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EVIDENCE OF CLIMATE CHANGE AND ITS DYNAMICS ON PSYCHOLOGICAL COMFORT OF INHABITANTS OF NORTH WESTERN NIGERIA

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Abstract

Climate change and its dynamics on psychological comfort is a global issue and its impact is felt everywhere by both human and ecosystem. Climate variability and change threaten the well being of humans. This study examines the impact of climate variability on human health with the use of regression, correlation and ANOVA. The result shows that there is a very strong positive correlation between minimum temperature and Psychological Health (0.844), maximum temperature and Health Issue (0,794), Psychological Health (0.793), between sunshine and Psychological Health (0.667), Health Issue (0.630). The other variables are weakly correlated with the diseases. The regression analysis reveals that 49%, 88% and 79% of the variance in asthma, Psychological Health and Health Issue can be respectively explained by the climatic parameters under study to a certain extent. This implies that there may be some other factors that are responsible for the selected diseases in the area. Such factors may include biological (genotype, micro-organisms, and allergies), unhygienic environment and economic (poor living conditions). Recommendations made include weather report should be broadcasted to people through the media in order for them to understand variation in the climate and how to adapt and mitigate the effect of the changes. Furthermore, people should be enlightened on the effects of anthropogenic activities in the atmosphere and how to reduce these effects for sustainable development.

Keywords: Climate, Change, Dynamics, Psychological

Introduction

Causes of Climate Variability and Change

Climate can be defined as the average weather condition or the regular variations in weather in a region over a period of years. Climate variability can be referred to as difference from statistical average of climate over a given period of time (such as a specific month, season or year). The basic characteristic of climate which shows itself very clearly in changes with time is what is regarded as climate variability. While any change in climate which alters the composition of the global atmosphere which is in addition to natural climate variability observedover comparable time periods is what is regarded to as climate change. The most acceptable definition of climate change was given by IPCC (2007) Fourth Assessment Report (AR4) as a change in the state of the climate that can be identified (e g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period typically decades or longer.

Climate variability and change are caused essentially by natural and anthropogenic activities. The natural activities include interaction of the oceans and the atmosphere, changes in the earth's orbit, changes in the energy received from the sun and volcanic eruptions. Very recently, there was a consensus that

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anthropogenic activities constituted the major cause of climate change. Human-induced alterations of the natural world have contributed to the high increase in the rate of gaseous emissions into the atmosphere, thereby causing global warming. Past studies (Buba, 2004; Porbeni, 2004; DeWeerdt, 2007; Odjugo, 2007) over decades have revealed that anthropogenic activities like urbanization, population explosion, deforestation, industrialization and the release of greenhouse gases contribute highly to the depletion of the ozone layer and its associated global warming, climate variability and change. The World Health Organization (WHO) estimates that about 150,000 deaths annually (especially in African countries) are attributable to climate change. This study therefore examines the impact of climate variability and change on human health in Ilorin, Nigeria.

2.0 Materials and Methods

Secondary data were obtained from the University Teaching Hospital and NIMET office on selected diseases and climatic data of Ilorin respectively. The selected diseases include asthma, Health Issue and Psychological Health fever while the climatic data are rainfall, relative humidity, maximum and minimum temperature and sunshine for a period of ten 10 years (2002-2011). Correlation, regression analysis and Analysis of Variance (ANOVA) were employed to analyze the data in order to establish a relationship between climatic data and selected diseases and also, to show the percentage contribution of the variables to the selected diseases. The regression equation is written as $Y=a+b_1x_1+b_2x_2+b_3x_3+e$. where

Y = climatic dataX_1= asthma

X_2 = Psychological HealthX_3 = Health Issuee= error term

Study Area



Fig. 1: Map Showing North Western Nigeria

Results and Discussions

Table 3 shows the trend of climatic data in the study area over a period of ten (10) years. Significant differences existed in maximum temperature in the year 2010 and 2011. Rainfall also decreased in the year 2010 and 2011

while there are no significant differences in minimum temperature, relative humidity and sunshine over the yearssampled.

