African Perioperative Nursing

Methodological Evaluation of Public Health Surveillance Systems in Senegal Using Multilevel Regression Analysis to Measure Yield Improvement

Mariama Diop[1]

[1] Department of Epidemiology, Cheikh Anta Diop University (UCAD), Dakar

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Correspondence: mdiop@aol.com

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Author notes

Mariama Diop is affiliated with Department of Epidemiology, Cheikh Anta Diop University (UCAD), Dakar and focuses on Medicine research in Africa.

Abstract

Public health surveillance systems are essential for monitoring infectious diseases in Senegal. However, their effectiveness can vary significantly across different regions. The study employed a mixed-method approach combining quantitative data from the surveillance system with qualitative insights through interviews. Multilevel regression models were used to analyse geographical and demographic factors influencing surveillance outcomes, with robust standard errors accounting for potential confounders. Multilevel regression analyses revealed that rural areas showed lower yield improvement compared to urban settings (effect size: -0.25, $p < 0.01$), indicating a need for targeted interventions in these regions. This study underscores the importance of addressing geographical disparities in public health surveillance efforts to enhance overall effectiveness. Immediate policy recommendations include focusing on rural areas with lower yield improvement and developing tailored training programmes for healthcare workers in those regions. Treatment effect was estimated with $text\{logit\}(\pi) = beta 0 + \vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, Geographic Information Systems, Multilevel Modelling, Public Health Surveillance, Data Quality, Evaluation Metrics, Yield Measures*

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