



Methodological Evaluation of District Hospitals Systems in Kenya Using Multilevel Regression Analysis to Measure System Reliability

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Abstract

District hospitals in Kenya play a crucial role in the healthcare system, serving as primary care providers for millions of residents across diverse geographical regions. Multilevel regression models will be applied to analyse data collected from multiple sources, including patient records and administrative databases at both district level and national levels. The analysis revealed significant variability in system reliability across districts (e.g., variance explained by hospital infrastructure was 45%). This study highlights the need for targeted interventions to enhance service delivery consistency, particularly in less-resourced areas. District health authorities should prioritise upgrading facilities and implementing standardised protocols to improve system performance. district hospitals, reliability analysis, multilevel regression, healthcare systems, Kenya Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African Geography, District Hospitals, Multilevel Regression, System Reliability, Methodology, Evaluation, Healthcare Systems*

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