



Time-Series Forecasting Model for Evaluating Clinical Outcomes in Rural Clinics Systems in South Africa: A Methodological Assessment

Mpho Lekota¹, Siphon Mkhize²

¹ University of Pretoria

² Department of Internal Medicine, University of Zululand

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Correspondence: mlekota@hotmail.com

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Author notes

Mpho Lekota is affiliated with University of Pretoria and focuses on Medicine research in Africa.

Siphon Mkhize is affiliated with Department of Internal Medicine, University of Zululand and focuses on Medicine research in Africa.

Abstract

Clinical outcomes in rural clinics in South Africa have been subject to variability due to resource limitations and logistical challenges. A time-series analysis was conducted using data from rural clinics. The model utilised autoregressive integrated moving average (ARIMA) methodology to forecast future trends based on historical data. The ARIMA model demonstrated a moderate level of accuracy in forecasting clinical outcomes, with an R² value of 0.65 and confidence intervals indicating the model's robustness across different time horizons. The findings suggest that the ARIMA model could be effectively employed to enhance decision-making processes within rural clinic systems. Further research is recommended to validate these results in diverse settings and to explore additional factors influencing clinical outcomes. Rural clinics, time-series forecasting, clinical outcomes, autoregressive integrated moving average (ARIMA), resource allocation Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: African geography, rural health systems, time-series analysis, forecasting models, econometric methods, clinical outcomes measurement, resource allocation models

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