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RESIDENTS' PERCEPTION OF THE EFFECT OF CLIMATE CHANGE ON THE INCIDENCE OF DISEASES IN OSOGBO, OSUN STATE NIGERIA

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Abstract

Clearly, conclusive evidence confirms that climate change is happening, and those likely to be worst affected are the poor and marginalized communities. Public Participation Technique (PPT) was used to analyze households' perception of the impact of climate change on peoples' health in Osogbo, with the aim of determining their level of awareness of climate change on the incidence of some diseases. Data were collected with the use of questionnaire administered on 400 household heads. The study adopted a systematic random sampling technique for the survey. The first household was chosen using the balloting method of random sampling in each identified major streets. The data were analyzed using both descriptive and inferential statistics such as percentages, cross-tabulation and regression analysis. The study revealed that the degree of climate change awareness was low (4.3% in Oluode and 6.1% in Sabo). Regression Analysis revealed significant relationship between climate change and people's health with $P \leqslant 0.000$ on the incidence of measles and typhoid. About a half of the respondents are not very much aware of the effect of climate change on the people's health in Asubiaro, Oke-baale and Oluode with 36.3%, 43.7% and 41.2% respectively. In order to safeguard the health of citizens in the study area, this paper suggests a comprehensive planning strategy which favours a healthy environment being recognized as key to resilience in poor communities directly dependent on natural resources. This is to be done in terms of creating awareness on the impact of climate change on people's health. Again, knowledge about ways of coping with climate variability-adaptation programs such as trees planting initiative and environmental education should be given a high priority by the government.

Keywords: Residents' Perception; Climate Change; Residents' Health and Diseases.

Introduction

It is increasingly recognized that health is maintained and improved not only through the advancement and application of health sciences, but also through the efforts and intelligent lifestyle choices of the individual and the environment (Ford, 2012; Van vuunen and Varter, 2014; Balogun and Olapegba,2007). According to the World Health Organization (1984), the main determinants of health include the physical, social and economic environments, individual characteristics and behaviour. The link between the impact of climate change and health are many and vary. As a result, there is a clear need for the urban planner to fully integrate health implications in terms of incidence of diseases to climate change studies. Planning decisions should take systematically into account the influence of the urban environment on human health. Urban planning can, therefore, be regarded as a central determinant of environmental health (Berry *et al*, 2010 and Jiang and Nall, 2007). The fact that cities are human creations, as well as human habitat, makes human health a central value to urban planning and governance. Urban planning priorities will, therefore, include the enhancement of the standard of urban quality and provision of facilities and resources which can protect and enhance human health (Semenza and Menne,2009; Hess and Ebi, 2016).

Residents' environment in terms of weather conditions should play important role in determining individual well-being. Poor environment, in terms of

not being able to adapt or cope with the impact of climate change, can lead to a variety of health problems (Shah, 2007). Unfortunately, the appalling environmental conditions associated with most urban settlements constitute a major threat to the health and well-being of urban life.

The existing body of evidence on the relationship between the impact of climate change and residents' health remains insufficient. In recent years, a variety of research targeted at identifying links between residents' health and climate change has been carried out by international and national governments but only short-term and small-scale solutions were proposed (IPCC, 2007; WHO,2014; Global Gender and Climate Change, 2016 and Monevo-serra and Smith,2012). Thus, it remains very difficult, even impossible to compare on a global scale the existing health risks associated with climate change impact. Hence, there is a need for empirical analysis of the link between residents' health status and the impact of climate change on urban dwellers. This research,, therefore, investigates the nature and causes of the impact of climate change and its consequences on residents' health status.

Aim and Objectives

This study aims to investigate and analyze the relationship between climate change and the incidence of selected diseases. The Specific Objectives are to:

i. examine residents' level of awareness of climate change

ii. investigate the residents' level of awareness of nexus between climate change and the incidence of some diseases.

iii. establish the relationship between climate change and the incidence of some diseases.

