



Bayesian Hierarchical Model for Assessing System Reliability in Ethiopian District Hospitals: A Systematic Literature Review

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Abstract

Bayesian hierarchical models are increasingly used in healthcare settings to evaluate system reliability across diverse institutions. The review employs rigorous methodology including comprehensive searches of academic databases, explicit inclusion criteria based on study quality, and thematic analysis focusing on the application of Bayesian hierarchical models in hospital systems. A notable finding is that Bayesian hierarchical models consistently yield more precise estimates of system reliability compared to traditional methods, particularly when applied across multiple district hospitals in Ethiopia. Bayesian hierarchical models provide a robust framework for assessing and improving the reliability of healthcare systems in Ethiopian district hospitals. Healthcare policymakers should consider implementing Bayesian hierarchical models as an advanced analytical tool for system evaluation and improvement. Treatment effect was estimated with $\text{text}\{\textit{logit}\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Ethiopia, Bayesian hierarchical model, System reliability, Hierarchical modelling, Methodology, Healthcare systems, District hospitals

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