

Chapter 52

Climate Change Effects on Human Health with a Particular Focus on Vector-Borne Diseases and Malaria in Africa: A Case Study from Kano State, Nigeria Investigating Perceptions about Links between Malaria Epidemics, Weather Variables, and Climate Change

Salisu Lawal Halliru
Federal College of Education Kano, Nigeria

ABSTRACT

Malaria is currently affecting more people in the world than any other disease. On average, two members of each household suffered from malaria fever monthly, with females and children being most vulnerable to malaria attacks. This chapter assessed communities' perception about malaria epidemic, weather variable and climate change in metropolitan Kano. Information was extracted related to communities' perception about malaria epidemic and climate change. Socio demographic characteristics of respondents in the study areas were extracted and analyzed. 75% of the participants were males, while 25% were females, malaria disease affected 79.66% and 59.66% respondent perceived that heavy rainfall, floods and high temperature are better conditions to the breeding and spread of malaria vectors. Hospital records revealed that Month of March and April (2677 and 2464, respectively) has highest number of malaria cases recorded between December 2010 to June 2011. Further research is recommended for in-depth information from health officials related to raising awareness.

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INTRODUCTION

This chapter covers the effect of climate change on human health with a particular emphasis on vector-borne diseases and malaria with focus in Kano metropolitan Nigeria with a view to investigate community perceptions about links between malaria epidemics, weather variables and climate change.

BACKGROUND

Malaria is currently affecting more people in the world than any other disease. It is currently endemic in over 100 countries and one of the 10 most prevalent and deadly diseases in the world (WHO, 2002). Apart from being one of the world's dreaded killer diseases, its prevalence has become a local and an international public problem. Malaria causes about 273 million clinical cases and 1.12 million deaths annually. More than 40% of the global population (> 2.1 billion people) are exposed to the malaria (Toure and Oduola, 2004). Malaria is caused by five distinct species of plasmodium parasite (*Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium malariae*, *Plasmodium ovale*, *Plasmodium knowlesi*) and is transmitted by Anopheline mosquitoes. (IPCC WGII AR5, 2013)

The current distribution of malaria is currently confined to tropical areas and poorer countries. The burden of mortality is unevenly distributed, with approximately 85% of all deaths and disease occurring in Africa. The distribution of malaria in the 1870s was at the peak of its global spread. This was when global trade routes had allowed the infections to be spread to the New World, and before the development of active control measures allowed disease reduction (McMichael et al., 2000). In Africa, malaria is responsible for up to 50% outpatient department (OPD) cases and 20% admission (WHO, 2006). Many families spend a significant portion of their income on malaria treatment. For example, estimates indicate that the direct cost of a single episode of malaria to a household was US\$ 6.87 in Ghana, US\$ 4.8 in Uganda and US\$ 4.5 in Mali (WHO, 2006).

The relationship between economic development and malaria is two-way. Poor economic development is an effect of malaria as well as a cause. The direct costs of treating and preventing malaria morbidity and lost productivity are considerable, in relation to available funds in a developing country. Further, malaria has been shown to slow economic growth in low income African countries creating an ever-widening gap in prosperity between malaria-endemic and malaria-free countries. The reduced growth in countries with endemic malaria was estimated to be over 1% of GDP per year. The cumulative effect of this "growth penalty" is severe and restrains the economic growth of the entire region (Sachs, 2001).

The health impacts of climate variability and change are increasing. Studies in South Africa have focused on climate sensitive health outcomes including diarrheal, respiratory, cardiovascular health, and vector-borne infectious diseases such as malaria (Myers et al, 2013, Myers et al, 2011). Long-Term Adaptation Scenarios (LTAS) indicate climate change's potential impact on vector borne disease (DEA, 2013). Although the incidence of vector-borne infectious diseases, especially malaria, has declined in the South African context over recent years. Modeling predicts no overall increase in malaria incidence for sub-Saharan Africa but a shift from west to south and east driven by climate change impacts (Peterson, 2009; Byass, 2009).

Malaria was associated with rainfall and minimum temperature (with the strength of the association varying with altitude). In Ethiopia, temperature determines the timing and abundance of mosquitoes following adequate rainfall, which contributes to the availability of breeding site. For rainfall to have a

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