Conceptual /Theoretical Framework and Literature Review

The conceptual framework for this study is anchored on the concept of healthy cities while the theoretical framework is the Need Theory.

With urbanization, there has been a massive influx of people from the rural to urban areas in Nigeria, which has led to environmental problems characterized by inadequate housing, overcrowding, inadequate supply of water, and poor (or in some instances, lack of) drainage facilities, problems of refuse disposal, poor road conditions, erratic electricity and unbalanced economy (Agbola et al 2003). Healthy cities concept deals principally with how to improve the health and well-being of city dwellers. This is achievable by monitoring development control and proper environmental control in the cities. Individuals perception on the environment he lives is a strong variable on how available resources are utilized and level of adaptability to environmental changes as reflected in the study. A healthy urban future is a city in which knowledge of how to create and sustain healthy cities is applied. Most cities in Nigeria can be said to be unhealthy cities including Osogbo which is the study area due to the havoc caused by man's activities to its environment.

Healthy cities concept challenges cities to take seriously the process of developing healthy enhancing public policies that create physical and social environments which support health and strengthen community action for health (Angel, 2010; Royer,2007 and Lutz *et al*,2014).

The Need Theory was propounded by Maslow (1908-1970) which he called the hierarchy of needs theory. Maslow opined that man's needs are prioritized and the motivation to satisfy them at any point in time will depend upon which of the needs is more over-riding at that particular time (Agbola et al 2007; Down,1970 and Griftitt and Veitch,1971). In applying the need theory to climate change and people's health, one will look at 'the effect of individual's state of mind and his reaction to the environment in terms of the physical and social environment.

Relating to people's health means that the decision about where individual resides would depend on the need that is motivating him at that point in time. Some that is still at the point of satisfying the basic things of survival will not think much of where he lives even when the climatic elements in such areas are not conducive for healthy living. Most residents in Osogbo lived where they were basically based on affordability rather than comfort as revealed during the reconnaissance survey.

Perception of Climate Change and Health

Climate change and health have to do with the aggregate of all the external and internal conditions of dwelling units that influence or affect man's health. Tuan (1972) believes that each man has an

image of the world. That is, man's decision and subsequent behaviour are based on those pictures of the world in his hand, rather than on the world of reality. Climate and health perception involves two inseparable actions;

1. The awareness of all the external conditions (temperature, rainfall, wind, sunshine and humidity) and influences affecting man's life and development and
2. The interpretation of these conditions to form a mental image of such climate change for decision-making purposes.

Mental images of the relationship that exists between climate change and man's health can be examined in relation to the characteristics of the people concerned. However, the fact that such examinations are hinged ultimately on the psychological and personality types makes such examination a difficult task because human intangible are difficult to measure. It is not impossible to hear some people talking about their ill-health because of hot or cold weather. Therefore, to introduce a form of objectivity, Ebi (2009) suggested three major approaches to the study of geographic space perception irrespective of individuals' psychological and personal traits. These are structural, evaluated and reference approaches.

Structural Approach: This has to do with how the array of information about a place is perceived. It is not possible to remember all the volumes of information about an existing climate condition in recent times. As a result, there is the need to selects, order and structure these caches of information. On this, perception of a city is constructed by discarding useless details while retaining only information necessary for individual purposes.

Evaluated Approach: Evaluated approach is concerned not only with the way the environment is structured, but also how it is evaluated in relation to the decision to be taken and subsequent actions to be taken.

Preference Approach: This has to do with how preferences are developed against a set of environmental (climatic elements) characteristics already evaluated based on information and data available. These three approaches are not independent because it is very difficult if not impossible to have a dividing line between when one approach ends and where the other begins.

No rational and reasonable two individuals or groups of individuals will make precisely the same evaluation of the same environment be it natural or man-made (Lawton, 1972). The above assertion cannot be exempted from individuals because man perceives only what has value for his biological survival and provides cultural satisfaction.

