



# Reliability Assessment of District Hospital Systems in Ghana Using Multilevel Regression Analysis: An Exploratory Study

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## Abstract

District hospitals in Ghana play a crucial role in providing healthcare services to rural populations. However, their effectiveness and reliability vary significantly across different regions. A multilevel regression model was employed to analyse data collected from multiple hospitals within various districts. The model accounts for both fixed effects (e.g., hospital infrastructure) and random effects (e.g., district-level variations). The analysis revealed that the proportion of patients receiving appropriate care varied significantly across districts, with some areas showing a reliability rate of only 30%. This study highlights significant disparities in healthcare delivery within Ghana's district hospital systems. The multilevel regression model provides robust insights into factors affecting system performance. Further research is recommended to explore potential interventions that can improve the reliability and effectiveness of district hospitals, particularly in underserved regions. District Hospitals, Multilevel Regression Analysis, Healthcare Reliability, Ghana 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, District Hospitals, Multilevel Modelling, Healthcare Systems, Reliability Assessment, Regression Analysis, Rural Health Care, Quantitative Methods*

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