iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 12 **Issue:** VII **Month of publication:** July 2024

DOI: https://doi.org/10.22214/ijraset.2024.63730

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue VII July 2024- Available at www.ijraset.com

Impact of Climate Change on Human Health - A Systematic Review

Gogoi E[1], Baishnab N[2], Dey A. K[3], Bhowal R[4], Dasgupta N[5], Sharma J[6]
[1, 2]*Project Fellow/Junior Research Fellow (JRF), Multi Disciplinary Research Unit, Silchar Medical College & Hospital*
[3]*Associate professor, Department of community medicine, Silchar Medical College & Hospital*
[4]*Assistant Professor, Department of Biochemistry & Nodal Officer, Multidisciplinary Research Unit, Silchar Medical College & Hospital,*
[5]*Scientist C, Multi Disciplinary Research Unit, Silchar Medical College & Hospital*
[6]*Scientist B, Multi Disciplinary Research Unit, Silchar Medical College & Hospital*

Abstract: ***This systematic review aims to collect information regarding the intricate impacts of climate change on human health. A thorough search of the peer-reviewed literature was used to select research according to predetermined inclusion criteria. Significant health hazards are associated with climate change through a number of pathways, such as heat-related illnesses, a rise in the prevalence of vector-borne diseases, air pollution-induced respiratory ailments that worsen, and food insecurity. Some important discoveries and new trends from a thorough analysis of the large body of research on the direct and indirect consequences of climate change on human health.***
Keywords: climate change, human health, health hazards, vector-borne diseases, air pollution.

I. INTRODUCTION

Human health is thought to be greatly impacted by climate change. The impact of climate change on human health is significant and multifaceted, affecting individuals directly and indirectly through various mechanisms. Unfavourable health consequences resulting from climate change include heat-related illnesses, poor air quality, increasing sea levels, insecurity in food and water, severe weather, and disease transmission. In addition to stress-related mental health issues, these repercussions include hormone imbalances, economic instability, and forced migration, with vulnerable groups including children, the elderly, and the impoverished being particularly at danger. Small changes in temperature or precipitation have a profound effect on the transmission of disease and the persistence of chronic illnesses. [9].The accumulation of greenhouse gases in the atmosphere will cause changes in Earth's climate, as demonstrated by climatological research conducted over the previous 20 years. The extremely rapid increase in temperature by 0·5ºC since the mid-1970s can be mostly attributed to the increase in greenhouse gases caused by human activity. This study was done with an aim to

- To explore community perception regarding health impact due to climate change.
- To identify the factors affecting community engagement in adaptation to climate change.
- To design community driven actions steps for community engagement process to adapt to the health impacts of a changing climate.

A. Heat-Related Mortality

Climate variables and climate change have a number of detrimental effects. Climate has an impact on people's health, physical wellness, food, water, and air quality. [13] Many papers have been published, for example, on the association of heat waves with mortality excesses. A study by Casimiro et al., (2006) provides potential impact of climate change in Portugal. They observed mortality related to heat, negative effects of air pollution, as well as some vector- borne diseases. Furthermore, they have estimated that Lisbon's annual heat-related mortality rate could increase from 5.4 to 6 per 100,000 in 1980 to 1998 to 8.5 to 12.1 by the 2020s and up to a maximum of 29.5 by the 2050s if no changes are made. [2] Haines and Patz (2004) also reported excess death in heat weaves is due to cardiovascular diseases, respiratory diseases, cerebrovascular in elderly persons and person who has illness. Similarly, Singh and Dhiman (2012) also shows the Heat-wave-related deaths, the significance of respiratory illnesses linked to poor air quality, catastrophic floods, starvation brought on by a decline in rice, maize, and sorghum crops, etc.

©IJRASET: All Rights are Reserved

Weather has a direct impact on human health by increasing mortality rates from natural disasters including floods, cyclones, and rising temperatures, as well as through harm to water supplies and vector-borne diseases, malnourishment, and respiratory illnesses. Furthermore, various physiological systems as well as kidney and cardiovascular problems are negatively impacted by climate change. [6,13].

B. Vector-borne and Water-borne diseases

Climate change can significantly impact the distribution and prevalence of vector-borne and water-borne diseases. Water-borne diseases such as diarrheal diseases such as giardiasis, salmonellosis, and cryptosporidiosis may become more frequent in a warmer climate. Among South Asia, infections caused by diarrhea are already a significant contributor to morbidity and mortality, especially among children.[3] It has been shown that climate change can affect the geographic distribution and behavior of vectors such as mosquitoes and ticks that transmit diseases such as malaria, dengue fever, and Lyme disease. Warmer temperatures can enhance the habitat of these vectors, allowing them to thrive in areas where they were previously unable to do so. Additionally, changing precipitation patterns can create breeding grounds for mosquitoes. Since human viruses spread indirectly by insects or rodents spend a lot of time away from their vertebrate hosts, environmental factors can readily impact them. Each vector-borne infection and its vector can only live and reproduce in a restricted range of acceptable environmental conditions. Changes in temperature and humidity can significantly affect the incubation period of a vector-borne infectious pathogen within its vector. [11]. One of the most relevant instances of a vector-borne disease that is becoming more common in South Asia is malaria. In Bangladesh, malaria is already one of the most significant vector-borne diseases. [3]

