Health & Place 25 (2014) 47–55

Contents lists available at ScienceDirect

Health & Place

journal homepage: www.elsevier.com/locate/healthplace

Perception and trends of associated health risks with seasonal climate variation in Oke-Ogun region, Nigeria

Grace Oloukoi [a,*], Urmilla Bob [b], Jyoti Jaggernath [b]

[a] Department of Environmental Management, Lead City University, Box 30678, Ibadan, Nigeria
[b] School of Environmental Studies, University of Kwazulu-Natal, South Africa

ARTICLE INFO

Article history:
Received 13 November 2010
Received in revised form
19 September 2013
Accepted 26 September 2013
Available online 21 October 2013

Keywords:
Climate variability
Health risks
Diseases
Adaptation
Oke-Ogun region

ABSTRACT

This paper investigates the perceived and observed trends of associated health risks with seasonal climate variability and identifies types of and preference for adaptation strategies that are available at households and community levels in Oke-Ogun region, Nigeria. The study made use of household survey and rapid appraisal through focus group discussion and key informant interviews. For a short term climate–health impacts analysis, cases of notable diseases were correlated with monthly mean temperature and rainfall for the period 2006 and 2008. The findings show similar trends in relation to local perception on climate–health risks and observed cases of some notable diseases during seasonal changes. Diarrhea, measles and malaria were prevalent during dry season, while flu cases increased at the onset of harmattan and monsoon of rainy season. Available adaptation strategies are autonomous, mostly in the form of treatment measures such as consultation with medical officers in hospitals (17.5%), self-medication (34%) and use of traditional therapy such as herbs (48.5%). Traditional therapy is mostly preferred and approved based on long-term experience of the study population.

1. Introduction

The concern to examine the effects of climate change on human health is linked to other global changes such as population growth, urbanization, development policy, land use and the depletion of ecosystems goods, that themselves have implications for health (Frumkin et al., 2008; Haines and Patz, 2004; Haines et al., 2006a). Understanding climate–health interlinks is important to raising concerns for intergenerational health equity and to further investigate the nexus between health and environmental factors (Costello et al., 2009; Frumkin and McMichael, 2008; Haines et al., 2006b). The link is significant because, an estimated one-quarter of the global disease burden is associated with environmental risk factors (Prüss-Üstün and Corvalán, 2006). These risk factors include: biological pathogens, chemical pollutants, physical hazards, and natural resource degradation. Changing climates are set to worsen the problem. By 2030, an estimated 310 million people are expected to have suffered ill health from climate change while nine out of 10 of these people will be in developing countries (International Institute for Environment and Development (IIED), 2011). Confalonieri et al. (2007) in the Intergovernmental Panel on Climate Change (IPCC) report indicated that climate change effects on human health is evident in altered distribution of some infectious disease vectors (medium confidence); altered seasonal distribution of some allergenic pollen species (high confidence), emergence and re-emergence of some vector-borne diseases. However, the greatest impacts of climate change are on those who have the least access to the world's resources and who have contributed least to its cause; thereby increasing health inequity with negative effects on the social determinants of health in the poorest communities (The Lancet Commissions, 2009).

Some studies have shown how changes in climate impact human health. For example, changes in temperature and rainfall may affect the distribution of disease vectors such as those of malaria, dengue and diarrhea (Ebi et al., 2006). High rise of mortality is observed in hot weather as shown by more than 2000 excess deaths that were reported in England and Wales during the major heat wave that affected most of Western Europe in 2003 (International Human Dimension Programme (IHDP), 2011). Climate can also trigger the impact levels of industrial air pollutants, with increase in cases of respiratory diseases (Jaggernath, 2012). It has also been reported that climate variability could trigger the vulnerability of slum dwellers, depending on other environmental intricacies and their health security outcomes (Cazelles et al., 2005). In most cases, the impact is skewed to further add to gender vulnerability, especially in elderly people and young children (Ebi et al., 2005; Sakdapolrak et al., 2011).

In addition, climate change impacts on public health by regional conflicts over food and water shortages (McMichael et al., 2006; Singh et al., 2001). Increases in temperature have

* Corresponding author. Tel.: +234 8052163358.
E-mail addresses: oreofeadeniji@yahoo.com, oloukoi.g@lcu.edu.ng (G. Oloukoi), bobu@ukzn.ac.za (U. Bob), 200000983@ukzn.ac.za (J. Jaggernath).

1353-8292/$ - see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.healthplace.2013.09.009

been noted to be associated with food poisoning as indicated in studies conducted in UK, Peru and Fiji (Bentham and Langford, 1995; Checkley et al., 2000; Parmesan and Yohe, 2003). Heavy rainfall/flooding and outbreaks of diarrhea is common in tropical and subtropical regions that are crowded and impoverished (Weiss and McMichael, 2004), especially as a result of contamination of waters and soil with dangerous chemicals (Manuel, 2006).

