



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

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Published: 07 May 2009 | Received: 20 January 2009 | Accepted: 18 April 2009

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DOI: [10.5281/zenodo.18883091](https://doi.org/10.5281/zenodo.18883091)

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Abstract

Maternal care facilities in South Africa face challenges in ensuring optimal clinical outcomes for pregnant women and new mothers. A comprehensive search strategy was employed to identify relevant studies. Studies were assessed using predefined inclusion criteria, including the application of Bayesian hierarchical models and measurement of clinical outcomes in South African settings. The analysis revealed that Bayesian hierarchical models provided a robust framework for evaluating clinical effectiveness across diverse maternal care facilities, with significant variation in model performance depending on facility type and patient demographics. This review underscores the utility of Bayesian hierarchical models in enhancing the evaluation of clinical outcomes within South African maternity services. Further research should explore the implementation of these models in real-world settings to refine their applicability and effectiveness. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: African geography, Bayesian statistics, hierarchical modelling, outcome assessment, systematic review, clinical outcomes, maternal care systems

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