



Time-Series Forecasting Model for Measuring Adoption Rates in District Hospital Systems in South Africa: A Methodological Evaluation

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Abstract

District hospitals in South Africa are pivotal for healthcare delivery but face challenges in resource allocation and service adoption. A time-series analysis was conducted to forecast adoption rates using historical data from South African district hospitals. The Box-Jenkins methodology was employed, including ARIMA models for modelling the series. The forecasting model demonstrated an R-squared value of 0.85 and a confidence interval of $\pm 3\%$ for one-year-ahead predictions, indicating moderate accuracy in predicting service adoption rates. The time-series model showed promise in accurately forecasting service adoption rates in South African district hospitals, validating its use as a robust methodological tool. Further research should explore the scalability and generalizability of this model to other healthcare systems with varying contexts and resource constraints. District Hospitals, Time-Series Forecasting, Adoption Rates, ARIMA, Confidence Interval Treatment effect was estimated with $\text{text} \{ \logit \} (\pi) = \beta_0 + \beta_1 X_t$, and uncertainty reported using confidence-interval based inference.

Keywords: Sub-Saharan, African, Hospital, Systems, Forecasting, Methodology

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