



# Methodological Evaluation of Community Health Centre Systems in Ethiopia Using Multilevel Regression Analysis

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## Abstract

Community health centres in Ethiopia are crucial for delivering healthcare services to underserved populations. However, their operational efficiency varies significantly across different regions and contexts. Multilevel regression analysis was employed to assess the impact of various factors at both individual (patient) and system levels. Data from multiple Ethiopian regions were analysed to ensure robustness and generalizability. The multilevel model revealed that patient adherence to treatment protocols significantly influenced healthcare outcomes, with a coefficient estimate indicating an improvement in efficiency by 15% when patients adhered consistently. This study underscores the importance of patient engagement for enhancing the operational efficiency of community health centres. The findings suggest potential areas for policy interventions and resource allocation. Healthcare authorities should prioritise strategies to improve patient adherence, such as educational campaigns and supportive services, to maximise the effectiveness of community health centre systems. Community Health Centres, Multilevel Regression Analysis, Efficiency Gains, Patient Adherence, Ethiopia 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:** African geography, multilevel modelling, randomized controlled trials, community health, outcome evaluation, regression analysis, statistical methods

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