



THE 4TH MULAWARMAN INTERNATIONAL
CONFERENCE ON TROPICAL PUBLIC HEALTH
(MICTOPH) 2025



ABSTRACT

Title of Abstract : Time series analysis of outpatient visits at RSUD X In Samarinda using the ARIMA model
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Background : Efficient hospital resource planning, including staff allocation and pharmaceutical logistics, heavily relies on accurate patient visit volume forecasting. Daily outpatient visit data at Regional Hospital from January 2023 to February 2025 shows high volatility and a strong weekly pattern (5-day work cycle). Therefore, a forecasting method is needed that can describe the patterns and trends of patient visits based on historical data. Methods commonly used for time series forecasting is ARIMA (Autoregressive Integrated Moving Average). This model is capable of capturing seasonal patterns and trends within the data, making it useful for predicting the number of future visits with a high level of accuracy.

Objective : This study aims to identify the most optimal time series forecasting model using internal seasonal SARIMA and external regression SARIMAX analysis.

Research Methods/ Implementation Methods : This study design is repeated cross-sectional. Outpatient visit data was divided into training (2023-2024) and testing (January-February 2025) sets for accuracy validation, measured by Root Mean Squared Error (RMSE).

Results : In the first stage, the seasonal ARIMA model without explanatory variables, namely ARIMA(0,0,1)(2,1,0)[5], passed the Ljung-Box diagnostic test ($p > 0.05$) but showed low predictive accuracy (RMSE 281.01). The second stage involved using explanatory (exogenous) variables such as Monday, Friday, and Public Holidays. A regression model with ARIMA(0,1,1) errors was identified as the superior model with an RMSE of 194.39. Regression coefficients showed a significant impact from specific days: Monday (+50 visits, 95% CI 32, 68), Friday (-91 visits, 95% CI -73, -109), and Public Holidays (-489 visits, 95% CI -463, -516).

Conclusion Although the Ljung-Box test resulted in $p < 0.05$, indicating that there are still residuals not fully explained by the model, it still provides important insights for hospital operational planning.
Lesson Learned :

Keyword : Keywords: hospital, outpatient visit, ARIMA, time series, prediction