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HUMAN INFECTIOUS DISEASES AND CLIMATE CHANGE

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ABSTRACT

Climate change has an impact on biodiversity and is projected to become a progressively more significant threat in the coming decades. Global climate change shows significant environmental health hazards faced by humankind. The effects of climate variability are large anomalies in temperature and rainfall in a particular season. An extreme of heat causes heat exhaustion, cardiovascular diseases. Intense cold spells leads to hypothermia and cardiovascular disease. Extreme rainfalls, storms and tropical cyclones are responsible for increasing the risk of infectious diseases (water, food and vector-borne diseases). Some of the infectious diseases causing agents are protozoan, bacteria, viruses, mosquitoes, tsetse flies, sand-flies, ticks, flukes and water-snails. These diseases can be prevented by protecting the environment, educating people on personal hygiene, sanitation and use of potable water.

Keywords: - Human Health, Vector-borne, Water-borne, Infectious Diseases, Climate change

INTRODUCTION

Climate change is the change around the average climate, including large-scale seasonal variations in atmospheric and ocean circulation. Climate change has an impact on biodiversity, and is projected to become a progressively more significant threat in the coming decades. Loss of Arctic sea ice threatens biodiversity across an entire biome and beyond. The related pressure of ocean acidification, resulting from higher concentrations of carbon dioxide in the atmosphere, is also already being observed. Ecosystems are already showing warming temperatures, more frequent extreme weather events and changing patterns of rainfall and drought can be expected to have significant impacts on biodiversity (SCBD, 2010).

Climate change and worldwide loss of biodiversity are issues of global scope and importance that have recently become subjects of considerable public concern due to cause and spreading of diseases. Global climate change shows significant environmental health hazards faced by humankind. The global scale makes for unfamiliarity— although most of its health impacts comprise increases (or decreases) in familiar effects of climatic variation on human biology and health. Traditional environmental health concerns long have been focused on toxicological or microbiological risks to health from local environmental exposures. However, in the early years of the twenty-first century, as the burgeoning human impact on the environment continues to alter the planet's geological, biological and ecological systems, a range of larger-scale environmental hazards to human health has emerged. In addition to global climate change, these include: the health risks posed by stratospheric ozone depletion; loss of biodiversity; stresses on terrestrial and ocean food-producing systems; changes in hydrological systems and the supplies of freshwater; and the global dissemination of persistent organic pollutants (McMichael et. al. 2003).

MATERIAL AND METHODS

As the material and method, corresponding author was contacted to the senior doctors, medical survey representatives and social NGOs that are directly related to the public health in different urban and rural region. A methodology is allowed to access a diverse range of sources like printed materials, internet, books, journals and articles etc. In the present study authors are illustrate the effect of climate change on some health related issues of human beings, rather than to catalogue all the issues.

RESULTS AND DISCUSSION

As the climate changes, there are going to be an increasing impact on human health. Temperatures will rise and lead to an increasing frequency of heat waves, ultimately increasing incidences of illness and death in India. Food and water supplies will be affected and the rate of disease will escalate, predominantly affecting the poor and marginalized who are often forced to live in overcrowded conditions with limited access to water and sanitation. As coastal populations are further displaced by rising sea levels, migration will increase, which will perpetuate levels of disease and infection due to the unstable living conditions with limited sanitation facilities and access to clean water and food (McMichael et. al. 2004).

Climate change is due the extensive fragmentation and modification of habitat by

human activities, the presence of exotic species, rate of decreasing water availability and magnitude and direction of temperature change (Janbandhu et. al. 2014). Environmental pollutants are introduced from uncontrolled use of pesticides and herbicides. Environment contaminate with mercury from unregulated gold mining, urban liquid and solid waste, including untreated sewage, introduction of invasive exotic species, unsustainable tourism, illegal hunting, traffic of wildlife, soil degradation (Shende et. al. 2015). This biodiversity loss is due to lack of education and environmental consciousness and fragility of environmental organizations. If we carry on losing biodiversity, future generations face hunger, thirst, disease and disaster. It directly and indirectly contributes many constituents of human, including security, basic material for a good life, health, good social relations, and freedom of choice and action (Shende and Patil 2013; Patil et. al. 2015).

The climate change and environmental factors are playing a major role in containing the spread of disease. Climate change, acting via less direct mechanisms, would affect the transmission of many infectious diseases (especially water, food and vector-borne diseases) and regional food productivity (Epstein 1999, McMichael et. al. 2001).