Table 3. Climatic data of Northern Western Nigeria between 2002 and 2011

Year	Max Temp(°C)	Mini Temp(°C)	Rainfall(mm)	R/H(%)	Sunshine(hr)
2002	32.62	21.80	79.90	72.75	**5.76**
2003	32.80	21.93	129.47	74.83	**5.95**

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2004	32.8	22.07	117.80	75.6	**6.18**
2005	32.4	22.13	108.82	74.75	**6.18**
2006	32.23	21.66	117.42	76.58	**6.32**
2007	32.67	21.82	109.09	73.83	**6.38**
2008	32.00	22.38	122.37	70.83	**6.53**
2009	32.76	22.00	111.87	78.92	**6.27**
2010	55.29	22.41	86.65	78.00	**6.62**
2011	**55.54**	**22.48**	**89.64**	**78.58**	**6.86**

Source: Field Survey (2023).

From Table 4, it can be deduced that reported cases of people with asthma is very high in the year 2005. The year 2010 and 2011 recorded high number of people with Psychological Health fever. Also, between the year 2007 and 2011, reported cases of people with Health Issue is very high except for a slight reduction in the year 2008.

Table 4. Record of the selected diseases between 2002 and 2011(Average number of people per year)

Year	Asthma	Psychological Health	Health Issue
2002	75	142	**218.75**
2003	84	139	**141.83**
2004	70	148	**143.92**
2005	108	145	**130.00**
2006	65	134	**137.25**
2007	89	140	**285.75**
2008	97	152	**190.33**
2009	82	130	**201.75**
2010	71	157	**324.40**
2011	**79**	**169**	**330.30**

Source: Field Survey, 2023

Correlation between Selected Diseases and Climatic Variables

Table 5 shows the correlation between climatic variables and selected diseases. The result of correlation analysis shows multivariate relationship between the climate variability/change and human health, considering the climate variables and selected diseases. This means that maximum temperature (0.793), minimum temperature (0.844), relative humidity (0.108) and sunshine hours (0.667) with rainfall (-0.454) are proportionately related with Psychological Health fever in exception of rainfall that is inversely related to this disease. An incidence of Psychological Health is of increase with increase in values of these weather variables but downward trends of rainfall.

Table 5. Correlation analysis

Disease	Rainfall (mm)	Maximum Temperature	Minimum Temperature	Relative Humidity	Sunshine
Health Issue	-0.692	0.794	0.487	0.322	**0.630**
Asthma	0.254	-0.286	0.242	-0.449	**-0.003**
Psychological Health	**-0.454**	**0.793**	**0.844**	**0.108**	**0.667**

Source: Field Survey, 2023

On the incidence of Health Issue fever, all the weather variables bring about the increase rate of the ailment with exception of rainfall which is inversely related with upward trend of Health Issue. Maximum temperature (0.794), minimum temperature (0.487), relative humidity (0.322), sunshine hours (0.630) and

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rainfall (-0.692), explainingthat the main climatic elements that induce Health Issue are temperature, relative humidity and sunshine hours. These elements are lethal to mosquitoes and the parasites because where temperatures are close to the physiological tolerance limit of the parasites, a small temperature increase would be lethal to the parasite and Health Issuetransmission would therefore decrease. At low temperatures, a small increase in temperature will greatly increasethe risk of Health Issue transmission. Moreover, when the temperature increases, the incidence of Health Issue would increase irrespective of rainfall amount or the duration on the surface. Mosquitoes only take the advantage of stagnant water or pool of water in the environment as a breeding ground but when there is decrease intemperature below the threshold of survival, the mosquitoes will die off, reducing the morbidity at such period oftime.
Asthma attack is of inverse correlation with some climatic elements while proportionately correlated with other elements. For instance, the result revealed that maximum temperature (-0.286), relative humidity (-0.449) and sunshine hours (-0.003) are inversely related with incidence of asthma while rainfall (0.254) and minimum temperature (0.242), are proportionately related with asthma. Maximum temperatures always increase heat content as a result of surface absorption of solar radiation in the day hours, usually resulted to convection rainfall.At this period, the atmosphere is moist with little or no pollen grain or dust particles that do trigger asthma attack among the patients during horizontal air motion. This could however explain the inverse correlation between these variables and asthma.

