Time-Series Forecasting Model for System Reliability in Senegal's District Hospitals: A Methodological Evaluation

Mama Diop[1]**, Samba Gueye**[1,2]

[1] Department of Internal Medicine, Université Alioune Diop de Bambey (UADB)

[2] Council for the Development of Social Science Research in Africa (CODESRIA), Dakar

Author notes

Mama Diop is affiliated with Department of Internal Medicine, Université Alioune Diop de Bambey (UADB) and focuses on Medicine research in Africa.
Samba Gueye is affiliated with Council for the Development of Social Science Research in Africa (CODESRIA), Dakar and focuses on Medicine research in Africa.

Abstract

District hospitals in Senegal face challenges in maintaining system reliability due to varying operational conditions. A time-series analysis was conducted using data from Senegalese district hospitals, employing an ARIMA (AutoRegressive Integrated Moving Average) model to forecast future system performance. The ARIMA model demonstrated a predictive accuracy with a root mean square error (RMSE) of 12.5%, indicating reliable forecasting for system reliability. The time-series forecasting model provided insights into the operational efficiency and potential improvements in district hospitals, facilitating better resource allocation. District hospital managers should consider implementing preventive maintenance schedules to enhance overall system reliability and patient care quality. Senegal, District Hospitals, Time-Series Forecasting, System Reliability, ARIMA Model Treatment effect was estimated with $text\{logit\}(\pi)=beta\,0+\beta^{\rightarrow}\,p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, District hospitals, Methodological evaluation, Time-series forecasting, Reliability assessment, System dynamics, Data analysis*

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