

IMPACT OF CLIMATE VARIATION ON SELECTED DISEASES IN NIGERIA

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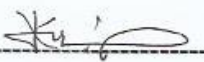
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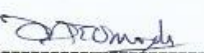
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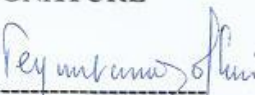
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Dedication

This work is dedicated to the Glory of GOD, *the Father, the Son and the Holy Ghost and* to my Children: Morenikeji Kolawole; Olwatobiloba Kolawole; Oluwaseun Kolawole; Tolulope Kolawole whom I have denied one right or the other because of this work.

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ABSTRACT

This study examines the impacts of climatic variations on the distributional patterns of malaria, measles, pneumonia, cerebro-spinal-meningitis (CSM), and tuberculosis in different ecological zones of Nigeria. The specific objectives is to: (a) examine the nature of climate variation in Nigeria, (b) identify the spatial and temporal distribution of the selected diseases in Nigeria, (c) investigate the relationships between climatic variations and the prevalence selected diseases occurrence in different ecological zone of Nigeria. Data on climatic parameters such as temperature, rainfall, humidity, radiation and wind from 1958-2009 were obtained from the Nigerian Meteorological Agency (NIMET), while data on incidences of malaria, measles, pneumonia, CSM, and tuberculosis and morbidity and mortality were obtained from Federal Ministry of Health as well as the National Bureau of Statistics (NBS) from 1982-2009. The nature of climatic variation was determined using simple descriptive statistics and dispersion, while time series analysis, contour analysis using density dot method and rainfall anomaly indices were used to determined the spatio-temporal distribution of selected diseases in Nigeria. Pearson correlation method, canonical correlation techniques, polynomial and linear regression methods were used to analyse the relationships between climatic variations and the prevalence selected diseases occurrences in different ecological zones of Nigeria. The results show that the climate characteristics in Nigeria vary in time and space. Three rainfall periods since the middle of the last century were revealed. These include a relatively wet period between 1958 and 1969; a relatively dry period between 1970 and 1994; and a relatively wet period between 1995 and 2009 which shows a period of recovery. Spatially, five rainfall-trend periods were observed for the southern area and three rainfall-trend periods for the northern areas of Nigeria. Dryer conditions prevailed over the sahel, sudan, guinea savannah and slightly over the mangrove swamp forest zones, and wetter conditions prevailed only over the tropical rain forest zone. The climatic conditions suitable for malaria transmission over the various ecological zones decreases from mangrove swamp forest (9-month), tropical forest (8-month), guinea savannah (6-month), sudan savannah (4-month) and sahel savannah (3-month). Temperature analysis also shows evidence of warming in Nigeria (1958-2009). There was an increase from the mean of 33.5°C to 33.7°C for maximum temperature over Kano and 29.4°C to 30.5°C for Lagos. The distribution of other significant climatic parameters such as relative humidity, solar radiation and wind shows values ranging between 80% and above in the southern region and 40%-60% in the northern region; solar radiation of 50.2Wm⁻² in the south while 71.2 Wm⁻² are in the north; average wind speed of 7.5m/s were found in the north and decreases to 3.5m/s in south. The study also revealed a spatio-temporal variability in the distribution of the selected diseases and this was presented by contour analysis. The study shows that the highest incident of malaria occurred in the month of August, while for measles, the highest occurred in the month of March and April. The highest for pneumonia occurred in the month of January, while the highest for CSM occurred in the month of March and for tuberculosis in the month of July. With regard to the result of the relationships between climatic parameters and the selected diseases incidence in the ecological zones. Negative correlation existed between rainfall, minimum temperature and relative humidity. Rainfall correlate weakly with malaria (-0.288) over the sahel region at 95% confidence level; strongly with CSM (-0.805) over the mangrove swamp forest at 99% confidence level. Minimum temperature correlate weakly with CSM (-0.111) over sudan savannah zone (not significant) but strongly with measles (-0.757) at 99% confidence level. Relative humidity correlate weakly with malaria (-0.291) at 99% confidence level and strongly with CSM (-0.873) at 99% confidence level. Positive correlation however existed between maximum temperature and radiation. Maximum temperature correlate weakly with malaria (0.228) over the sahel savannah zone at 95% confidence level. But strongly with CSM (0.805) over tropical forest at 99% confidence level. Similarly, radiation correlate weakly with malaria (0.302) over mangrove swamp forest at 99% confidence level, but strongly with

CSM (0.806) over mangrove swamp forest at 99% confidence level. Finally, the policy framework on the basis of findings of this study, climatic information for improving health through diseases control and preventive behaviour were also highlighted.