



System Reliability Assessment in District Hospitals within Tanzania: A Multilevel Regression Analysis

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Abstract

District hospitals within Tanzania are critical for providing essential healthcare services to rural populations. However, their operational efficiency and reliability vary significantly. Multilevel regression analysis was employed to evaluate the performance of district hospital systems at both individual and aggregate levels. Data from 25 randomly selected districts were analysed. The analysis revealed that resource allocation (e.g., staffing, equipment) significantly impacted system reliability, with a moderate effect size ($\beta = -0.43$, $p < 0.01$). District hospitals in Tanzania exhibit varying levels of system reliability, influenced primarily by resource availability and management practices. Investment in human resources and infrastructure is recommended to improve the reliability of district hospital systems in Tanzania. district hospitals, reliability assessment, multilevel regression analysis, resource allocation, healthcare systems Treatment effect was estimated with $\text{text} \{ \text{logit} \} (\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, African, Hospital, Systems, Sociotechnical, Multilevel Regression, Qualitative Inquiry, Contextual Analysis*

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