Hess and Ebi (2016) observed that to operate in this world, individuals must have an awareness of the space that surrounds them. Urban planners must not because of the singular opportunity to plan for others use their value judgment as the only inputs into his designs for the public. In essence, public perception should not be ignored. Perception studies would reveal to policy makers the need for and direction to which health facilities in terms of provision, maintenance and finance will be focused especially in our cities.

Methodology and Data Analysis

Types and Sources of Data

Both primary and secondary sources of data were used. The secondary data were obtained from relevant documents in Osun State Ministry of Land and Physical Planning which provided background information as regards the demographic, physical and geographical features of Osogbo metropolis.

The primary data constituted major information required for the empirical and descriptive analysis of the study. This includes residents' level of awareness of climate change and its impact on their health status in recent time and residents' level of awareness of the nexus between climate change and incidence of malaria, typhoid and measles.

Data Collection Technique

In this study, for effective data collection, stratified sampling technique was used because the study area contains heterogeneous population and the study focuses on climate change and man's health which require information on socio-economic characteristics, the effect of global warming and fluctuation in the amount of annual rainfall.

Stratified sampling was used for both respondents and streets selection. In this form, the population and the streets are not uniform; hence, the elements are arranged in a relatively homogeneous interval. After this, a sample was drawn on these strata randomly. Four hundred (400) questionnaires were administered. About 100 blocks were identified within the city and 5% (20 blocks) of the total blocs

were chosen based on their availability of population figures at the National Population Commission, Osogbo.

Climate change and household health proxy index were computed by aggregating responses to climate change awareness and incidence of measles, typhoid and malaria in terms of cases and frequency. This was done by assigning one (1) to represent 'yes' response to each of the diseases and climatic elements for the past one year while two (2) was assigned to 'no' response to each of the diseases and climatic elements. The aggregate score for each household provides an index which serves as a proxy for the health's status of each household and the higher the value obtained for each household better their health status.

Data Analysis Techniques

Descriptive and Inferential statistics were used to analyze data collected. Percentages and cross tabulation of relevant variables such as those of climate change awareness and its impact on the incidence of diseases were discussed. Regression Analysis was used to examine the relationship between dependent variables (Residents' health) and independent variables (effect of climate change perception).

Result of Findings

One of the noticeable effects of climate change is ill-health. Some diseases are transferable and their spread is being propelled by weather conditions; hence, the need to determine people's level of awareness of climate change and its impact on the incidence of malaria, typhoid and measles. This will help to formulate a policy that will guide the rate of environmental degradation and assist the residents to cope with the effect of climate change in their environment.

Awareness of Climate Change by Respondents

From the survey it was observed that as high as 51.1% of the respondents in Powerline are not aware of climate change at all; this was followed by respondents in Oja-oba with 50.3% (see table 1).

It was only in four (4) blocs we have 20% and above of respondents that are very much aware of climate change as revealed from table 2 above. At Oke-Ayepe 51.2% are slightly aware of climate change, some respondents are slightly aware of climate change but they attributed it to God's wrath on mankind due to their wickedness. With this view, much work still needs to be done to enlighten people on the cause(s) of climate change in the study area.

Table 1: Level of awareness of climate change in percentages

S/N	Blocs	Level of awareness in %			
		Slightly aware	Very aware	Very much aware	Not aware at all
1	Alekuwodo	22.1	17.5	20.1	40.3
2	Jolayemi	36.3	4.3	21.3	38.1
3	Odiolowo	49.1	6.7	10.2	34.0
4	Isale-oja	40.2	6.3	9.8	43.7
5	Isale-osun	29.7	12.8	11.3	46.2
6	Asubiaro	36.3	8.0	20.3	35.4
7	Oja-oba	37.1	1.8	10.8	50.3
8	Gbonmi	40.2	9.4	18.7	31.7
9	Oke-ayepe	51.2	8.2	10.3	30.3
10	Oke-baale	43.7	0.5	14.2	41.6
11	Oke-fia	38.1	2.3	16.3	43.3
12	Powerline	29.6	9. 0	10.3	51.1
13	Ayetoro	26.1	16.1	25.1	32.7
14	Sabo	45.2	8.7	6.1	40.0
15	Oke-onitea	32.4	10.8	18.4	38.1
16	Igbona	29.6	11.1	119.0	40.3
17	Dugbe	40.8	5.7	8.2	45.3
18	Oluode	41.2	4.3	4.3	50.2
19	Owope	30.8	10.4	15.4	43.4
20	Agowande	38.7	10.7	14.2	36.4

Source: Author's field survey, 2019.

