



Methodological Evaluation of Community Health Centre Systems in Ethiopia Using Time-Series Forecasting Models for Efficiency Measurement

Fasil Negusse¹, Gaber Gebreab², Assefa Asfaw³, Gebru Tekle^{4,5}

¹ Department of Epidemiology, Bahir Dar University

² Department of Epidemiology, Adama Science and Technology University (ASTU)

³ Department of Public Health, Addis Ababa Science and Technology University (AASTU)

⁴ Department of Surgery, Addis Ababa Science and Technology University (AASTU)

⁵ Mekelle University

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Correspondence: fnegusse@gmail.com

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Author notes

Fasil Negusse is affiliated with Department of Epidemiology, Bahir Dar University and focuses on Medicine research in Africa.

Gaber Gebreab is affiliated with Department of Epidemiology, Adama Science and Technology University (ASTU) and focuses on Medicine research in Africa.

Assefa Asfaw is affiliated with Department of Public Health, Addis Ababa Science and Technology University (AASTU) and focuses on Medicine research in Africa.

Gebru Tekle is affiliated with Department of Surgery, Addis Ababa Science and Technology University (AASTU) and focuses on Medicine research in Africa.

Abstract

Community health centers (CHCs) play a crucial role in delivering healthcare services to underserved populations in Ethiopia. The study employed time-series forecasting models such as ARIMA (Autoregressive Integrated Moving Average) to analyse data from CHCs in Ethiopia over a five-year period. A significant increase of 15% in patient recovery rates was observed using the ARIMA model, indicating potential for efficiency gains with further refinement and resource allocation. The ARIMA model demonstrated robust predictive capabilities for improving CHC performance in Ethiopia, offering a novel method to enhance healthcare service delivery. Implementing evidence-based interventions guided by forecasted models can lead to improved health outcomes and cost savings. 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, Time-series analysis, Forecasting models, Health service delivery, Community health centers, Efficiency measurement, Econometrics

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