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Bayesian Hierarchical Model for Evaluating Clinical Outcomes in Emergency Care Units: A Methodological Assessment in Tanzanian Settings

Gakoma Ngulu[1], Nyimba Tuyen[2], Mwalimu Mwachiro[3], Kamali Mushi[4]

[1] Department of Internal Medicine, Catholic University of Health and Allied Sciences (CUHAS)

[2] Department of Surgery, Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha

[3] Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha

[4] Ardhi University, Dar es Salaam

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Correspondence: gngulu@aol.com

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Author notes

Gakoma Ngulu is affiliated with Department of Internal Medicine, Catholic University of Health and Allied Sciences (CUHAS) and focuses on Medicine research in Africa.

Nyimba Tuyen is affiliated with Department of Surgery, Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha and focuses on Medicine research in Africa.

Mwalimu Mwachiro is affiliated with Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha and focuses on Medicine research in Africa.

Kamali Mushi is affiliated with Ardhi University, Dar es Salaam and focuses on Medicine research in Africa.

Abstract

Emergency care units (ECUs) in Tanzania are critical for managing acute health conditions, yet their effectiveness varies widely across different settings. A Bayesian hierarchical linear regression model was applied to analyse data from multiple ECUs, accounting for both fixed effects (e.g., patient demographics) and random effects (e.g., differences between ECUs). The analysis revealed significant heterogeneity in clinical outcomes across different ECUs, with some units showing substantial improvement rates. This study demonstrated the utility of Bayesian hierarchical models for understanding variability in emergency care settings. Further research should consider longitudinal data and incorporate additional factors to enhance model accuracy and generalizability. Bayesian Hierarchical Model, Emergency Care Units, Clinical Outcomes, Tanzania Treatment effect was estimated with $text\{logit\}(\pi) = beta 0 + \beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Tanzania, Bayesian Hierarchical Model, Methodological Assessment, Hierarchical Linear Regression, Quantile Regression, Spatial Analysis, Multilevel Modelling*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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