African Veterinary Surgery

Forecasting Risk Reduction in Senegalese District Hospitals: A Time-Series Forecast Model Assessment

Toure Mboup[1,2], **Mamadou Diop**[1,2]

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

[2] Université Gaston Berger (UGB), Saint-Louis

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Correspondence: tmboup@aol.com

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Author notes

Toure Mboup is affiliated with Council for the Development of Social Science Research in Africa (CODESRIA), Dakar and focuses on Medicine research in Africa.

Mamadou Diop is affiliated with Université Gaston Berger (UGB), Saint-Louis and focuses on Medicine research in Africa.

Abstract

Recent studies have highlighted significant challenges in risk management within Senegalese district hospitals, particularly regarding patient outcomes and resource allocation. A comprehensive time-series analysis was conducted using historical hospital data from three districts, focusing on patient admissions, bed turnover rates, and financial expenditure patterns over a five-year period. The model utilised an ARIMA (AutoRegressive Integrated Moving Average) approach to forecast future trends with robust standard errors provided. The forecasting model demonstrated an accuracy rate of 85% in predicting hospital resource needs, highlighting the need for proactive risk reduction strategies such as staffing adjustments and inventory management improvements. This study validates the utility of time-series forecasting models in enhancing district hospitals' operational efficiency by providing actionable insights into potential risks and enabling better resource allocation. Based on findings, we recommend implementing a continuous monitoring system to validate forecast accuracy and adjusting hospital protocols accordingly. Additionally, further research should explore the impact of these interventions on patient outcomes. Senegal, district hospitals, time-series forecasting, risk reduction, 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: *Sub-Saharan, Geographic, Epidemiology, Forecasting, Intervention, Cohort, Spatial*

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