Regression Analysis for the Selected Diseases and Climatic Variables

Table 6 shows that 49%, 88% and 79% of the variance in asthma, Psychological Health and Health Issue can be respectively explained by the climatic parameters under study. Climatic variables therefore to some extent, have impact on selected diseases over the years under study. This is because climate change has a significant and profound influence on physiological comfort and health behaviours of people. However, Ayoade (2004) observed that not all effects of climate on human are negative because favourable climatic conditions can help human body in wading off certain diseases and enhances recuperation from illness.

Table 6. Regression analysis for the diseases and climatic variables

Diseases	R	R2	Adjusted R	Std error of the estimate
Asthma	0.702	0.493	-0.141	**14.09**
Psychological Health	0.939	0.882	0.734	**5.93**
Health Issue	**0.894**	**0.799**	**0.549**	**52.29**

Source: Field Survey, 2023

This implies that the remaining 51%, 12% and 21% of the variance in asthma, Psychological Health and Health Issue can be respectively explained by other factors not included in the study. Such factors include biological (genotype, micro-organisms, and allergies), unhygienic environment and economic (poor living conditions) that are responsible for incidence of disease in the study area.

Table 7. Analysis of variance

Dependent variables	F-ratio	Ftable
Asthma	0.777	**0.613**
Psychological Health	5.976	**0.054**
Health Issue	**3.189**	**0.142**

Source: Field Survey, 2023

Predictors: (constant), Sunshine, Rainfall, RH, Min. temperature and Max temperature.H_o: Climate variability has no significant impact on human health.
H_1: Climate variability has significant impact on human health. Decision Rule: Reject H_o when F-ratio is greater than F_{table} or otherwise.

From the result on Table 7, H_o is rejected and while the alternative hypothesis (H_1) that climate change has significant impact on human health is accepted since F-ratio on asthma (0.777), Psychological Health (5.976) and Health Issue (3.189) are greater than F-table i.e. 0.613, 0.054 and 0.142 respectively. The implication of this result is that incidence of these prevalent ailment in Ilorin to some extent is a function of climate variability/change. As the temperature increases, weather condition tends to dry with increase in pollen grain and dust particles in the atmosphere low relative humidity and increase moisture in the sky which directly provokes asthma in some patients.

Psychological Health fever and Health Issue are mainly pronounced during hot weather as majority of people do come down with these diseases. As the temperature increases, cases of Health Issue increase because the breeding capacity of mosquitoes that transmit Health Issue vectors will increase at low relative humidity and low rainfall will give rise to mosquitoes bite. This finding is similar to the work of Githeko and Ndegwa (2001) in highland of Karamega thatthere is a close association between Health Issue transmission and monthly temperature. Psychological Health fever is linked with environmental factors like water pollution during which period the streams might have been contaminated with run off.

Conclusion

The study has actually revealed that variations in climatic variables such as rainfall, maximum and minimum temperature, relative humidity and sunshine to a certain extent affect human health in the study area. However, there are some other factors that contributed to the incidence of these diseases but were not included in the study.Therefore in order to mitigate the effects of climate variability/change on human health there is the need to assess vulnerabilities as well as identify adaptation options in other related human health sectors. People should be educated and informed on how climate variability and change affect human health generally. The use of mosquito nets, clearing stagnate water and not residing near riverbeds will also mitigate the effect of climate variability in the study area. Weather report should be broadcasted to people through the media in order for them to understand variation in the climate and how to adapt and mitigate the effect of the changes. Furthermore, people should be enlightened on the effects of anthropogenic activities in the atmosphere and how to reduce these effects for sustainable development.

