

# Abstract

This research demonstrates the multiple approaches to workforce planning. It mainly focuses on the healthcare sector workforce planning. Many healthcare institutions are under pressure to increase their treatment quality while becoming more cost-effective. Hospitals struggle with the problematic issue of maintaining an adequate number of General Physicians, Nurses, and Midwives staff to satisfy patient needs due to the ongoing variation in healthcare demands. The need to meet the same level of demand puts pressure on the remaining staff. For this reason, the second aim of this study is to use time series forecasting methods to curate the need of the healthcare workers.

We have explored different time series models and finally used Box- Jenkins ARIMA extension, i.e. Seasonal ARIMA, for forecasting with consideration of seasonality. The Vector Auto Regression (VAR) model is used for healthcare worker forecasting by leveraging the population increase.

Different statistical tests were leveraged to find the best parameter and model, like the Eyeball test of Autocorrelation and Partial autocorrelation to see the lag order, the Augmented Dickey-Fuller (ADF) for testing the stationarity of time series, Granger causality test to find the causal relationship between the two-time series.

The results were evaluated through Root Mean Square (RMSE), R-squared error (Multiple and Adjusted R square), Mean Absolute error (MAE), Mean Absolute Percentage Error (MAPE) and Mean Absolute Scaled Error (MASE)