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

Muhemedi Shabani[1], **Simu Kassim**[2,3], **Kamasi Nkosi**[4,5], **John Mwesemba**[6]

[1] Department of Epidemiology, Catholic University of Health and Allied Sciences (CUHAS)

[2] Department of Epidemiology, Ardhi University, Dar es Salaam

[3] University of Dar es Salaam

[4] Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha

[5] Department of Clinical Research, Catholic University of Health and Allied Sciences (CUHAS)

[6] Department of Pediatrics, Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha

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Correspondence: mshabani@hotmail.com

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Author notes

Muhemedi Shabani is affiliated with Department of Epidemiology, Catholic University of Health and Allied Sciences (CUHAS) and focuses on Medicine research in Africa.

Simu Kassim is affiliated with Department of Epidemiology, Ardhi University, Dar es Salaam and focuses on Medicine research in Africa.

Kamasi Nkosi is affiliated with Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha and focuses on Medicine research in Africa.

John Mwesemba is affiliated with Department of Pediatrics, Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha and focuses on Medicine research in Africa.

Abstract

Public health surveillance systems are crucial for monitoring disease outbreaks in Tanzania. However, their effectiveness varies across different regions and sectors. A multilevel logistic regression model was employed to analyse data from multiple sources including government records, community surveys, and hospital databases. The model accounts for both individual-level (e.g., healthcare provider attitudes) and area-level (e.g., infrastructure availability) influences on surveillance system adoption. The analysis revealed that the proportion of healthcare facilities adopting electronic health record systems was significantly higher in urban areas compared to rural regions, with a 60% adoption rate in cities versus 45% in villages. This suggests an uneven distribution affecting equitable access to public health interventions. Multilevel regression analysis provided insights into the adoption dynamics of surveillance systems in Tanzania, highlighting regional disparities that require targeted intervention strategies. Public health authorities should prioritise investment and training programmes in underserved rural areas to improve electronic health record system adoption and ensure comprehensive coverage across all regions. Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, Tanzania, multilevel, regression, surveillance, public health, evaluation*

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