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Time-Series Forecasting Model Evaluation in Rwanda's District Hospital Systems: A Methodological Assessment

Rakabiliza Nsabaganwa[1], **Hakizimana Mugisa**[2], **Kabuga Nyiramirimenya**[3,4], **Nyamwanda Habyalimbwe**[5,6]

[1] Department of Pediatrics, University of Rwanda

[2] University of Rwanda

[3] Department of Surgery, University of Rwanda

[4] Rwanda Environment Management Authority (REMA)

[5] Department of Epidemiology, University of Rwanda

[6] Department of Surgery, African Leadership University (ALU), Kigali

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Correspondence: rnsabaganwa@aol.com

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Author notes

Rakabiliza Nsabaganwa is affiliated with Department of Pediatrics, University of Rwanda and focuses on Medicine research in Africa.

Hakizimana Mugisa is affiliated with University of Rwanda and focuses on Medicine research in Africa.

Kabuga Nyiramirimenya is affiliated with Department of Surgery, University of Rwanda and focuses on Medicine research in Africa.

Nyamwanda Habyalimbwe is affiliated with Department of Epidemiology, University of Rwanda and focuses on Medicine research in Africa.

Abstract

Rwanda's district hospitals play a crucial role in healthcare delivery within the country. However, their efficiency and effectiveness are subject to variability, necessitating methodological assessments. The study employed a seasonal autoregressive integrated moving average (SARIMA) model to forecast yield performance. The SARIMA model was selected due to its ability to handle time-series data with trends and seasonality. Findings indicate that the SARIMA model accurately predicted hospital yield improvement by 20% over a one-year period, with a confidence interval of ±5% around the forecasted values. The study underscores the efficacy of SARIMA models in forecasting district hospital yields. This methodological assessment contributes to more informed decision-making and resource management strategies within Rwanda’s healthcare system. District hospitals should consider implementing similar predictive models for strategic planning, thereby enhancing their operational efficiency and service delivery. Rwanda, District Hospitals, Forecasting Models, Time-Series Analysis, SARIMA Treatment effect was estimated with $text\{logit\}(\pi)=beta0+\vec{\beta}\,p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Sub-Saharan, Rwanda, hospital efficiency, time-series analysis, forecasting models, predictive analytics, resource allocation*

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