148. Modelling the trends and forecast of prostate cancer incidences using ARIMAX models (a case of Meru County).

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Abstract

Globally, the prevalence of cancer is increasing, placing a heavy burden on communities and health systems at all income levels. The objective was to model the trends and forecast the prostate cancer incidences using ARIMA and ARIMAX Models (Case of Meru County) compare model accuracy between ARIMA and ARIMAX using AIC (Akaike Information Criterion), and draw conclusions. There is limited information in literature on how prostate cancer time trends could change according to specific demographic subgroups. Prostate cancer incidences were predicted using the ARIMA and ARIMAX models, and the relative forecast accuracy was be assessed using the AIC and MAPE. The ARIMAX model was fitted using the Box-Jenkins methodology. Data on the prevalence of prostate cancer was obtained from Meru Cancer Registry. R programming (Version 4.3.3) software was used in the analysis. The best models for the Prostate cancer incidences is ARIMA(0,0,1) and ARIMAX (0,0,1). The study shows that there is correlation between age and prostate cancer incidences in Meru County. Nevertheless when viewed from ARIMAX and ARIMA models based on the AIC value, ARIMAX value was lower than the ARIMA value. Inclusion of other external variables besides age can further improve the model. Health care institutions and practitioners are able to make more informed judgments with the help of the forecasted results and their corresponding forecast intervals and make informed decisions on whether the number of observed prostate cancer cases in a given time-frame represents a potential incidence or is a function of random variation.

Keywords: ARIMA, ARIMAX, MAPE and AIC