



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

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Abstract

Tanzania's district hospitals play a critical role in healthcare provision but face challenges related to system reliability and forecasting of resource needs. A systematic literature review was conducted using databases such as PubMed, Scopus, and Google Scholar. Studies published between and were included if they employed time-series forecasting models to assess system reliability at district hospitals in Tanzania. The review focused on methodologies for data collection, model selection, and validation. The analysis revealed a significant variation in the use of ARIMA (AutoRegressive Integrated Moving Average) models across different studies, with some employing Box-Cox transformations to enhance model accuracy. Time-series forecasting models are recognised as effective tools for assessing system reliability at district hospitals but require further standardisation and validation to ensure consistent application and interpretation. Future research should focus on developing robust ARIMA models tailored specifically for Tanzanian healthcare contexts, incorporating local data and expert insights. Standardised guidelines for model selection and evaluation are also recommended. Treatment effect was estimated with $\text{text} \{ \logit \} (\pi) = \beta_0 + \beta_1 X_1 + \dots + \beta_p X_p$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan Africa, district hospitals, forecasting models, time-series analysis, reliability assessment, system evaluation, healthcare systems*

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