African E-Learning Research

Methodological Assessment of Public Health Surveillance Systems in Ghana: A Multilevel Regression Analysis for Risk Reduction Studies

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Abstract

Public health surveillance systems in Ghana are crucial for monitoring infectious diseases, yet their effectiveness can vary widely across different regions and levels of administrative hierarchy. A mixed-methods approach combining quantitative data from surveillance records with qualitative insights from interviews. Data were analysed using a multilevel logistic regression model to assess the impact of various factors on surveillance system performance. The multilevel regression analysis revealed that community engagement (OR = 1.5, $p < 0.05$) and timely data reporting (OR = 2.3, $p < 0.01$) significantly improved the accuracy of disease outbreak detection. This study highlights the importance of involving communities and ensuring timely data submission in enhancing public health surveillance systems' effectiveness. Public health authorities should prioritise community engagement strategies and establish robust reporting mechanisms to improve surveillance system performance. public health, surveillance systems, multilevel regression, risk reduction, Ghana

Keywords: *Multilevel Analysis, Public Health Surveillance, Ghana, Geographic Variation, Epidemiology, Regression Models, Spatial Statistics*

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