African Public Health Nursing

Multilevel Regression Analysis of Public Health Surveillance Systems Reliability in Nigeria: A Longitudinal Study

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Abstract

Public health surveillance systems in Nigeria face challenges in reliability due to various factors including resource limitations, infrastructure gaps, and human resource constraints. The study employed a longitudinal design with data from multiple years. Multilevel regression models were used to analyse system performance across different levels (national, state, local), accounting for temporal trends and spatial variations. Multilevel analyses revealed that national-level surveillance systems generally exhibited higher reliability compared to sub-national levels, with a significant proportion (25%) of variance explained by contextual factors such as funding availability and training programmes. The study underscores the importance of tailored interventions at different administrative levels to enhance overall system reliability in Nigeria's public health surveillance framework. Policy recommendations include targeted investments in human resources, infrastructure development, and continuous capacity-building initiatives across all governance tiers. Treatment effect was estimated with $text\{logit\}(\pi)=beta0+\beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Nigerian, Multilevel, Regression, Public, Health, Surveillance, Reliability*

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