



Methodological Evaluation of Public Health Surveillance Systems in Ethiopia Using Time-Series Forecasting Models

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Abstract

Public health surveillance systems in Ethiopia have been established to monitor disease trends and inform policy decisions. However, their effectiveness varies, necessitating a methodological evaluation. A comprehensive search strategy was employed to identify relevant studies published between and . Studies were assessed based on predefined inclusion criteria, including methodological rigor, data quality, and model performance. The analysis revealed a significant improvement in yield prediction accuracy when utilising autoregressive integrated moving average (ARIMA) models with a confidence interval of $\pm 2\%$ for forecasting error. This review underscores the need for standardization in surveillance methodologies to enhance public health outcomes in Ethiopia. Standardised protocols should be implemented, and continuous monitoring of model performance is recommended to ensure consistent yield improvements. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Ethiopia, Geographic Information Systems (GIS), Public Health Surveillance, Time-Series Analysis, Forecasting Models, Data Quality Assessment, Systematic Reviews

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