African Immunotherapy

Methodological Evaluation of Public Health Surveillance Systems in Tanzania Using Difference-in-Differences Approach for Risk Reduction Assessment

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Abstract

Public health surveillance systems in Tanzania are crucial for monitoring infectious diseases such as malaria, HIV/AIDS, and tuberculosis (TB). However, their effectiveness varies across different regions and requires methodological evaluation to ensure timely risk reduction. We employed a DiD approach, comparing pre- and post-intervention data from multiple surveillance sites to estimate the impact on disease prevalence. Data were collected through routine reporting systems and validated by independent laboratory testing. Our analysis revealed a significant reduction in reported malaria cases ($p < 0.05$) following intervention measures, indicating effective surveillance system improvements but also highlighting persistent issues with underreporting in remote areas. The DiD model proved robust in measuring risk reduction impacts and provided insights into optimising public health surveillance systems for better disease control across Tanzania. Future studies should focus on enhancing data quality through training of surveillance personnel and strengthening communication channels to improve reporting accuracy. Public Health Surveillance, Difference-in-Differences (DiD), Risk Reduction, Malaria, HIV/AIDS, TB Treatment effect was estimated with $text{logit}(\pi) = beta 0 + \vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Tanzania, Geographic Information Systems (GIS), Spatial Analysis, Public Health Surveillance, Randomized Controlled Trials, Quasi-Experimental Design, Evaluation Studies*

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