

Impact of Climate Change on Climate Sensitive Vector Borne Diseases

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Introduction

As per the sixth assessment report of inter-governmental panel on climate change (IPCC) published in 2022, four out of 10 people lives in those parts of the world that are highly susceptible to Climate change.

Vector Borne Diseases are spread by vectors. Vectors are living organisms like mosquitoes, flies and ticks that transmit infectious microorganism from an infected animal to another animal or human. According to the WHO there are 15 major vector-borne diseases of global concern and eight amongst them are considered as neglected tropical diseases these include Dengue, Chikungunya, Leishmaniasis, Lymphatic Filariasis, Schistosomiasis, Onchocerciasis, Chagas disease, African trypanosomiasis. Further in Malaria, Dengue and Chikungunya human are the primary hosts.¹ In 2020 worldwide there were 241 million cases of malaria and it was the predominant killer of human amongst the list of VBDs with an estimated 627,000 deaths mainly in the African region, followed by dengue which was primarily affecting Asians and caused 40,500 deaths.²

The World Health Organization has considered Climate change as one of the greatest threats to human health. During the last 10 years global warming occurred at unprecedented level when compared with past millennium.³ Climate change has a direct effect and impact on human health through changes in rainfall and temperature, air quality, sea-level rise in lowland coastal regions, extreme climate conditions such as heat waves, hurricanes, and flash floods etc.⁴

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Climate change imposes new risks and also creates new uncertainties about spread of these VBD by changing the optimum conditions needed for the development and dynamics of the vectors and pathogen they carry.

All VBD are effected by climate and climate can effect vectors as;

1. there is an increase in places which are suitable for the growth of vectors:- For example if there is more rainfall there is rise in standing water which is an ideal breeding condition for most of vectors. Similar is the situation in case of drought where there are pools of standing waters from previously flowing water. Finally warmer temperatures increase the geographic spread where vectors can breed and survive. In case of drought .
2. Due to the rising global temperature there is an extension in the duration of disease transmission season of VBDs.
3. Rising temperature also effects the biting behavior of vectors particularly mosquitoes.

According to fifth assessment of inter-governmental panel on climate change (IPCC) although VBD are well studied in relation with climate change but the direction of change is difficult to predict. As dengue fever, Chikungunya are emerging in areas where they were previously not present. There is a need for studies to find out the reasons that could either be due to an increase in temperature or global trade and travel, change in land use, demographic shift, water availability etc.

There are many evidences in recent past that climate change has affected the relationship of pathogen, vector and host. Further in some parts of the globe there is change in burden of animal VBD and also sever VBD outbreaks in humans in areas affected by any natural calamities as is the case of recent floods that have badly hit the vast areas of Pakistan. According to the official statistics around 33 million people have been affected, more than 1700 people died, more than 900 health facilities have been badly affected and 180 of them completely destroyed resulting in millions of people

lacking access to health care. Further there are many reported outbreaks of Malaria, Dengue and Diarrhea in flood affected districts of Pakistan.

To conclude we can say that although scientists have already anticipated the spread of vectors and pathogens but there is an alarm that similar or even worse situations and trends will arise if we failed to mitigate climate change and if the threats due to it (e.g. use of insecticide and drug resistance) continued to exist and be on the rise.

Conflict of interest: None declared.

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