Methodological Evaluation of Emergency Care Units in Ethiopia: A Multilevel Regression Analysis of Clinical Outcomes Over Time

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Abstract

Emergency care units (ECUs) play a crucial role in managing acute health conditions across Ethiopia but their effectiveness varies significantly over time and across different regions. A longitudinal study design was employed to analyse data from multiple ECU sites. Multilevel mixed-effects models were used to account for hierarchical structures within and between regions. The multilevel regression analysis revealed that the proportion of patients with improved clinical status over time varied by region, suggesting regional-specific factors impact patient outcomes. The study highlights the importance of considering regional variations in ECU performance to optimise emergency care delivery. Health policymakers should tailor interventions based on findings from this analysis to enhance clinical outcomes and improve resource allocation. Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \beta^{\rightarrow} p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Ethiopia, Multilevel Analysis, Longitudinal Studies, Regression, Public Health Systems, Geographic Variation, Clinical Outcomes*

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