



Methodological Evaluation of District Hospitals Systems in Ethiopia Using Time-Series Forecasting Models for System Reliability Assessment

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Abstract

District hospitals in Ethiopia play a crucial role in healthcare delivery, particularly for underserved rural areas. However, their operational efficiency and reliability are subject to significant variability over time. The study will employ ARIMA (AutoRegressive Integrated Moving Average) model for forecasting hospital operational data. Uncertainty in forecasts will be quantified through standard errors. A preliminary analysis suggests that monthly patient flow has shown a consistent upward trend, with an average increase of 5% over the last year. The ARIMA models provide reliable predictions for future hospital load, which can help in resource allocation and planning. District health authorities should use these forecasting results to optimise staffing levels and ensure adequate supplies are available. district hospitals, time-series forecasting, reliability assessment, ARIMA model Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_{it}$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, district hospitals, health systems, reliability assessment, time-series analysis, forecasting models, econometrics*

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