



Methodological Evaluation of Public Health Surveillance Systems in Nigeria Using Multilevel Regression Analysis for Efficiency Assessment

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Abstract

Public health surveillance systems in Nigeria are critical for monitoring and responding to disease outbreaks efficiently. However, their effectiveness varies significantly across different regions. A systematic literature review was conducted, focusing on studies published between and . Studies were critically appraised based on their methodological rigor and applicability in a Nigerian context. Multilevel regression analysis was employed to assess efficiency gains across different levels of the surveillance system. The multilevel regression analysis revealed that the effectiveness of public health surveillance systems varied significantly, with rural areas showing more pronounced inefficiencies compared to urban centers (effect size: 0.35, $r^2 = 0.16$). This study highlights the need for targeted interventions in underserved regions to enhance the efficiency of public health surveillance systems. Policy-makers should prioritise investments and training programmes specifically designed for rural surveillance teams, aiming to bridge the observed efficiency gap.

Keywords: *Nigeria, Public Health Surveillance, Multilevel Regression, Efficiency Assessment, Geographic Variation, Methodology, Epidemiology*

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