommended to further improve CHC performance. 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 models, regression analysis, resource allocation, service delivery, efficiency assessment*

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