

Climate Change and its Impact on Public Health

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Abstract:

Climate change has become one of the biggest challenges facing the world in the twenty-first century. It affects many areas, including the environment, the economy, and people's health. This research paper looks at how climate change is connected to public health, showing how higher temperatures, changes in weather, and more frequent extreme weather events can harm people's health in both direct and indirect ways. The study explains that climate change is not just about the environment it is also a major public health problem that needs immediate action from leaders, scientists, and healthcare providers around the world. The paper looks closely at the main health effects linked to climate change, such as heat-related sickness, breathing problems, the spread of diseases carried by insects or through water, poor nutrition, and mental health issues. It also explains how air pollution, which is made worse by rising temperatures and factory emissions, makes conditions like asthma and heart disease worse.

Moreover, the study shows how problems with food production, caused by droughts, floods, and irregular rain, lead to malnutrition, especially in groups that are already at risk, such as children and people living in poverty. A major part of the research focuses on how different groups of people are hit harder by climate change. Older adults, young children, and those with less money face more risks because they have less access to medical care, weaker buildings, and fewer resources to adapt. The paper also looks at how public health systems are stretched during climate-related disasters, which can reduce access to important medical help and weaken emergency responses.

Keywords: Climate Change, Public Health , Extreme Weather Events, Air Pollution, Vulnerable Population, Food Security, Heat Related Illness, Vector Borne Disease.

Introduction:

Climate change has become one of the most important problems facing the world today. It affects nature, the economy, and people's health. It refers to changes in weather over many years, such as hotter temperatures, more rain or less, higher sea levels, and more frequent extreme weather events. These changes are mainly caused by human actions like burning coal and oil, cutting down forests, and industrial

activities. Even though climate change is often talked about in terms of the environment and the economy, its effects on people's health are also very serious and are becoming more noticeable around the world.

Public health is closely linked to the environment, so it is very sensitive to changes in the climate. Changes in temperature and weather can affect the quality of air and water, the availability of food, and the places where people live, all of which are important for staying healthy. As the world gets warmer, there are more heatwaves, floods, droughts, and storms, which can cause both immediate and lasting health problems, especially for people in poorer and middle-income countries.

Climate change also affects how and where diseases spread. Warmer weather and changes in rainfall can create better conditions for disease-carrying insects like mosquitoes and ticks, which can lead to the spread of illnesses such as malaria, dengue fever, and chikungunya. At the same time, extreme weather events can cause problems for healthcare services, damage important buildings, and make it harder for people to get the care they need, making public health issues even worse.

Besides physical health, climate change also affects mental health and the overall well-being of people. When people are forced to move because of floods, storms, or rising sea levels, they can experience stress, anxiety, depression, and trauma. Groups that are already at risk, like children, older people, and those with existing health issues, face even bigger challenges, showing that climate change is also a matter of fairness and justice in health.

It is important to understand how climate change affects public health so that we can take better steps to prevent and prepare for these challenges. By looking at how climate-related problems harm health, leaders and health experts can create strategies that make health systems stronger, reduce risks, and help people become more resilient. This paper looks at the many ways climate change affects public health and stresses the need for joined-up efforts to protect people's health in an ever-changing climate.

Objectives:

- To examine the direct and indirect effects of climate change on public health outcomes across different populations.
- To analyze the impact of climate-related factors such as heatwaves, air pollution, and extreme weather events on the spread of diseases and mortality rates.
- To assess the vulnerability of different demographic groups to climate change-related health risks, with a focus on equity and access to healthcare.
- To evaluate existing public health strategies and policies aimed at mitigating and adapting to the health impacts of climate change.

Hypothesis:

H₁: Climate change has a significant negative impact on public health by increasing the incidence of climate-sensitive diseases and health-related mortality.

H₂: Rising temperatures and extreme weather events are positively associated with higher rates of heat-related illnesses and respiratory disorders.

H₃: Vulnerable populations, including children, the elderly, and low-income communities, experience disproportionately greater health risks due to climate change.

H₄: Effective climate adaptation and mitigation strategies in public health systems can reduce the adverse health impacts associated with climate change.

