



Methodological Evaluation of Public Health Surveillance Systems in Ethiopia: A Randomized Field Trial for Risk Reduction Measurement

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Abstract

Public health surveillance systems in Ethiopia are pivotal for monitoring infectious diseases such as malaria and tuberculosis (TB). However, their effectiveness in reducing morbidity and mortality is not well understood. A randomized controlled trial was conducted among 500 healthcare workers across six regions, employing mixed-methods including quantitative surveys and qualitative focus groups to assess system performance and participant compliance. Data indicated a significant improvement in TB detection rates from baseline ($p < 0.01$) with no substantial difference observed across different surveillance sites. However, there was a notable variance in the number of reported cases between districts (range: 20-85%). The study highlights disparities in public health system efficacy and underscores the need for standardised training protocols and improved data reporting mechanisms. Standardised training programmes should be implemented to ensure consistent TB detection rates across all surveillance sites. Additionally, a comprehensive evaluation framework is recommended to monitor system performance over time. Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: African, Randomized Controlled Trial, Surveillance, Public Health, Evaluation, Epidemiology, Metrics

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