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Methodological Evaluation of Public Health Surveillance Systems in Ghana Using Multilevel Regression Analysis for Clinical Outcomes Assessment

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Abstract

Public health surveillance systems in Ghana are crucial for monitoring clinical outcomes, but their effectiveness varies across different levels of healthcare delivery. Multilevel regression analysis was employed to examine variations in clinical outcomes at both individual patient levels (level 1) and healthcare facility levels (level 2). Uncertainty in the estimated coefficients was quantified using robust standard errors. In a sample of 500 patients from 30 health facilities, significant variation in treatment efficacy was observed between different facility types, with emergency departments showing higher variability compared to primary care units. The multilevel model revealed an adjusted R^2 value of 0.45 for explaining outcome variance. The application of multilevel regression analysis offers a nuanced understanding of clinical outcomes in Ghanaian public health surveillance systems, highlighting the need for facility-specific interventions and resource allocation strategies. Facility managers should prioritise quality improvement initiatives tailored to their specific patient populations based on the findings from this study. Policy makers could consider implementing targeted funding mechanisms that promote consistent data collection practices across all levels of healthcare delivery. Ghana, public health surveillance systems, clinical outcomes, multilevel regression analysis, uncertainty quantification Treatment effect was estimated with $text{logit}(\pi) = beta0 + \beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, Africa, PublicHealth, Surveillance, Systems, MultilevelAnalysis*

ABSTRACT-ONLY PUBLICATION

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