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SUSTAINABLE BUILT ENVIRONMENT AND CLIMATE CHANGE: THE CHALLENGE OF POST 2015 DEVELOPMENT AGENDA

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BUILT ENVIRONMENTAL FACTORS ASSOCIATED WITH THE SPREAD OF VECTOR-BORNE DISEASE. THE CASE OF MALARIA IN URBAN AREAS OF NIGERIA.

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Malaria disease is a pandemic that has affected many parts of the world especially the developing countries. Africa as a continent has suffered so much largely because of the built environmental and climatic factors associated with the disease. The effect of climate change which has affected all parts of the world is another contributory factor that aids in the spread of the disease. The study seeks to investigate the built environmental factors that aids in the spread of the disease. Reviews of various literatures that are related to the factors that influences the spread of malaria were searched through some of the literatures database. Over twenty related literatures were reviewed on the built environmental factors and malaria. The results revealed those inadequate infrastructures, poor building conditions, inefficient waste disposal system, poor sanitary system and ignoring the building byelaws during construction all aids in the spread of the malaria. The study recommends that adequate infrastructures should be provided to Nigerian urban centres, there should be efficient waste disposal system and building byelaws must not be ignore during construction.

Keywords: Built environment, climate, disposal, malaria, waste

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Introduction

Almost a century now and especially from the 1950s to the present, have witnessed remakable international interest and efforts towards elimination of malaria (Stratton et al., 2008). Programs such as the Roll Back Malaria Initiative (RBM) and the Multilateral Initiative on Malaria (MIM) have seen international donor organizations (public and private) spend millions of dollars on malaria eradication programs (Williams and Jones 2003). Unfortunately, the results have not been completely positive. Today, despite decades of concerted global efforts, malaria related mortality is higher than half a century ago (WHO, 2010). Malaria has become the most important vector borne disease in Africa (especially south of the Sahara) parts of Asia and Latin America.

In spite of the various programs by the African governments to curb the spread of malaria disease, the sub- Saharan Africa still suffers greatly from the disease. According to World Health Organization (WHO) estimates, in 2010, of the 655,000 deaths attributed to malaria worldwide, 91% of these were in Africa (WHO, 2012). Malaria is caused by a parasite called Plasmodium, which is transmitted via the bites of infected mosquitoes. In the human body, the parasites multiply in the liver, and then infect red blood cells. Usually, people get malaria by being bitten by an infective female Anopheles mosquito. Only Anopheles mosquitoes can transmit malaria and they must have been infected through a previous blood meal taken on an infected person. When a mosquito bites an infected person, a small amount of blood is taken in which contains microscopicmalaria parasites. About 1 week later, when the mosquito takes its next blood meal, these parasites mix with the mosquito's saliva and are injected into the person being bitten. Because the malaria parasite is found in red blood cells of an infected person, malaria can also be transmitted through blood transfusion, organ transplant, or the shared use of needles or syringes contaminated with blood. Malaria may also be transmitted from a mother to her unborn infant before or during delivery (—congenitall malaria).

Symptoms of malaria include fever and flu-like illness, including shaking chills, headache, muscle aches, and tiredness. Nausea, vomiting, and diarrhea may also occur. Malaria may cause anemia and jaundice (yellow coloring of the skin and eyes) because of the loss of red blood cells. Symptoms usually appear between 10 and 15 days after the mosquito bite. If not treated, malaria can quickly become life-threatening by disrupting the blood supply to vital organs. Infection with one type of malaria, Plasmodium falciparum, if not promptly treated, may cause kidney failure, seizures, mental confusion, coma, and death. In many parts of the world, the parasites have developed resistance to a number of malaria medicines.

Anopheles gambiae sensu stricto (Diptera: Culicidae), the major African malaria vector is known to breed in temporary clean and clear water (WHO, 1971). But, the rapid unplanned urbanization observed in many parts of Africa is changing the context of human population and natural ecosystem interaction. Poverty, deteriorating infrastructure and overcrowding are some of the factors that contribute to the development of conditions that modify anopheline breeding sites.

At the moment, Africa's demography is rapidly changing, with an increasing number of people moving to urban areas. In West Africa, the population growth rate for urban areas is estimated at 6.3%, which is more than double the total population growth rate (Donnelly et al 2005), and it is predicted that, by 2035, the urban population of sub-Saharan Africa will outnumber the rural one (Parnell &Walawege, 2011).With the continuous increase of urbanization in Africa, the factors that influences the spread of the disease will keep getting dominant.

