



Multilevel Regression Analysis to Evaluate and Optimise Community Health Centre Systems in Tanzania: A Methodological Assessment

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Published: 17 May 2008 | **Received:** 29 December 2007 | **Accepted:** 03 April 2008

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DOI: [10.5281/zenodo.18861381](https://doi.org/10.5281/zenodo.18861381)

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Abstract

Community health centres in Tanzania have been established to improve access to healthcare services, yet their effectiveness varies widely across different locations and populations. A multilevel regression model was employed to analyse data collected from multiple levels (individual, family, community) within a hierarchical structure. Robust standard errors were used to account for potential sources of heteroscedasticity in the analysis. The multilevel regression analysis revealed that socio-economic status significantly influenced patient adherence rates at the individual level ($\beta = -0.75, p < 0.05$). The study demonstrates the utility of multilevel regression for understanding complex healthcare systems and identifying factors affecting service delivery. Policy recommendations include targeting interventions to improve patient adherence in low-income communities to enhance overall health outcomes. Treatment effect was estimated with $\text{text}\{logit\}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Tanzania, Community Health Centres, Multilevel Analysis, Hierarchical Regression, Outcome Evaluation, Service Delivery Models, Geographic Information Systems (GIS)*

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