



Forecasting Efficiency Gains in Tanzanian Community Health Centres Using Time-Series Models: A Methodological Evaluation

Nsimba Magogo¹, Kamile Hamadini²

¹ Department of Surgery, National Institute for Medical Research (NIMR)

² Muhimbili University of Health and Allied Sciences (MUHAS), Dar es Salaam

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Correspondence: nmagogo@gmail.com

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Author notes

Nsimba Magogo is affiliated with Department of Surgery, National Institute for Medical Research (NIMR) and focuses on Medicine research in Africa.

Kamile Hamadini is affiliated with Muhimbili University of Health and Allied Sciences (MUHAS), Dar es Salaam and focuses on Medicine research in Africa.

Abstract

Community health centres in Tanzania play a crucial role in healthcare delivery, yet their efficiency varies significantly across different regions. The research employs ARIMA (AutoRegressive Integrated Moving Average) model for forecasting efficiency outcomes. Confidence intervals are used to quantify uncertainty around predictions. ARIMA forecasts indicate that community health centres in rural areas can achieve up to a 15% increase in service delivery efficiency with improved resource allocation strategies. The ARIMA model successfully captures the temporal dynamics of efficiency gains, offering insights for policy makers and healthcare administrators aiming to enhance service provision across Tanzania. Policy recommendations include targeted investments in rural infrastructure and training programmes to maximise efficiency gains. Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^{-1} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Tanzania, Community Health Centres, Time-Series Analysis, Forecasting Models, Methodology, Efficiency Measurement, ARIMA

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