



Methodological Evaluation of Public Health Surveillance Systems in Nigeria Using Difference-in-Differences for Risk Reduction Analysis

Chinedu Obiora¹

¹ University of Ibadan

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Correspondence: cobiora@aol.com

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Author notes

Chinedu Obiora is affiliated with University of Ibadan and focuses on Medicine research in Africa.

Abstract

Public health surveillance systems are crucial for monitoring infectious diseases in Nigeria. However, their effectiveness has not been rigorously evaluated. A difference-in-differences approach was used to assess the impact of surveillance systems on disease incidence rates, comparing pre-survey and post-survey data across different regions. The analysis revealed a significant reduction in disease prevalence by 20% in areas with active surveillance compared to those without. The difference-in-differences model effectively quantified the risk-reduction impact of public health surveillance systems, demonstrating their potential to mitigate infectious diseases. Future studies should focus on expanding and improving surveillance coverage across all regions for further risk reduction. Treatment effect was estimated with $text\{logit\}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, Public health surveillance, Difference-in-differences, Intervention effectiveness, Epidemiologic methods, Quantitative analysis, Geographic information systems*

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