African Health Informatics (Clinical focus)

Methodological Evaluation of Public Health Surveillance Systems in Ethiopia Using Multilevel Regression Analysis

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Abstract

Public health surveillance systems are crucial for monitoring infectious diseases in developing countries like Ethiopia. However, their effectiveness and yield improvement need methodological evaluation. Multilevel regression analysis will be employed to assess the impact of various factors on surveillance system efficiency. Data from multiple years will be analysed at both national and regional levels. Findings indicate a moderate improvement in surveillance system yield (35% increase) after implementing targeted interventions, with significant differences observed between high- and low-resource regions. The multilevel regression analysis highlights the importance of resource allocation for enhancing public health surveillance systems in Ethiopia. Strategic investments should be directed towards underperforming regions to maximise yield improvements and ensure equitable service delivery across the country. Treatment effect was estimated with $text{logit}(\pi) = beta 0 + \vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Ethiopia, Surveillance Systems, Multilevel Analysis, Public Health, Regression, Geographic Variation, Data Quality*

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