C. Education level, Income and Health

The level of education of the respondent is also one of the important factors. Toan et al. mention in their study those respondents with a higher education had a greater awareness of climate change and its effects [14]. Many poor communities rely on agriculture, fishing or other natural resource-dependent livelihoods that are highly sensitive to climate variations. Droughts, floods and extreme weather events can devastate crop and disrupt livelihoods, leading to food insecurity and economic instability. Garg divided people into three income categories in order to study the effects of urban air pollution on health. Compared to the medium- and high-income groups, the low-income groups have worse overall health conditions. In addition, he came to the conclusion that urban households with low and moderate incomes had greater death rates. Haines et al. (2006) also reported about high- & low-income countries. Their study indicates that the main effects of climate change are predicted to be detrimental to health, with the most severe effects being seen by the most vulnerable populations in industrialized countries and low-income countries where adaptation capacity is lowest. Although the implementation of adaptation techniques is expected to provide some obstacles, particularly for low-income nations, it should also help mitigate some of the negative impacts.[4,5].

D. Drought

Drought is also one of the climatological effects which can impact on human health. Drought can impact food and water security, infectious disease and injury rates, respiratory and mental health, and problems related to toxin exposure. Yusa et al. (2015) studied the impact of drought in Canada. Haines and Patz (2004) also reported the same. Drought has a negative impact on food production, cleanliness, and public health in underdeveloped nations because water is mainly used for cooking rather than cleaning. As a result of changes in vector breeding sites, Malaria outbreaks can also happen when there is a drought. According to their study, populations in poor nations are likely to be vulnerable to floods because they live in high-risk areas like coastal areas and flood plains, have inadequate public health facilities, and suffer comparatively greater economic losses. Physical injuries and diarrheal illness are more common, particularly in developed nations where malnutrition is a significant issue. [6,15].

E. Other diseases and effects

Kidney and cardiovascular disorders are worsened by climate change through a variety of processes. Heatwaves occur more frequently as a result of rising temperatures, which stresses and dehydrates people, straining their hearts and kidneys. Increased smog and wildfires exacerbate air pollution, which causes respiratory issues that strain cardiovascular health and impede renal function. Natural catastrophes linked to climate change also cause disruptions to the healthcare system, which restricts access to necessary therapies. All things considered, the burden of renal and cardiovascular illnesses increases due to climate change, putting human health and wellbeing at risk.

©IJRASET: All Rights are Reserved

According to the study by Kjellstrom et al. (2009), they also reported the same. Additionally, they found that there are several ways in which the increased exposure of the population to heat and other environmental changes brought on by global climate change can have a detrimental effect on NCDs, or non-communicable diseases, which can cause acute or chronic illness. These mechanisms include the increased risk of chronic disease caused by climate change and other factors like air pollution, malnutrition, and extreme weather events..[8] Whereas, in the study by Brubaker et al. (2011) provides adverse health effects in Northwest Alaska. There have been many unexpected weather and environmental conditions in Northwest Alaska as a result of warming, including a delayed freeze-up, earlier breakup, storm surge, coastal erosion, and permafrost thawing. They have found that as a result of climate change, people are becoming more vulnerable to injury, disease, mental stress, hunger and water shortages.[1] Orimoloye et al. (2018) mentioned the same and examined the evidence regarding the effects of climate change on urban areas and human health. The findings of this study suggest that adverse weather conditions may play a major role in the emergence of a number of heat-related illnesses, including skin cancer, heat stroke, heart disease, and diarrhoea.[10]. Reduced population growth, international trade, bilateral aid, and technical help are all important means of promoting equitable and sustainable economic growth, as highlighted by Ramin and McMichael (2009). In addition, the study's conclusion emphasized how climate change has a wide range of implications on health and well-being, including effects on communities, families, and future generations. It suggests that interventions for climate change and socioeconomic development should consider multiple sources of vulnerability.[12]

Author	Year	Country/ study area	Climatological effect	Findings	Reference no
Haines & Patz	2004		Flood, Drought, heat waves, water/air pollution.	Developing countries are more vulnerable as it has a high risk of health issues, outbreak of water/air born diseases, infectious diseases, arboviruses, psychiatric disorders, economic and environmental losses.	6
Casimiro et al.	2006	Portugal	High temperature, air pollution.	Increased temperatures have the potential to worsen the spread of zoonoses including Mediterranean spotted fever, Lyme disease, and leishmaniasis, which are currently endemic to Portugal.	2
Kjellstrom et al.	2009		Malnutrition, Air pollution and extreme weather events.	Climate factors and climate change have detrimental effects on certain physiological processes, as well as on kidney and cardiovascular disorders.	8

