Forecasting Clinical Outcomes in Ethiopian District Hospitals Using Time-Series Models: A Methodological Evaluation

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Abstract

Clinical outcomes in Ethiopian district hospitals are influenced by various factors including resource availability and patient demographics. The current system lacks a robust framework for forecasting these outcomes, which is essential for planning and resource allocation. A systematic review was conducted to identify relevant datasets from Ethiopian district hospitals. Time-series models, specifically ARIMA (AutoRegressive Integrated Moving Average), were applied to forecast outcomes based on historical data. The application of ARIMA models showed a reasonable fit for predicting hospital readmission rates with an R-squared value of 0.75 and a confidence interval around the model's predictions ranging from -10% to +20%. ARIMA models proved effective in forecasting clinical outcomes, suggesting their potential utility in improving healthcare planning. Further research should validate these findings across more districts and incorporate additional variables such as socioeconomic factors. Ethiopia, district hospitals, clinical outcomes, time-series analysis, ARIMA Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \beta^{\neg}\,p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Ethiopia, District Hospitals, Time-Series Analysis, Forecasting Models, Epidemiology, Methodology, Public Health Planning*

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