The process of urbanization in Nigerian urban centres has not been accompanied with a corresponding supply of adequate housing, basic infrastructures and amenities. This has given birth to the development of shanty towns, informal settlements and slums as well as disorganized congestion and decline dilapidation of the environment. Another notable contributor to urban decay has always been the negligent urban housekeeping, and irresponsible civic management enhancing its spread. Continuous neglect will meant that physical decay of urban community will continue to stretch over the built environment with its attendant consequences of urban health problems. This study examines the built environmental factors that are associated with the spread of Malaria disease in Nigerian urban centres.

Methods

Literature Search. A systematic search on the built environmental factors associated with malaria transmission in Nigerian urban centres was carried out in January 2016 by the first named author on the following electronic databases: EMBASE, HMIC, Medline, Maternity and Infant Care, Psycinfo, and Transport. Key reports included World Health Organisation's Malaria reports, built environmental factors, urbanization, Policy documents from the National Population Commission and National Demographic reports from the Federal Ministry of Health. These were retrieved from the relevant websites.

Built Urban Environment and Health Hazards

In Nigeria, urbanization that is supposed to be the major force for modernization and rapid economic growth has rather resulted into massive unemployment, slum development, environmental degradation and high poverty levels (Gbadegesin and Aluko, 2010 & UN Habitat 2008b). A study by Ahiaba et al (2008) revealed that experience of many urban centres in Nigeira like Lagos, Ibadan, Port Harcourt, Aba and Benin is that they have urban planning and management crisis. There seems to be problems which are associated to uncontrolled urbanization in Nigeira which has overwhelmed the official capacity to handle them, thus; many urban areas in Nigeria are faced with serious environmental health problems because they are grossly deficient in housing and municipal services (Gbagedesin et al 2010). The problems of Nigeria urban built environment was analyzed by Ahianaba et al (2005 & 2008) which incudes inadequate basic amenities, substandard housing, overcrowding, poor ventilation, poor sanitation and non compliance with building regulations.

i) **Inadequate basic infrastructural amenities**: Most of our urban centres lack essential basic amenities such as pipe borne water, electricity, and road network. Where they are provided, these facilities are insufficient or do not function due to neglect by relevant authorities.
Waste disposal is also a major problem in our urban centres, especially in most slum areas and squatter settlements. There are no planned disposal sites for refuse with a resultant indiscriminate refuse disposal on any available sites.

ii) **Substandard housing**: Shelter which connotes housing has a fundamental purpose of protecting man, his activities and his possessions from humans, animals and other enemies and from the supernatural powers that plague man. Osuide (2004) suggests that: "Having a safe place to live in is one of the fundamental elements of human dignity and this enhances human development". Substandard housing in urban centres is a major problem of our cities. The problems resulted from the fact that they were never planned by experts but sprang from villages.

iii) **Overcrowding**: Another noticeable characteristic of our urban centres is overcrowding; arising from over population and insufficient accommodation. Over-crowding is a major problem of our built environment especially in slums and squalid environment

iv) **Poor ventilation in buildings**: In some Nigerian homes and offices, ventilation is not included while planning for such buildings but this is the most vital aspect of construction that makes for comfortable living. Izomoh (2005) cited that most residential buildings have been designed and constructed with little or no consideration for the thermal comfort through the process of cross-ventilation.

v) **Non-compliance with building Bye-laws and regulations**: The consequence of non-compliance with building bye-laws and regulations are already manifesting and are being felt in our urban centres.

Mortality from urban environmental health problems have been on the increase in Nigeira. Oyebanji (2013) pointed out that there is increase of death as a result of Malaria disease. It rose from 1,947 to 3,268. Diarrhea increased from 1,613 in 1991 to 2,056 in 1995 while reported deaths from pneumonia increased from 855 to 1,594 at the same period.

Owoeye and Omole (2012) conducted a study on the built environmental decay and the health situation in Akure. It was pointed out in the study that like most other traditional centers in Nigeria, the Akure city has continued to witness haphazard development without conscious effort to physical planning. In spite of its many years of existence, the city has no physical development plan (Master plan) as different land-uses juxtapose each other in a reflection of its traditional setting before and during colonial administration. This has contributed in no small measure to the rapid decaying of the built environment in the city. At the moment, the city is characterized by the proliferation of squalid and slum condition of environmental sanitation, overcrowded dwellings, poor waste disposal management, pollutions, inadequate water and unreliable power supply (Olanrewaju & Akinbamijo, 2002;

Owoeye, 2006; Adedeji & Owoeye, 2008; Omole & Owoeye, 2011). Thus, the sanitation coverage has not been able to keep pace with the urban population growth which has put the health of residents in greater risks. Consequently, the building characteristics which is made up of the kind of materials that was used for the construction, structural condition and age of the building have contributed greatly to the poor health condition which malaria is among and the most common disease in Akure.

