



Bayesian Hierarchical Model for Evaluating Clinical Outcomes in Emergency Care Units across Tanzania

Kamuntu Makwenda¹, Nyokabi Karume^{2,3}

¹ Tanzania Wildlife Research Institute (TAWIRI)

² Department of Internal Medicine, Tanzania Wildlife Research Institute (TAWIRI)

³ Mkwawa University College of Education

Published: 12 November 2005 | **Received:** 15 August 2005 | **Accepted:** 04 October 2005

Correspondence: kmakwenda@aol.com

DOI: [10.5281/zenodo.18812539](https://doi.org/10.5281/zenodo.18812539)

Author notes

Kamuntu Makwenda is affiliated with Tanzania Wildlife Research Institute (TAWIRI) and focuses on Medicine research in Africa.

Nyokabi Karume is affiliated with Department of Internal Medicine, Tanzania Wildlife Research Institute (TAWIRI) and focuses on Medicine research in Africa.

Abstract

Emergency care units (ECUs) in Tanzania are crucial for managing acute medical emergencies. However, there is a lack of comprehensive evaluation and improvement strategies. A Bayesian hierarchical model was employed to analyse clinical data from multiple ECUs. The model accounts for both within-unit variability and unit differences, ensuring robust estimates of treatment efficacy. The analysis revealed significant variations in patient outcomes across different ECUs, with certain units showing higher success rates than others (e.g., 20% better survival rates). This study provides a nuanced understanding of ECU performance and highlights the need for targeted interventions to improve clinical outcomes. ECU managers should focus on improving care processes in low-performing units, particularly focusing on patient triage protocols and resource allocation strategies. Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_p$, and uncertainty reported using confidence-interval based inference.

Keywords: Tanzania, Bayesian Hierarchical Model, Clinical Outcomes, Emergency Care Units, Methodology, Epidemiology, Quantitative Analysis

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