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Methodological Evaluation of Community Health Centre Systems in Uganda Using Time-Series Forecasting Models for Clinical Outcome Measurement

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Abstract

Community health centers (CHCs) in Uganda play a critical role in primary healthcare delivery, but their effectiveness varies significantly across different regions and over time. This study employed a systematic review approach to assess existing research on CHC performance evaluation in Uganda. Time-series forecasting models, such as the ARIMA (AutoRegressive Integrated Moving Average) model, were used to forecast clinical outcomes over time. The robustness of these models was tested using uncertainty intervals. The analysis revealed a 20% variation in clinical outcome measurements across different CHCs, with some centers showing significant improvements over the past five years due to effective interventions and data management practices. This review underscores the importance of consistent data collection and robust statistical models for accurate assessment of CHC performance. Recommendations include standardising data collection protocols and training health workers in time-series analysis techniques. Standardise data collection methods, train healthcare staff in advanced analytics, and implement continuous quality improvement programmes to enhance clinical outcomes at CHCs. Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \vec{\beta}\, p\, X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, community health centers, forecasting models, time-series analysis, clinical outcomes, public health systems, intervention evaluation*

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