Ramin & McMichael	2009	Sub-Saharan Africa	Multiple stresses from climate change	implications on agriculture and food security, droughts, floods, malaria, and population relocation, among other environmental or social effects of climate change that have an influence on health.	12
Brubaker et al.	2011	Northwest Alaska	Unusual meteorological and environmental circumstances, such as thawing permafrost, storm surge, early or delayed disintegration, and coastal erosion .	Growing susceptibility to illness, trauma, mental strain, and shortages of food and water	1
Garg	2011	Delhi	Air pollution	The health impacts are estimated for mortality & morbidity.	4
Jankowska et al.	2011	Mali, Africa	Heat waves, poor air quality.	Heat waves related deaths, agricultural loss, malnourishment, anemia and underweight appear in the humans, and presuming unchanged morbidity levels	7
Singh & Dhiman	2012	India	Heat wave, Air pollution	Heat-wave-related deaths, the significance of respiratory illnesses linked to poor air quality, catastrophic floods, starvation brought on by a decline in rice, maize, and sorghum crops, vector-borne diseases.	13
Toan et al.	2014	Hanoi, Vietnam	Heavier rainfall and higher temperatures.	Headaches, exhaustion, and light headedness were the most often reported symptoms during hot weather; hypertension and other cardiovascular disorders were also mentioned. People reported cough, fever, influenza,	14

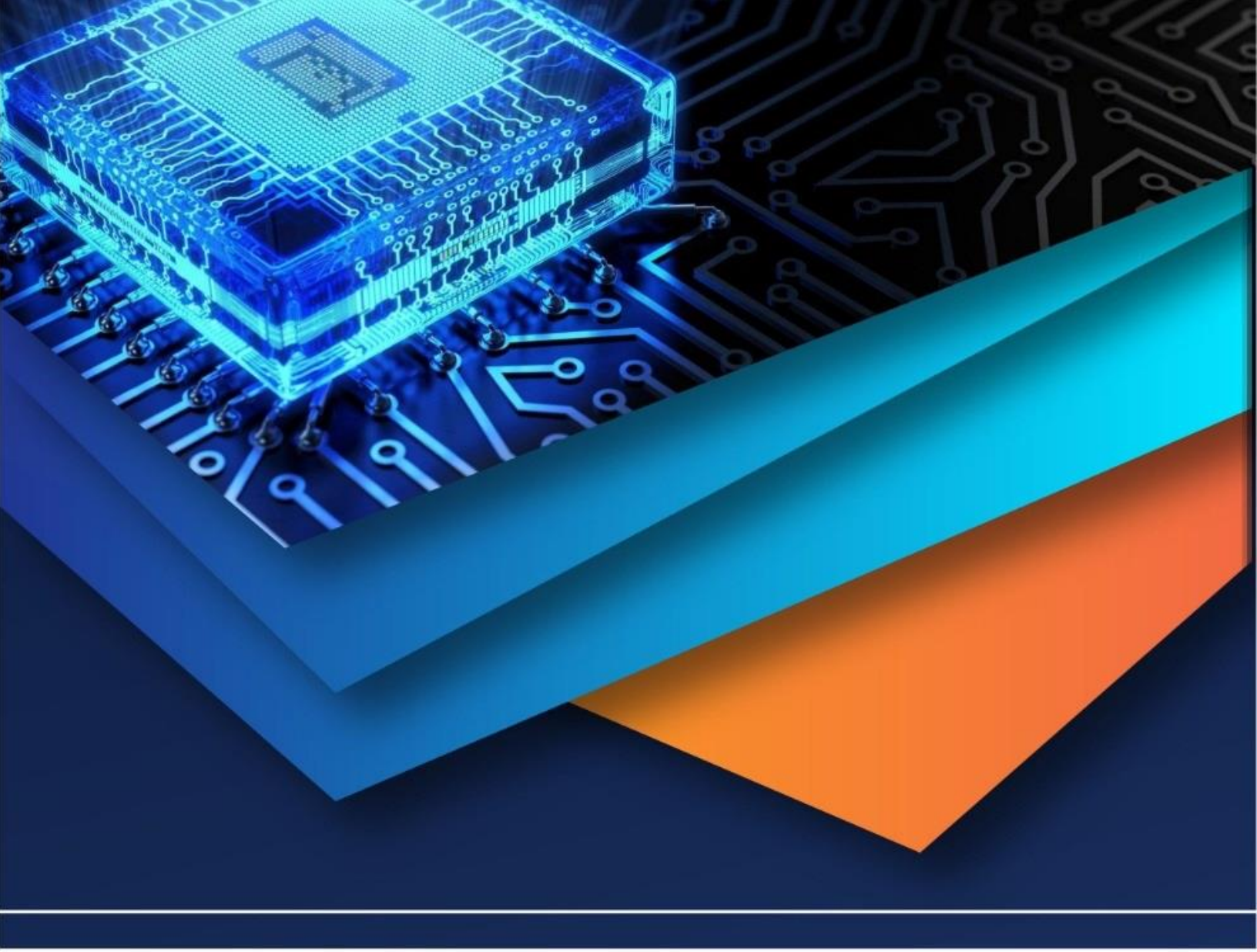
				pneumonia, and newly discovered infectious diseases like dengue and Japanese encephalitis during the cold weather.	
Yusa et al.	2015	Canada	Drought	The effects of drought can include respiratory health, mental health, toxic exposure-related illnesses, food and water security, injury rates, and infectious disease rates.	15
Orimoloye et al.	2018	Urban Region	Higher temperature	Extreme weather events have a major impact on heat-related illnesses, such as skin cancer, heat stroke, heart disease, and diarrhoea.	10

