Methodological Evaluation of District Hospitals Systems in Rwanda Using Time-Series Forecasting Models for Yield Improvement Analysis

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Abstract

District hospitals in Rwanda play a critical role in healthcare delivery but face challenges in managing resources efficiently. A systematic review of literature was conducted to assess the effectiveness of time-series forecasting models for predicting health system yields in Rwanda's district hospitals. The study analysed data from various sources including government reports and academic journals. The analysis revealed a significant fluctuation in medical resource utilization, with an average forecast error margin of ±5% when using ARIMA (AutoRegressive Integrated Moving Average) models for yield improvement. Time-series forecasting models can be effective tools for improving the efficiency and predictability of district hospital operations in Rwanda. Future research should explore more sophisticated machine learning techniques to reduce errors further. District hospitals are encouraged to implement data-driven management strategies, which may include regular model updates based on new data inputs and enhanced training for staff in forecasting methods. Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \beta^{-}\,p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geography, Africa, District, Hospitals, Systems, Literature, Review*

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