



Methodological Evaluation of Municipal Water Systems in Nigeria Using Time-Series Forecasting Models for Clinical Outcomes Assessment

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Abstract

The quality of municipal water systems in Nigeria significantly impacts public health, particularly in rural areas where access to clean drinking water is limited. A comparative analysis was conducted using historical data from selected regions in Nigeria, employing ARIMA (AutoRegressive Integrated Moving Average) model for forecasting future trends based on past performance indicators such as water quality, usage rates, and health surveillance reports. The ARIMA model indicated a significant positive correlation ($\text{text}\{ARIMA\}(p, d, q)$ where $p=1, d=0, q=2$) between the percentage of households with access to safe drinking water and reduced incidence of enteric diseases among agricultural workers. The study underscores the critical role of municipal water systems in mitigating health risks associated with contaminated water sources, particularly affecting agriculture-dependent communities. Investment in infrastructure upgrades and continuous monitoring are recommended to ensure sustainable improvements in water quality and public health outcomes. Municipal Water Systems, Nigeria, ARIMA Model, Clinical Outcomes, Agriculture

Keywords: *African Geography, Water Supply Systems, Time-Series Analysis, Epidemiology, Public Health, Forecasting Models, Intervention Evaluation*

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