



Forecasting System Reliability in Ghanaian District Hospitals Using Time-Series Models: A Methodological Evaluation

Yaw Asare¹, Kofi Ameyaw^{1,2}

¹ Accra Technical University

² Ghana Institute of Management and Public Administration (GIMPA)

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Correspondence: yasare@outlook.com

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Author notes

Yaw Asare is affiliated with Accra Technical University and focuses on Medicine research in Africa.

Kofi Ameyaw is affiliated with Ghana Institute of Management and Public Administration (GIMPA) and focuses on Medicine research in Africa.

Abstract

In Ghanaian district hospitals, there is a critical need to forecast system reliability due to resource constraints and varying patient volumes. A time-series forecasting model was applied to historical data from four district hospitals, focusing on bed occupancy rates as a key indicator. Robust standard errors were used for inference. Bed occupancy rates varied significantly between the districts, with District A showing an average of 75% occupancy compared to District B at 82%, indicating distinct system reliability patterns. The time-series models accurately forecasted bed occupancy trends, suggesting a need for tailored resource allocation strategies in each district. Health authorities should consider the findings to enhance resource management and improve patient care across districts. time series forecasting, hospital system reliability, Ghanaian district hospitals Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, African, Hospitals, Systems, Reliability, Forecasting, Modelling*

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