



Forecasting System Reliability in Tanzanian District Hospitals Using Time-Series Analysis: A Methodological Evaluation

Kamanga Musafiri^{1,2}, Mwakabukwa Chimengo²

¹ Tanzania Wildlife Research Institute (TAWIRI)

² National Institute for Medical Research (NIMR)

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Correspondence: kmusafiri@yahoo.com

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Author notes

Kamanga Musafiri is affiliated with Tanzania Wildlife Research Institute (TAWIRI) and focuses on Medicine research in Africa.

Mwakabukwa Chimengo is affiliated with National Institute for Medical Research (NIMR) and focuses on Medicine research in Africa.

Abstract

District hospitals in Tanzania often face challenges related to system reliability, which can affect patient care and hospital operations. A time-series analysis approach was employed, including autoregressive integrated moving average (ARIMA) modelling to forecast future system reliability indicators based on past performance data. The ARIMA model showed a predictive accuracy of around 75% in forecasting the number of hospital beds available over a six-month period, with a confidence interval indicating reasonable precision. The time-series analysis demonstrated potential for improving system reliability forecasts, which can inform resource allocation and planning strategies within district hospitals. Further studies should explore additional factors influencing system reliability to enhance the predictive model's accuracy and applicability in diverse settings. District Hospitals, System Reliability, Time-Series Analysis, ARIMA Model Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, African, methodology, hospitals, reliability, time-series, fault-tree*

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