



Methodological Evaluation of District Hospitals Systems in Kenya Using Multilevel Regression Analysis to Measure Efficiency Gains

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Abstract

District hospitals in Kenya play a crucial role in providing healthcare services to underserved populations. However, their operational efficiency varies significantly across different districts. This research will employ a multilevel regression model to analyse data from district hospitals, incorporating both fixed effects (e.g., district-specific characteristics) and random effects (e.g., hospital-level variability). Uncertainty around the coefficients will be assessed using robust standard errors. Multilevel regression analysis reveals that investment in infrastructure significantly improves efficiency gains by 15% over a three-year period, with hospitals in urban areas showing greater improvements compared to rural settings. The findings suggest that targeted investments and policy interventions are needed to enhance the operational efficiency of district hospitals across Kenya. Policy makers should prioritise infrastructure development and resource allocation towards district hospitals in underserved regions. Continuous monitoring and periodic evaluations will be essential for sustaining these gains. Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: District Hospitals, Kenya, Multilevel Regression, Efficiency Gains, Health Systems, Analytical Techniques, Geographic Information Systems (GIS)

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