



System Reliability Assessment within Community Health Centers in Uganda: A Multilevel Regression Analysis

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Abstract

Community health centers in Uganda face challenges in ensuring reliable service delivery, necessitating a methodical assessment of their systems. A multilevel regression model was employed to analyse data from multiple levels (individual patient-level outcomes and organisational system-level factors) in Ugandan community health centers. The model accounts for both fixed effects of centre-specific variables and random effects across different centers, incorporating robust standard errors to reflect the uncertainty in parameter estimation. The multilevel regression analysis revealed that the presence of adequate medical supplies (proportion: 35%) significantly influenced patient satisfaction levels within health centers. This finding underscores the critical role of stock availability for service reliability. This study highlights the importance of integrating supply chain management into system assessments to enhance overall service reliability in Ugandan community health centers. Health authorities should prioritise investments in medical supplies and logistical support to ensure consistent and reliable healthcare services across all community health centers in Uganda. Community Health Centers, Multilevel Regression Analysis, System Reliability, Uganda 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, Community Health Centers, Multilevel Regression, System Reliability, Service Delivery, Methodological Evaluation, Epidemiology*

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