



Methodological Evaluation of Community Health Centre Systems in Uganda Using Multilevel Regression Analysis to Measure System Reliability

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Abstract

Community health centres (CHCs) in Uganda play a crucial role in delivering healthcare services to rural populations. However, their effectiveness and reliability vary across different regions. A multilevel regression model was applied at both the centre-level (level 1) and district-level (level 2) to assess variability in service quality. The model accounts for clustering effects inherent in CHCs nested within districts. Findings indicate that factors such as staffing levels, infrastructure adequacy, and community engagement significantly influence service reliability at both levels of analysis. The multilevel regression approach revealed significant differences in system reliability across different CHC clusters. These findings highlight the importance of tailored interventions to improve service delivery quality. Recommendation for policymakers includes targeted capacity-building programmes and infrastructure investments to enhance service reliability at district level, particularly focusing on resource-limited areas. Treatment effect was estimated with $\text{text}\{logit\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Community health centers, Multilevel regression, Reliability assessment, Health systems, Anthropology, Evaluation methodology, Public health, Geographic distribution, Service delivery

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