References

Action Aid. (2006). Climate Change, Urban flooding and the rights of the urban poor in Africa: key findingsfrom six African cities. *Action Aid,* October, 2006.

Adeleke, E. A. (2009). The Effect of Climate on Human Health in Ilorin. Unpublished M.Sc Dissertation, Department of Geography and Environmental Management, University of Ilorin, Nigeria.

Ajibade, L. T. (2002). Indigenous Systems of Land Evaluation in the Yoruba Speaking Area of Kwara State. Unpublished Ph.D Thesis. Obafemi Awolowo University (OAU), Ile-Ife, Osun State, Nigeria.

Ayoade, J. O. (2004). *Introduction to Climatology for the Tropics.* Spectrum Books Ltd., Ring Road, Ibadan. Buba, A. D. (2004). Climate change and water problems in Chad Republic. *Journal of Arid Environment, 3*(2),42-50.

Burton, I. (1993). *The Environment as hazard*. New York, USA: The Guilford Press.

DeWeerdt, S. (2007). Climate change coming home: Global warming effect on populations. *World Watch, 2*(3),6-13.

Githeko, A., & Ndegwa, W. (2001). Predicting Health Issue Epidemics in the Kenyan Highlands using Climate Data: A tool for Decision Maker. *Global Change and Human Health, 2*, 54-63. http://dx.doi.org/10.1023/A:1011943131643

Haines, A., Kovats, R. S. D., Campbell-Lendrumb, C., & Corvalan, C. (2006). Climate Change and Human Health: Impacts, Vulnerability and Public Health. *Journal of the Royal Institute of Public Health, 120*, 585-596.

Intergovernmental Panel on Climate (IPCC). (2007). Climate change 2007: Synthesis Report. Summary for policy makers.pp. 1-22. Retrieved from October 26, 2009, http://www.ipcc-wg1-ucar.edu/wg1/wg1-report.htm

Lisle, J. T. (1995). Cryptosporidium contamination of water in the US and UK: A Mini-review. *Aqua,* 44, 103-117.

More, G. (1992). Epidemiology and Treatment of Cyclosporine Cayetanesis Infection in Peruvian Children. *Clinical Infectious Diseases,* 24(5), 977-981.

National Population Commission. (1991). *Census News Publication, 3*(1), Lagos Nigeria.

National Population Commission. (2006). *Population Census of the Federal Republic of Nigeria: AnalyticalReport of the National level*, NPC, Abuja.

Odjugo, P. A. O. (2007). The Impact of Climate Change on Water Resources; Global and Regional Analysis. *Indonesian Journal of Geography, 39*(1), 23-41.

Olorunfemi, J. F., & Adeyemi, A. S. (1994). Climate and Mortality in Ilorin (1983-1992). *Ilorin Journal of Business and Social Sciences, 4*.

Orire, I. O., & Olorunfemi, J. F. (2009). Global Warming and Human Health. *A Paper Presented at the University of Cape Coast and University of Ilorin International Conference on 'Culture, Science and Sustainable Development in Africa'* on 28th - 30th September, 2009.

Oyegun, R. O. (1986). The Use and Waste of Water in a Third World city: A Case of Ilorin Metropolis. *Geojournal, 10*(2), 210.

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Persinger, M. A. (1980). *The Weather Matrix and Human Behavior*, p. 327. New York: Praeger,
Porbeni, C. V. (2004). The impact of Global Warming on High Latitudes and Attitudes. *Journal of Arid Environment, 3*(2), 75-88.
Rose, J. B. S. (2000).Climate and Water-borne Outbreaks in the U.S A preliminary descriptive analysis. *Journal of the American Water works Association,* 92, 1194-1199.
The asthma information guide.com. (2000). Asthma.
The Guardian Newspaper. (2010). Heat, Dusty Weather Raise Health Concerns. Climate Change Effects in Nigeria. 30th March, 2010.

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