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Methodological Evaluation of District Hospitals Systems in Tanzania Using Time-Series Forecasting Models for Clinical Outcomes Assessment

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Abstract

The healthcare system in Tanzania faces challenges, particularly in district hospitals where clinical outcomes are often suboptimal. A combination of descriptive statistics and time-series analysis was employed to assess hospital performance metrics such as patient admissions, bed occupancy rates, and treatment success rates. Time-series models were developed to predict trends in these metrics over a specified period. District hospitals exhibited an average bed occupancy rate of 85%, with significant variability across different regions. Predictive models indicated that if current trends continue without intervention, the number of hospital admissions will increase by approximately 10% within the next year. The time-series forecasting models provided insights into potential future clinical outcomes and operational challenges in district hospitals, highlighting the need for targeted interventions to improve service delivery efficiency. Targeted training programmes should be implemented for healthcare workers to enhance patient care quality. Additionally, resource allocation strategies focused on reducing bed occupancy variability could mitigate predicted increases in admissions. Treatment effect was estimated with $text\{logit\}(\pi)=beta0+\beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Tanzania, Geographic Information Systems, Public Health, Time-Series Analysis, Forecasting Models, Clinical Outcomes Assessment, Geographic Mapping Techniques*

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