



Bayesian Hierarchical Model for Evaluating System Reliability in Senegalese District Hospitals Systems

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Abstract

District hospitals in Senegal have been identified as crucial health care providers for underserved populations. However, their reliability and efficiency remain under-researched. This systematic literature review employed a Bayesian hierarchical model to analyse existing data from Senegalese district hospitals. The model accounts for variability across different health facilities and time periods. The analysis revealed that the probability of hospital system reliability varied significantly between districts, with some areas showing a greater than 70% likelihood of maintaining high standards. The Bayesian hierarchical model provided insights into district hospitals' reliability, emphasising the importance of tailored interventions for specific regions. Health policymakers should prioritise targeted investments in infrastructure and personnel training to improve system reliability in areas with lower probabilities of meeting standards. 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, Bayesian, Hierarchical, Reliability, Evaluation, Methodology, District Hospitals

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