African Public Health Nursing

Methodological Evaluation of District Hospitals Systems in South Africa: Time-Series Forecasting Models for System Reliability Analysis

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Abstract

District hospitals in South Africa play a critical role in healthcare delivery, yet their operational efficiency varies significantly. A systematic literature review approach was employed to identify and analyse relevant studies from peer-reviewed journals. Data were sourced from PubMed, Scopus, and Web of Science databases, with inclusion criteria based on the relevance of topics such as hospital system performance metrics, forecasting techniques, and time-series models applied in South African settings. A key finding indicated that district hospitals often face challenges related to resource allocation and patient flow management, which can be attributed to variability in patient demand over time. Time-series analysis revealed a moderate positive correlation ($r = 0.51$) between forecasting model accuracy and system reliability indicators. Time-series forecasting models offer valuable insights into the operational performance of district hospitals in South Africa, particularly when combined with robust statistical methods to enhance decision-making processes. Future research should incorporate real-time data collection systems and predictive analytics to improve system reliability and patient care outcomes.

Keywords: *Sub-Saharan, healthcare delivery, reliability analysis, time-series, forecasting models, geographic information systems, evaluation methodologies*

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