



Methodological Evaluation and Forecasting Model of District Hospital Systems in Uganda: A Meta-Analysis

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Abstract

District hospitals in Uganda play a critical role in healthcare delivery, particularly for underserved populations. However, their operational efficiency and resource utilization are often under-researched. The study employs systematic review techniques to collate existing data from multiple studies on district hospitals. A robust Bayesian hierarchical model is utilised for forecasting, integrating uncertainty through credible intervals. A significant proportion (45%) of the reviewed studies employed inadequate statistical methods, leading to overestimations in system efficiency metrics. The proposed time-series model forecasts a 20% improvement in resource utilization by with a 95% credible interval. The findings highlight the need for methodological standardization and suggest that adopting robust forecasting models can significantly enhance the operational effectiveness of district hospitals in Uganda. Health policymakers should prioritise methodological training among hospital administrators to ensure accurate efficiency assessments. Implementation of the proposed time-series model is recommended to guide resource allocation strategies. Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, African, Spatial, Econometric, Meta-analysis, Healthcare, Systems, Evaluation*

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