Multilevel Regression Analysis of Clinical Outcomes in Ghanaian District Hospitals Systems,

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Abstract

Ghanaian district hospitals have been identified as critical in providing accessible healthcare services across the country. However, there is a need to evaluate their clinical outcomes systematically. A multilevel regression model was applied to analyse the data collected from hospital records. The model accounts for both individual patient-level variables (e.g., age, comorbidities) and contextual factors at the district level (e.g., infrastructure, personnel availability). The analysis revealed significant differences in clinical outcomes across districts, with a notable proportion of variance explained by district-level characteristics. This study provides empirical evidence on the effectiveness of Ghanaian district hospitals and highlights areas for improvement based on multilevel regression insights. Future research should consider longitudinal data and incorporate additional contextual variables to enhance model accuracy. Treatment effect was estimated with $text\{logit\}(\pi) = beta\, 0 + \vec{\beta}\, p\, X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, district hospitals, multilevel models, regression analysis, health systems, geographic variation, clinical effectiveness*

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