Multilevel Regression Analysis for Assessing System Reliability in District Hospitals in Kenya: A Methodological Evaluation

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Abstract

District hospitals in Kenya play a crucial role in healthcare delivery but face challenges related to system reliability. A multilevel regression model was employed, accounting for both patient-level (individual health records) and hospital-level (administrative data) variability. Uncertainty in estimates was addressed through robust standard errors. The analysis revealed a moderate level of system reliability with significant differences between hospitals in terms of resource allocation and patient care quality. Multilevel regression analysis provided insights into the strengths and weaknesses of district hospital systems, suggesting areas for improvement to enhance service delivery. District health authorities should prioritise investment in infrastructure and human resources to improve system reliability and patient satisfaction. District hospitals, Multilevel Regression Analysis, System Reliability, Kenya Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \vec{\beta}\,p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, district hospitals, multilevel regression, system reliability, healthcare delivery, methodological evaluation, statistical analysis*

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