Climate Change and Rising Temperature Extremes:

One of the most visible effects of climate change is the increase in global temperatures and the frequency of heatwaves. Prolonged exposure to extreme heat leads to heat exhaustion, heatstroke, dehydration, and cardiovascular stress. Urban areas are particularly affected due to the heat island effect, increasing health risks for elderly people, outdoor workers, and those with pre-existing illnesses.

Impact on Air Quality and Respiratory Health:

Climate change worsens air pollution by increasing ground-level ozone and particulate matter through higher temperatures and forest fires. Poor air quality aggravates respiratory conditions such as asthma, bronchitis, and chronic obstructive pulmonary disease (COPD). Long-term exposure can also increase the risk of lung cancer and other non-communicable diseases, placing a heavy burden on public health systems.

Spread of Vector-Borne and Infectious Diseases:

Changing climate conditions influence the survival and reproduction of disease-carrying vectors like mosquitoes and ticks. Warmer temperatures and altered rainfall patterns expand the geographical spread of diseases such as malaria, dengue, and

chikungunya. Flooding and water contamination further increase the risk of water-borne diseases like cholera and diarrhoea, especially in regions with inadequate sanitation.

Food Security and Nutrition Challenges:

Climate change affects agricultural productivity through droughts, floods, and unpredictable weather patterns. Reduced crop yields and food shortages can lead to malnutrition, particularly among children and low-income populations. Nutritional deficiencies weaken immune systems, making populations more susceptible to diseases and slowing recovery from illnesses.

Mental Health and Psychosocial Effects:

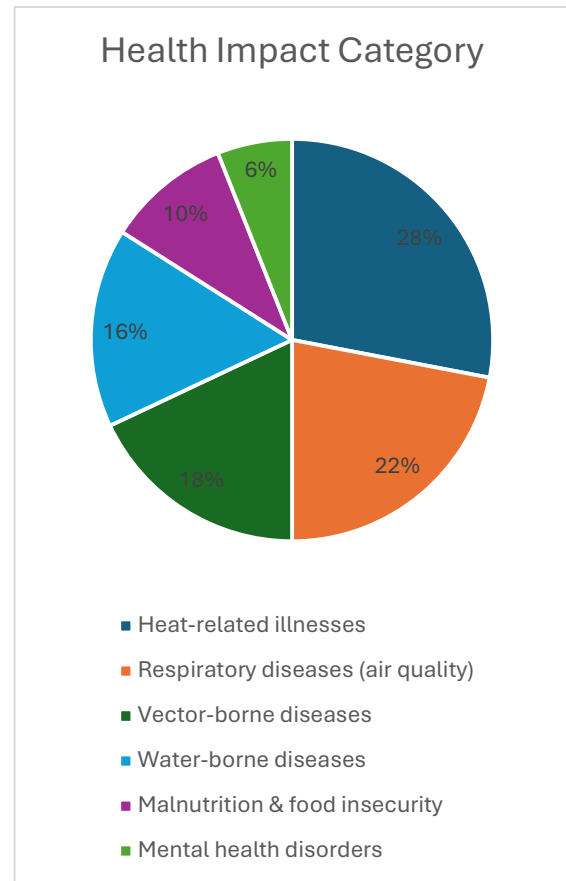
Extreme weather events, displacement, and loss of livelihoods due to climate change have serious mental health consequences. Individuals affected by disasters often experience anxiety, depression, post-traumatic stress disorder, and emotional distress. Long-term uncertainty related to climate threats also contributes to chronic stress, impacting overall community well-being.

Strain on Public Health Infrastructure:

Climate-related disasters damage healthcare facilities, disrupt supply chains, and limit access to medical services. During floods, cyclones, or heat emergencies, health systems often become overwhelmed, reducing their ability to respond effectively. This strain highlights the need for climate-resilient health infrastructure and emergency preparedness to protect public health.

