



Methodological Evaluation of District Hospitals Systems in Ethiopia: Multilevel Regression Analysis for Risk Reduction Measurement

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Abstract

District hospitals in Ethiopia play a critical role in the healthcare system but face challenges related to resource allocation and service delivery. A longitudinal study using multilevel regression models will be conducted across multiple districts in Ethiopia, accounting for hierarchical data structures to ensure valid inference. The multilevel model revealed significant variations in service delivery quality between hospitals, with a substantial reduction in risk factors observed after implementing targeted interventions. Multilevel regression analysis provides robust insights into the operational efficiencies and risk management strategies for district hospital systems in Ethiopia. Implementing evidence-based policies targeting identified high-risk areas will enhance service delivery quality and patient outcomes across all districts. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Ethiopia, District Hospitals, Multilevel Models, Hierarchical Analysis, Regression Analysis, Geographic Information Systems, Spatial Statistics

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