Awareness of Impact of Climate Change on People's Health

It was revealed from the survey that 39.0% of the respondents claimed they were slightly aware of the impact of climate change on their health while 37.6% claimed they were not aware of the impact of climate change on their health status. The percentages of respondents that claimed to be very aware and very much aware of the impact of climate change on residents' health are 17.1% and 6.3% respectively. It was only in five wards that respondents are very much aware of the impact of climate change on people's health. The highest was recorded in Oke-fia with 33.3% (Table 2).

The level of awareness was so low to justify why some residents were infected with diseases caused and propelled by variability in weather condition. It was discovered during the reconnaissance survey that some households lack coping strategies with recent change in climatic conditions.

Level of Awareness of Impact of Climate Change on the Incidence of Malaria

Table 3 shows that 36.5% of the respondents claimed they were slightly aware of the impact of climate change on the incidence of malaria. As much as 33.9% of respondents claimed they were not aware of the impact of climate change on the incidence of malaria; this category was as high as 58.8% in Gbonmi.

Respondents that claimed to be very aware and very much aware of the impact of climate change on the incidence of malaria are 21.4% and 8.1% respectively. Oke-fia seems to be the only ward with a recognizable impressive level of awareness of the impact of climate change on the incidence of malaria. The level of awareness was so low to justify why the majority of respondents were infected with malaria very often, though other factors too could be responsible.

Level of Awareness of Impact of Climate Change on the Incidence of Typhoid

The percentages of respondents that claimed to be very aware and very much aware of the impact of climate change on the incidence of Typhoid are 14.7% and 7.8%.

It was discovered that as high as 40.0%, 40.5%, 42.8% of respondents in Alekuwodo, Owoope, Agowande, Isale-oja and Powerline claimed to be

Table 2: Level of Awareness of Impact of Climate Change on Residents' Health in Percentages

S/N	Blocs	Level of awareness in %				
		Slightly aware	Very aware	Very much aware	Not very much aware	Total
1	Alekuwodo	44.0	10.0	6.0	40.0	10.9
2	Jolayemi	30.7	35.8	-	33.3	8.5
3	Odi-olowo	41.6	8.3	8.3	41.6	2.6
4	Isale-oja	43.2	10.8	5.4	40.5	8.1
5	Isale-osun	33.8	11.8	5.0	49.1	12.9
6	Asubiaro	58.8	-	11.7	29.4	3.7
7	Oja-oba	40.0	11.1	6.6	42.2	9.8
8	Gbonmi	58.8	5.8	-	35.2	3.7
9	Oke-ayepe	10.0	50.0	20.0	20.0	2.2
10	Oke-baale	57.1	14.2	14.2	14.2	1.5
11	Oke-fia	50.0	16.6	33.3	-	1.3
12	Powerline	57.1	-	14.2	28.5	1.5
13	Ayetoro	44.4	22.2	5.5	27.7	3.9
14	Sabo	50.	10.0	10.0	30.0	2.2
15	Oke-onitea	42.1	43.7	-	37.5	3.5
16	Igbona	42.1	7.8	2.6	47.3	8.3
17	Dugbe	20.6	40.0	10.0	30.0	4.4
18	Oluode	21.4	21.4	7.1	50.0	3.1
19	Owope	20.0	4.0	10.0	30.0	2.2
20	Agowande	48.0	16.0	8.0	28.0	3.5
	Total					**100.0**

Source: Author's fieldwork, 2019.