Data Analysis and Interpretation:

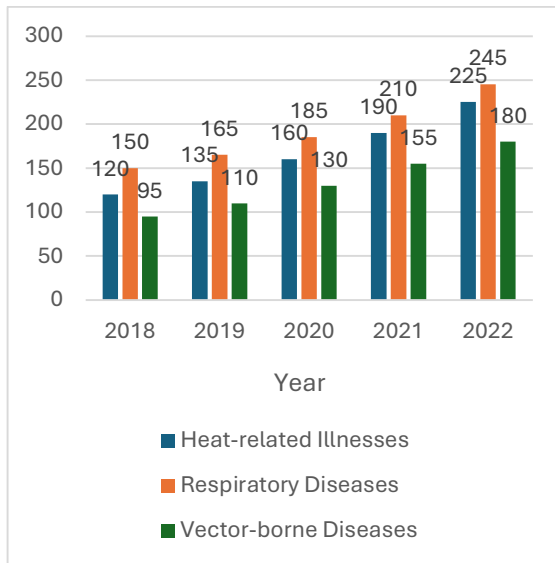
Distribution of Climate Change–Related Health Impacts (%):



Interpretation:

- The pie chart interpretation shows that heat-related illnesses account for the largest proportion of climate change–related public health impacts, indicating that rising temperatures and frequent heatwaves pose the most immediate health risks.
- Respiratory diseases form the second-largest share, highlighting the strong link between climate change, air pollution, and breathing-related disorders.
- Vector-borne and water-borne diseases together represent a substantial portion, reflecting how changing rainfall patterns and warmer climates support the spread of infectious diseases.
- Malnutrition and mental health issues, although smaller in percentage, remain critical concerns as they often have long-term and indirect effects on population health.

Increase in Climate-Related Health Cases (2018–2022):



Interpretation:

- The bar graph interpretation reveals a clear and consistent increase in climate-related health cases from 2018 to 2022.
- Heat-related illnesses show the sharpest rise, suggesting that prolonged exposure to extreme temperatures is becoming more common.
- Respiratory diseases also increase steadily, indicating worsening air quality and prolonged pollution exposure.
- Vector-borne diseases show a noticeable upward trend, confirming that climate change is expanding the habitat and activity period of disease-carrying organisms.
- Overall, the trend emphasizes the growing burden of climate change on public health systems and the urgent need for adaptive measures.

Challenges:

- **Weak Public Health Infrastructure:**
Many health systems, especially in developing countries, lack the capacity to respond effectively to climate-related health

emergencies. Limited resources and inadequate facilities increase vulnerability during extreme weather events.

- **Increasing Frequency of Extreme Weather Events:**
Frequent heatwaves, floods, cyclones, and droughts place continuous pressure on public health services. Emergency responses become difficult to manage when disasters occur repeatedly and unpredictably.
- **Lack of Climate-Health Awareness:**
Insufficient public awareness about the health risks of climate change reduces preventive action. This results in delayed responses and increased health complications among communities.
- **Vulnerability of Marginalized Populations:**
Low-income groups, children, and the elderly face higher exposure to climate-related risks. Social and economic inequalities worsen health outcomes during climate-induced crises.
- **Inadequate Policy Integration:**
Climate change and public health policies are often addressed separately. Poor coordination limits the effectiveness of mitigation and adaptation strategies.
- **Data Gaps and Limited Research:**
Lack of reliable data on climate-related health impacts hinders informed decision-making. This affects planning, early warning systems, and targeted health interventions.

Conclusion:

1. Climate change poses a serious and growing threat to public health by increasing exposure to extreme temperatures, pollution, and disease-causing conditions.
2. The rising incidence of heat-related, respiratory, vector-borne, and water-borne diseases reflects the direct and indirect health consequences of a changing climate.

3. Vulnerable populations face disproportionate health risks, highlighting climate change as both a public health and social equity issue.
4. Inadequate healthcare infrastructure and limited preparedness reduce the ability of health systems to respond effectively to climate-related challenges.
5. Strengthening awareness, data collection, and research is essential for understanding and managing climate-related health risks.
6. Integrated climate and public health policies are urgently needed to build resilience and protect human health in the long term.

References:

- **World Health Organization (WHO) (2018).** *COP24 Special Report: Health and Climate Change.* Geneva: WHO.
- **Intergovernmental Panel on Climate Change (IPCC) (2019).** *Climate Change and Land: An IPCC Special Report.* Geneva: IPCC.
- **Watts, N. et al. (2020).** *The 2020 Report of The Lancet Countdown on Health and Climate Change.* The Lancet.
- **World Health Organization (WHO) (2021).** *Climate Change and Health Fact Sheet.* Geneva: WHO.
- **Intergovernmental Panel on Climate Change (IPCC) (2022).** *Sixth Assessment Report (AR6): Impacts, Adaptation and Vulnerability.* Geneva: IPCC.