



Bayesian Hierarchical Model Assessment of Clinical Outcomes in Emergency Care Units across Rwanda: A Meta-Analysis

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Abstract

Emergency care units in Rwanda face challenges related to clinical outcomes due to varying system efficiencies across different regions. A Bayesian hierarchical model was employed to assess the clinical outcomes data from multiple emergency care units. The model incorporates random effects for regional variability and fixed effects for common factors affecting outcomes across regions. The analysis revealed significant differences in clinical outcomes between urban and rural areas, with a higher likelihood of improved patient recovery rates in urban settings ($p < 0.05$). This study highlights the importance of regional-specific interventions to enhance emergency care unit performance in Rwanda. Regional health authorities should prioritise investments in infrastructure and training programmes tailored to specific needs identified by this analysis. 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 analysis, Hierarchical modelling, Meta-analysis, Clinical outcomes, Emergency care systems, Methodological evaluation

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