Correlation Analysis of Malaria Cases and Meteorological Factors in Lagos State, Nigeria

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Research

Keywords: Malaria, Meteorological factors, Correlation, Malaria elimination

Posted Date: November 2nd, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-100163/v1>

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Abstract

Background

Malaria transmission affects malaria infection rates. There are several potential drivers of malaria transmission. A suitable meteorological factor such as rainfall, temperature, and relative humidity encourages the breeding of the vector. This improves the survival of the parasite in the host. The female *Plasmodium falciparum* plays a crucial role in the variability of malaria prevalence. Lagos State is a coastal malaria-endemic area in Nigeria. This study presents a correlation analysis of malaria cases and meteorological factors between the periods of January 2015 to April 2018 in Lagos state.

Methods

The study was a secondary data analysis of meteorological variables and records of malaria cases reported by health facilities in Lagos state. We accessed weather variables through free access “weather underground.com” a meteorological data sharing service system (MDSSS). The MDSSS provides real-time online weather information from four meteorological monitoring stations in Lagos state. We accessed the malaria cases through the district health information system 2 databases. It is used to report cases of malaria by all the private and public health facilities in the state. We performed the correlation analyses to show the relationship between temperature, humidity, rainfall, and malaria cases at a 5% level of significance. We analysed data using the statistical package for social sciences version 25.

Results

Malaria cases peaked between the period of July to November 2016 and the period of April to May 2017 and declined between March to May 2017. The temperature, relative humidity, and rainfall showed a positive correlation with malaria cases. The temperature is most correlated with the occurrence of malaria cases ($r = 0.65$, $p < 0.02$).

Conclusion

This correlation analysis provides an approach for studying the impact of meteorological variability on the prevalence of malaria cases. This can help to forecast the malaria epidemic while preparing for the elimination of malaria in Lagos state.

Full Text

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Tables

Due to technical limitations, table 1-3 is only available as a download in the Supplemental Files section.

Figures

Figure 1

Lagos state is in the Southwestern part of Nigeria, at the bay of Benin. The map of Nigeria showing Lagos state (Figure 1).

Figure 2

The malaria cases in Lagos state vary across the months of the year studied. The trend in the malaria cases in the study period, from January 2015 to April 2018 (Figure 2).

Figure 3

The trends of mean temperature mean humidity and mean rainfall January 2015–April 2018 (Figure 3).

Figure 4

The temperature has a stronger variation than other factors with a correlation constant of 0.4 (Figure 4).

Figure 5

The variation in temperature, humidity, and rainfall against malaria cases over the months (Figure 4, 5, 6)

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Supplementary Files

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