African Journal of Nephrology

# Forecasting System Reliability in Ethiopian District Hospitals Using Time-Series Models: A Methodological Evaluation

**Bedru Belay**[1,2], **Fikadu Assefa**[1,3], **Mengistu Tekle**[4,5], **Tsegaye Amsallo**[1]

[1] Hawassa University

[2] Addis Ababa Science and Technology University (AASTU)

[3] Haramaya University

[4] Ethiopian Institute of Agricultural Research (EIAR)

[5] Department of Public Health, Addis Ababa Science and Technology University (AASTU)

**Published:** 02 August 2002 | **Received:** 17 May 2002 | **Accepted:** 11 July 2002

**Correspondence:** bbelay@aol.com

**DOI:** 10.5281/zenodo.18738393

**Author notes**

*Bedru Belay is affiliated with Hawassa University and focuses on Medicine research in Africa.*

*Fikadu Assefa is affiliated with Hawassa University and focuses on Medicine research in Africa.*

*Mengistu Tekle is affiliated with Ethiopian Institute of Agricultural Research (EIAR) and focuses on Medicine research in Africa.*

*Tsegaye Amsallo is affiliated with Hawassa University and focuses on Medicine research in Africa.*

## Abstract

The healthcare landscape in Ethiopia presents significant challenges, particularly in rural and underserved districts where infrastructure is often limited. Time-series analysis was employed using ARIMA (AutoRegressive Integrated Moving Average) model for predicting hospital system performance across Ethiopian districts. A prediction error rate of ±10% in the ARIMA model indicated a reliable forecast, with some hospitals showing improvement trends over two years. The ARIMA models successfully forecasted system reliability, offering insights into potential areas for intervention and resource distribution among district hospitals. District health authorities should prioritise investment in these systems based on the reliability forecasts to ensure equitable healthcare access. Time-series forecasting, ARIMA model, System Reliability, Ethiopian District Hospitals Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \vec{\beta} p X_i$, and uncertainty reported using confidence-interval based inference.

**Keywords:** *Ethiopia, District Hospitals, Time-Series Analysis, Forecasting, Reliability Assessment, Methodology, Evaluation, Health Systems Research*

# ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

## ✉ REQUEST FULL PAPER

**Email:** info@parj.africa

Request your copy of the full paper today!

## SUBMIT YOUR RESEARCH

**Are you a researcher in Africa? We welcome your submissions!**

Join our community of African scholars and share your groundbreaking work.

**Submit at:** app.parj.africa

Scan to visit app.parj.africa

**Open Access Scholarship from PARJ**

Empowering African Research | Advancing Global Knowledge