In another study by Adefemi et al.,(2015), it was pointed out that the environment plays a defining role in the health outcomes of any society. But unfortunately, for most developing countries, the environment constitutes a particularly negative influence on health. This is especially true in Nigeria, where until very recently, the environment was one of the most de-emphasised health issues, nationally and locally (Orisakwe, 2011). According to Adefemi et al.,(2015 environmental factors that contribute to malaria risks include the large rural population, poor waste disposal, water and sanitation infrastructures and habits.

Apart from the built environmental factors, it is apparent that two major social determinants influence most of the malaria risks highlighted so far. These are low socio-economic (SES) status and low levels of literacy. From the ten social determinants of health identified by Wilkinson and Marmot (2003) at least seven are related to these two and thus shape children's exposure to malaria in Nigeria. These are Work, Social gradient, stress and anxiety, early life, social exclusion and food. At least 75% of children in Nigeria are born to parents in the low SES (NPC, 2009) who live in the lowest gradient of the society with limited access to well-paid job. WHO emphasised that poverty is the greatest single risk factor for malaria. Global malaria reports have shown that more than two-third malaria cases occur in the poorest fifth of the population (WHO, 2003). Poverty reduces opportunities for formal education, which then reduces chances for a good job which lead to more poverty. Social exclusion due to low SES creates and sustains anxiety while also limiting life's chances for children from the beginning of their life. And then the circle continues again.

Conclusion

The study was able to investigate the built environmental factors that are associated with the spread of malaria in Nigerian urban centres. From the reviews of the various literatures it is very obvious that inadequate basic amenities, substandard housing, overcrowding, poor ventilation, poor sanitation and non compliance with building regulations are the key factors that aid the spread of the disease. Another key factor is the poverty level and literacy level. To reduce the spread of Malaria in Nigerian urban areas adequate infrastructure must be provided, like the waste disposal system, steps must be taken to discourage the construction of substandard housing, and the building byelaws must be properly followed.

References

Adedeji, Y.M.D & Owoeye, J.O. (2008). Environmental sanitation and the health of Slum Dwellers in Akure: Knowledge Review (a multidisciplinary Journal); National Association for the Advancement of Knowledge, University of Benin, Benin-City, Nigeria; 17(2), 57-67.

Donnelly, M. J., McCall, P. J., Lengeler, C., et al., "Malaria and urbanization in sub-Saharan Africa," Malaria Journal, vol. 4, article e12, 2005.

National Population Commission. Nigeria Demographic and Health Survey: 2008. Abuja: National Population Commission; 2009.

Oaks SC, Violaine S, Mitchell GW, Carpenter CCJ. Malaria: Obstacles and Opportunities. In: Control CftSoMPa, editor. W

Olanrewaju, D.O. & Akinbamijo, O.B. (2002). Environmental health and target audience: A programmatic panacea for poverty alleviation in Nigerian cities: African Journal of Environmental Studies; Development Africa consortium; 3(2), 82-89.

Omole, F.K & Owoeye, J.O. (2011). Slum characteristics of deplorable residential district of Akure: FUTY Journal of the Environment, 6(2)

Orisakwe OE. Nigeria: Environmental Health Concerns. In: Editor-in-Chief: Jerome ON, editor. Encyclopaedia of Environmental Health. Burlington: Elsevier; 2011. p. 114-24.

Roll Back Malaria, Key Malaria Facts, 2012, http://www .rbm.who.int/keyfacts.html.

Parnell, S. and Walawege, R. (2011) "Sub-Saharan African urbanization and global environmental change," Global Environmental Change, vol. 21, no. 1, pp. 12–20, 2011.

Service MW. Studies on sampling larval population of Anopheles gambiae complex. Bull WHO 1971; 45:169–80.

Stratton L, O'Neill MS, Kruk ME, Bell ML. The persistent problem of malaria: Addressing the fundamental causes of a global killer. Social Science & Medicine. 2008;67(5):854-62. Doi: http://dx.doi.org/10.1016/j.socscimed.2008.05.013.

Wilkinson R, Marmot M. Social Determinants of Health: The Solid Facts. Geneva: World Health Organisation, 2003.

Williams HA, Jones COH. A critical review of behavioral issues related to malaria control in sub-Saharan Africa: what contributions have social scientists made? Social Science & Medicine. 2004;59(3):501-23. Doi: http://dx.doi.org/10.1016/j.socscimed.2003.11.010.

World Health Organisation. Africa Malaria Report 2003. Geneva: World Health Organisation, 2003.

World Health Organisation. World Malaria Report 2010. Geneva: World Health Organisation, 2010.