



Forecasting Risk Reduction in Tanzania's Community Health Centres Systems Using Time-Series Models: A Longitudinal Study

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Abstract

Community health centres in Tanzania face challenges in risk reduction due to fluctuating healthcare needs and resource availability. A longitudinal study using ARIMA (AutoRegressive Integrated Moving Average) model for forecasting future trends in healthcare demand and resources. The ARIMA model forecasts a 15% decrease in patient consultations over the next year with an uncertainty interval of $\pm 3\%$. ARIMA models effectively predict risk reduction, aiding in strategic planning to enhance service delivery efficiency. Implementing preemptive resource allocation based on forecasted trends can mitigate future risks and improve health outcomes. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Longitudinal analysis, risk assessment, ARIMA models, time-series, public health, community healthcare, forecasting methods*

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