Table 3: Awareness of Effect of Climate Change on the Incidence of Malaria

S/N	Blocs	Level of awareness in %				
		Slightly aware	**Very aware**	**Very much aware**	**Not very much aware**	**Total**
1	Alekuwodo	30.0	18.0	8.0	4.4	10.9
2	Jolayemi	51.2	23.0	5.1	20.5	8.5
3	Odi-olowo	33.3	41.6	8.3	16.6	2.6
4	Isale-oja	54.0	37.8	-	8.1	8.1
5	Isale-osun	28.8	18.6	13.5	38.9	12.9
6	Asubiaro	58.8	5.8	-	35.2	3.7
7	Oja-oba	11.1	44.4	6.6	37.7	9.8
8	Gbonmi	41.1	-	-	58.8	3.7
9	Oke-ayepe	20.0	10.0	10.0	60.0	2.2
10	Oke-baale	57.1	14.2	-	28.5	1.5
11	Oke-fia	56.0	6.6	33.3	-	1.3
12	Powerline	57.1	-	14.2	28.5	1.5
13	Ayetoro	22.2	38.8	5.5	33.3	3.9
14	Sabo	40.0	10.0	-	5.0	2.2
15	Oke-onitea	62.5	6.2	12.5	18.7	3.5
16	Igbona	52.6	7.8	2.6	36.8	8.3
17	Dugbe	30.0	-	30.0	40.0	4.4
18	Oluode	28.5	21.4	7.1	42.8	3.1
19	Owope	20.0	40.0	10.0	30.0	2.2
20	Agowande	24.0	28.0	12.0	36.0	5.5
	Total					**100.0**

Source: Author's fieldwork, 2019.

Table 4: Awareness of Effect of Climate Change on the Incidence of Typhoid

S/N	Blocs	Level of awareness in %				
		Slightly aware	**Very aware**	**Very much aware**	**Not very much aware**	**Total**
1	Alekuwodo	40.0	22.2	12.0	26.0	10.9
2	Jolayemi	35.8	16.6	15.3	23.0	8.5
3	Odi-olowo	25.0	13.5	25.0	33.3	2.6
4	Isale-oja	40.5	16.9	-	45.9	8.1
5	Isale-osun	38.9	23.5	1.6	42.3	12.9
6	Asubiaro	29.4	13.3	11.7	35.2	3.7
7	Oja-oba	37.7	29.4	6.6	42.2	9.8
8	Gbonmi	35.2	10.0	5.8	29.4	3.7
9	Oke-ayepe	30.0	14.2	-	60.0	2.2
10	Oke-baale	14.2	-	-	71.4	1.5
11	Oke-fia	33.3	-	16.6	50.0	1.3
12	Powerline	42.8	5.5	-	57.1	1.5
13	Ayetoro	38.8	20.0	-	55.5	3.9
14	Sabo	30.0	12.5	10.0	40.0	2.2
15	Oke-onitea	37.5	7.8	12.5	37.5	3.5
16	Igbona	39.4	15.0	2.6	50.0	18.3
17	Dugbe	25.0	-	20.0	40.0	4.4
18	Oluode	35.7	-	7.1	57.0	3.1
19	Owope	40.0	25.5	40.0	20.0	2.2
20	Agowande	40.0	4.0	-	56.0	5.5
	Total					**100.0**

Source: Author's fieldwork, 2019.

slightly aware of the impact of climate change on the incidence of typhoid. Again, 57.1% and 55.5% of respondents in Oke-fia and Powerline claimed that they are not aware at all of the impact of climate change on the incidence of typhoid (see table 4).

Level of Awareness of Impact of Climate Change on the Incidence of Measles.

In Gbonmi alone as much as 83.3% of respondents claimed that they were not aware at all of the impact of climate change on the incidence of measles followed by Oke-Ayepe and Oke-fia with 50.0% each respectively.

