



Bayesian Hierarchical Model for Evaluating Clinical Outcomes in Emergency Care Units in South Africa: A Systematic Literature Review

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Abstract

Emergency care units in South Africa face significant challenges in providing timely and effective clinical outcomes due to resource constraints and variability across different regions. A comprehensive search strategy was employed to identify relevant studies. The analysis included rigorous evaluation of study methodologies, data sources, and statistical models applied to measure clinical outcomes. The review revealed that the use of Bayesian hierarchical models significantly improved the precision of clinical outcome measurements by accounting for variability across different units and regions in South Africa. Bayesian hierarchical models provided a robust framework for evaluating clinical outcomes, enhancing the consistency and comparability of results across emergency care units in South Africa. Healthcare policymakers should prioritise the implementation of Bayesian hierarchical models to enhance the quality and uniformity of clinical outcome assessments in emergency care systems. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta^T X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, Bayesian hierarchical models, clinical outcomes, emergency care, meta-analysis, resource constraints, variability assessment*

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