



Time-Series Forecasting Model for Evaluating Community Health Centre Systems in Nigeria: A Methodological Assessment

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Abstract

Community health centres in Nigeria face challenges in ensuring reliable service delivery due to variability in patient demand and resource availability. A time-series forecasting model was developed using ARIMA (AutoRegressive Integrated Moving Average) methodology to predict demand for services. The model's performance was assessed using robust standard errors and confidence intervals. Historical patient flow data indicated a seasonal pattern with peaks during the first quarter of each year, necessitating adjustments in staffing and resource allocation to maintain service quality. The ARIMA model demonstrated accuracy in forecasting future demand by incorporating seasonality and trend components, enhancing system reliability and efficiency. Community health centres should implement proactive scheduling systems based on forecasted data to manage resources effectively during peak periods. Treatment effect was estimated with $\text{text}\{\logit\}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, health systems, forecasting, econometrics, community healthcare, resource allocation, service delivery assessment*

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