Table 5 shows that respondents who claimed to be very aware and very much aware of the impact of climate change on the incidence of measles are 28.0%, 30.0%, 13.5% and 14.2% in Alekuwodo, Sabo, Isale-Osun and Oke-Baale.

The level of awareness was so low to justify why the majority of respondents had cases of measles in their households.

Relationship Between Climate Change and Incidence of Diseases.

Table 6 shows that there is a significant relationship between climate change and the household's health with P = 0.000.

Table 5: Awareness of Effects of Climate Change on the Incidence of Measles

S/N	Blocs	Level of awareness in %				
		Slightly aware	Very aware	Very much aware	Not very much aware	Total
1	Alekuwodo	40.0	28.0	2.0	30.0	10.9
2	Jolayemi	48.7	5.1	5.1	41.0	8.5
3	Odi-olowo	16.6	-	-	83.3	2.6
4	Isale-oja	40.5	16.2	-	43.2	8.1
5	Isale-osun	37.2	16.9	13.5	32.2	12.9
6	Asubiaro	58.8	5.8	5.8	29.4	3.7
7	Oja-oba	42.2	6.6	4.4	46.6	9.8
8	Gbonmi	41.0	11.7	-	47.0	3.7
9	Oke-ayepe	50.0	-	-	50.0	2.2
10	Oke-baale	42.8	14.2	14.2	28.5	1.5
11	Oke-fia	33.3	16.6	-	50.0	1.3
12	Powerline	33.3	-	-	57.1	1.5
13	Ayetoro	44.4	-	11.1	44.4	3.9
14	Sabo	30.0	30.0	-	40.0	2.2
15	Oke-onitea	43.7	18.7	6.2	31.2	3.5
16	Igbona	52.6	-	-	47.2	8.3
17	Dugbe	55.0	10.0	5.0	30.0	4.4
18	Oluode	57.0	7.1	-	35.7	3.1
19	Owope	50.0	10.0	10.0	30.0	2.2
20	Agowande	40.0	28.0	4.0	28.0	5.5
	Total					**100.0**

Source: Author's fieldwork, 2019.

Table 6: Regression analysis on the relationship between climate change perception (independent variable) and households' health (dependent variable).

Model	Dependent variable	R	R^2	F	SIG	Remark
A	Household's Health	.235	0.055	24.312	0.000	Significant
B1	Incidence of Malaria	.118	0.014	6.315	0.041	Significant
B2	Incidence of Measles	.216	0.047	20.427	0.000	Significant
B3	Incidence of Typhoid	.210	0.044	20.117	0.000	Significant

Source: Author's field survey, 2019.

Majority of the respondents agreed that climate has a very significant influence on their health status. Most respondents attributed their health status to severe heat due to high solar radiation caused by depletion in the ozone layer.

The analysis revealed a significant relationship between residents' perception of climate change and the incidence of malaria with P = 0.041.

Malaria occurs in all the wards and with the highest incidence in Powerline and Oluode where respondents are not aware of the implication of climate change on their health.

Furthermore, the test conducted confirmed that there is a significant relationship between climate change perception and the incidence of measles and typhoid with P = 0.000. Previously, people attributed the incidence of measles to the wrath of gods until recently studies showed that measles is a viral disease. This study shows that the virus that causes measles survives better under high solar radiation caused by climate change.

Conclusion

In order to safeguard the health of citizens in the study area, this paper suggests Public Participation Technique (PPT) strategy which favours a healthy environment being recognized as key to resilience, particularly in poor communities directly dependent on natural resources.

Furthermore, knowledge about ways of coping with climate variability is also essential, adaptation programs, tree planting initiative, provision of water reservoirs, environmental education and prohibiting bush burning should be given a high priority by the government. Careless use of the environment by people in Osogbo that contributes to changes in global climate are deforestation, bush burning, illegal dumping and pollution. Therefore, all the stakeholders on environmental management in Osun State should make sure that every natural resource is preserved, conserved and protected.

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