As a result of data availability, empirical analysis are available from the developed countries showing the link between climate change and health related risks, even though developing countries are more impacted (Haines et al., 2006a; Ramin and McMichael, 2009). For instance, climate change is expected to raise the number of people vulnerable to global warming in Africa while distribution of vector borne diseases, such as malaria would respond most promptly to localized warming events in some parts of the sub-Saharan Africa in particular (Lafferty, 2009; McMichael et al., 2008, 2006). Early hypothesis about climate change and vector borne diseases in general proposed that increased temperature and precipitation towards temperate regions could facilitate the emergence and persistence of *Anopheles* mosquitoes with increase in incidence of malaria (Ebi et al., 2005; Harvell et al., 2002; Martens and McMichael, 2002; Tonnang et al., 2010). Peterson's model (2009) predicts a reduction of 11.3–30.2% in the percentage of the overall population living in areas climatically suitable for vector borne species in coming decades, but reductions and increases are focused in different regions: malaria vector suitability for example is likely to decrease in West Africa, but increase in eastern and southern Africa.

Despite various global interventions on health for all, nearly 250 million people, mostly children, were affected by the malaria in the sub-Saharan Africa on annual basis (WHO, 2009). African continent generally is more vulnerable to hostile climatic conditions because it has less health related resources; large proportions of her population have poor access to health care, water and sanitation services; has lower income levels and exhibits lower life expectancy (Bloom and Sachs, 1998; Boko et al., 2007; Tang et al., 2009). According to Robinson and Clark (2008), Africa carries 25% of the world's disease burden, yet has only 3% of the world's health workers and 1% of the world's economic resources to meet the challenge. Poverty and low human development also contribute to the impacts of climate health risk in Africa (Tol et al., 2007). For example, malaria remains inextricably linked with poverty of the six highest burden countries (in order of estimated number of cases): Nigeria, Congo, Tanzania, Uganda, Mozambique and Cote d'Ivoire. These six countries account for an estimated 103 million (or 47%) of malaria cases in the sub-Sahara Africa region (WHO, 2012). Some works have also examined the socio-economic and demographic effects of climate to health at sub regional level (Blashki et al., 2007; Dell et al., 2008; Tol, 2008; Tol et al., 2007). Previous studies are mostly focused on individual climate-sensitive health hazards in some African countries with generalized policy interventions (e.g. McMichael et al., 2006; Haines et al., 2006b). However, little is known about sub-national contexts especially for marginalized communities.

In Nigeria, climate change has been observed to alter the life cycle dynamics of infectious parasites, further influencing transmission potential, and most diseases burden is associated with deficient hygiene and sanitation (The Ministry of Environment of the Federal Republic of Nigeria, 2003). Sea level rise and increased coastal flooding in particular have also favoured vector species such as *anopheles subpictus*, thereby increasing the burden of vulnerable coastal communities (Adelekan, 2009). Most of the available data in Nigeria context have been at national level, focusing mainly on incidence of diseases and long term effects. But not much is known about their effects and propagation at specific local spatial scales with focus on short term trend analysis that can be accommodated within the available local adaptive capacity. This paper argues that previous focus is too general and has the risk of missing out specific, health needs at micro level and the inputs of community perceptions that always provide pathways for local adaptation (Heltberg et al., 2008).

In addition, considering the fact that regions and communities within a country are not homogenous in terms of microclimate systems and local understanding, this paper identifies the similarity between community perceptions on health risks impacts and cases of some notifiable diseases during seasonal climate variation to explain the short term effects. This approach is important because, local perception provides public understanding, translation and response to the cause–effect of climate change and human health and how these may influence short term policy intervention (Bickerstaff, 2004; Brody et al., 2004; Scammel et al., 2009); and the long-term implications on health outcomes in developing countries such as Nigeria. This article, therefore, adds to the evidence in the literature by providing location perspectives and incidence of health risks that are associated with seasonal climate variability; identifies available analogous climate health adaptation and preference factors for choice of adaptation by households and communities in Oke-Ogun region in Nigeria.

2. Data and methods

2.1. The study area

Oke-Ogun Region is located between latitudes 7°39′ and 9°10′N and longitudes 2°40′ and 4°20′E in Oyo State, Nigeria, West Africa (Fig. 1); located within the savannah zone with distinct rainy season (April–September) and dry season (October–March). Average annual rainfall is 1400 mm while average temperature is 26 °C. In recent times, there have been variations in the number of wet and dry seasons per annum and some other ecosystem alteration and climate modification. For example, a double peak period (bimodal trend) of precipitation pattern between 1989 and 2008 is observed in the region (Adeniji-Oloukoi et al., 2013) while ecosystems degradation with significant impacts on the water footprint is observed (Fasona et al., 2013).

The population of the region is increasing with addition of 55.2% between 1991 and 2008 (Adeniji-Oloukoi et al., 2013). Livelihood activities of the population are ecosystem based. Majority of the household incomes (56%) clustered between 7500 and 30,000 Naira (less than 200USD) monthly. Oke-Ogun residents depend on surface water such as rivers and subsurface water such as well, ponds and hand pump boreholes for domestic uses. During the dry season, 67% have access to less than 20 l per person per day (LPD) of water from protected sources. Most local communities in the region are underserved by medical personnel. For instance, doctor to population ratio is 1–100,000 while nurse to population ratio is 1 to every 10,000, community health officer is 1–5000 persons. In terms of development, the region is generally marginalized and characterized by poor access to social infrastructure.

2.2. Study approach and sampling procedure

The study was done during the dry season (between December 2008 and February 2009) in order to capture the temporal variation. A case study research approach was used while the sampling procedure was multi-staged (four stages) stratified technique. First, the three oldest local government areas (LGAs) out of the existing 10 in the region were purposefully selected because each of them represents federal constituency in Nigeria. These were Iseyin, Kajola and Shaki West. Second, the selection of