Table I: List of references by authors

REFERENCES

[1] Brubaker, M., Berner, J., Chavan, R., & Warren, J (2011). Climate Change and Health Effects in Northwest Alaska. Global Health Action. https://doi.org/10.3402/gha.v4i0.8445
[2] Casimiro, S., Calheiros, J., Santos, F. D., & Kovats, S. (2006). National assessment of Human Health Effects of Climate Change in Portugal: Approach and key Findings
[3] Dhara, R., V. & Luber, G. (2013). Climate change & infectious diseases in India: Implications for health care providers. Environment, Safety & Health Compliance Office, Centers for Disease Control & Prevention & Climate & Health Program, National Center for Environmental Health, Centers for Disease Control & Prevention, Atlanta, GA, USA.
[4] Garg, A., (2011). Pro- equity Effects of Ancillary Benefits of Climate Change Policies: A case Study of Human Health Impacts of Outdoor Air Pollution in New Delhi. Elsevier. https://doi.org/10.1016/j.worlddev.2010.01.003
[5] Haines, A., Kovats R. S., Campbell-Lendrum, D., Corvalan, C. (2006). Climate Change and Human Health: Impacts, Vulnerability and Public Health. Elsevier. Doi: 10.1016/j.puhe.2006.01.002
[6] Haines, A., & Patz, A., J. (2004). Health Effects of Climate Change.
[7] Jankowska, M. M, Carr L., D., Funk, C., Husak, J., G., & Chafe, A., Z., (2011). Climate change and human health: Spatial modeling of water availability, malnutrition, and livelihoods in Mali, Africa. Elsevier. DOI: 10.1016/j.apgeog.2011.08.009
[8] Kjellstrom, T., Butler, J., A., Lucas, M., R., & Bonita, R. (2008). Public Health Impact of Global Heating due to Climate Change: Potential Effects on Chronic Non- Communicable Diseases. In J Public Health. DOI: 10.1007/s00038-009-0090-2
[9] McMichael, J., A., Woodruff, E., R., Holes, S., (2006). Climate Change nnd Human Health: Present and Future Risks. National Centre for Epidemiology and Population Health, The Australian National University, Canberra 0200, Australia. DOI:10.1016/S0140-6736(06) 68079-3
[10] Orimoloye, R., I., Mazinyo, P., S., Kalumba, M., A., Ekundayo, Y., O., & Nel, W. (2018). Implications of Climate Variability and Change on Urban and Human Health: A Review. Elsevier. https://doi.org/10.1016/j.cities.2019.01.009
[11] Patz, J., & Olson H., S. (2006). Climate Change and health: Global to local influences on disease risk. Annals of Tropical Medicine & Parasitology, Vol. 100, Nos. 5 and 6, 535–549 (2006). https://www.researchgate.net/publication/6888343
[12] Ramin, M., B., & McMichael, J., A. (2009). Climate Change and Health in Sub-Saharan Africa: A Case- Based Perspective. Eco Health. DOI: 10.1007/s10393-009-0222-4
[13] Singh, K. P., & Dhiman C. R., (2012). Climate change and human health: Indian Context. J Vector Borne Dis 49
[14] Toan, T., T., D., Kien, D., V., Kim, B., G., Minh, V., H., & Wright, P. (2014). Perceptions of Climate Change and its Impact on Human Health: an integrated Quantitative and Qualitative Approach. Global Health Action. https://doi.org/10.3402/gha.v7.23025
[15] Yusa, A., Berry, P., Cheng, J., J., Ogden, N., Bonsal, B., Stewart R., & Waldick, R. (2015). Climate Change, Drought and Human health in Canada. https://doi.org/10.3390/ijerph120708359

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)