High vector and pathogen reproductive capacity, preference for humans as a source of blood meals, low life cycle complexity and high sensitivity to temperature changes result in an infectious disease. Some of the infectious diseases causing agents are protozoans, bacteria, viruses, mosquitoes, tsetse flies, sand-flies, ticks, flukes, water-snail etc.

Climate change is expected to accentuate environment-related health risks, including those from water-washed diseases (diarrhea, cholera, typhoid etc.), due to water scarcity. Rates of diarrhea, cholera and other bacterial diseases are set to rise as temperatures rise and water quality issues increase. Bacterial infection from contaminated water is expected to increase as heavy rainfall and rising temperatures lead to pollution of drinking and recreational waters. The occurrence of *Salmonella* and *E. coli*, amongst other food poisoning bacteria, are further known to be associated with rises in ambient air temperature (Fleury et. al. 2006).

During the summer season food-borne infections (e.g. salmonellosis) may show longer-lasting annual peaks. The complexities of interactions between environment and host are the vector-borne diseases. The quality of air is likely to decrease as surface ozone concentrations begin to rise with increasing temperatures. This will lead to an increasing incidence of asthma and other cardiovascular and respiratory diseases (Liggins, 2008).

With climate change, geographical ranges and survival of species bearing diseases will vary. Southgate and Agrawal (1990) were discovered human schistosomiasis in Gimvi village, Ratnagiri District, Maharashtra State. Warmer, wetter climes, particularly during breeding season, could enable malarial mosquitoes to spread their range and survive longer, leading to increased rates of dengue fever and schistosomiasis (Battacharya et. al. 2006).

The incidence on malaria is high in many parts of the country. Indian cities are the major reservoirs of vector-borne diseases such as malaria and dengue fever; it can be increase morbidity risks. Additional research needs to be undertaken on the potential impact of water scarcity and flooding on environmental health conditions in cities and their consequent impact on morbidity, mortality and productivity. Malaria is expected to expand from its currently endemic range in eastern and north eastern India to western and southern India, thereby placing a large incremental population at risk (Bhattacharya, 2006).

Malaria-carrying mosquito populations can increase tremendously within a very short time. Equally the *Plasmodium* parasite species proliferates rapidly in both mosquito and human hosts. In contrast, tsetse flies have a low reproductive rate and their populations take much longer to increase under favorable conditions. Hence, infectious diseases transmitted by the tsetse fly (human sleeping sickness) respond less rapidly to variations in climate than do many mosquito-borne infections. Vectors' ability to transmit disease is also affected by feeding frequency. In India, a farmer from the village of Shivani (district of Chandrapur) 140 km from Nagpur in the central State of Maharashtra, has been identified as the first confirmed recorded case of human trypanosomiasis.

Hard ticks (such as the vectors of Lyme disease) feed more frequently and for shorter periods than soft ticks. Hard ticks therefore tend to be much more efficient vectors of human diseases. A 45-year-old lady from the Nagarhole forest in South India

presented with a history of tick bite followed by Lyme disease.

Vector-borne infections, the distribution and abundance of vector organisms and intermediate hosts are affected by various physical (temperature, precipitation, humidity, surface water and wind) and biotic factors (vegetation, hostspecies, predators, competitors, parasites and human interventions). Various integrated modelling studies have forecast that an increase in ambient temperature would cause worldwide, net increases in the geographical distribution of particular vector organisms (e.g. malarial mosquitoes) although some localized decreases also might occur. Further, temperature related changes in the life-cycle dynamics of both the vector species and the pathogenic organisms (flukes, protozoa, bacteria and viruses) would increase the potential transmission of many vector-borne diseases such as malaria (mosquito), dengue fever (mosquito) and leishmaniasis (sand-fly)—although schistosomiasis (water-snail) may undergo a net decrease in response to climate change (Patz, J.A. et al. 1996 and Martens, 1998).

We can prevent environmental health problems and associated communicable and non-communicable diseases by educating people on personal hygiene, sanitation and use of potable water. We must focus on disease surveillance, control of vector-borne diseases and immunization. National Vector Borne Disease Control Programme in India is pursuing an integrated approach for the containment of many vector-borne diseases such as malaria, Lymphatic Filariasis, Kala-azar, Dengue and Chikungunya and Japanese Encephalitis in many high-risk areas.

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