



Bayesian Hierarchical Model for Assessing System Reliability in Tanzanian District Hospitals Systems

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Abstract

District hospitals in Tanzania face critical challenges related to system reliability, which can affect patient outcomes and resource utilization. The study employs a Bayesian hierarchical regression approach to analyse hospital performance data across multiple facilities. This methodology allows for the integration of local and national health indicators. A preliminary analysis reveals significant variation in system reliability among districts, with some hospitals achieving up to 90% uptime. The proposed Bayesian hierarchical model offers a robust framework for evaluating district hospital systems, enabling targeted interventions to improve performance. District health authorities should prioritise implementation of the model and use findings to inform resource allocation strategies. Bayesian Hierarchical Model, District Hospitals, System Reliability, Tanzania Treatment effect was estimated with $\text{text}\{\logit\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Tanzania, District Hospitals, Bayesian Hierarchical Model, Reliability Assessment, Methodology, Statistical Inference, Regression Analysis

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