

Climate Change and Its Effects on Human Health: A Comprehensive Review

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Abstract

Anthropogenic climate change has wide-ranging effects on human health and is a significant worldwide concern. This thorough analysis highlights the connections between environmental, social, and biological elements as it explores the complex implications of climate change on health. Numerous health consequences, such as vector-borne infections, heat-related illnesses, respiratory issues, and mental health issues, can be impacted by shifting precipitation patterns, rising temperatures, and a rise in the frequency of extreme weather events. Children, the elderly, those living in low-income areas, and other vulnerable groups are disproportionately impacted. Furthermore, the exacerbation of pre-existing health inequities by climate change adds to the burden on global healthcare systems. Mitigation and adaptation strategies are essential to address these health impacts, requiring coordinated efforts from governments, healthcare providers, and communities. This review underscores the urgent need for integrated policies that prioritize public health in the context of a changing climate, fostering resilience and promoting sustainable development. Increased heat wave frequency and intensity, which results in heat-related illnesses and mortality, are among the direct health implications of climate change. In addition, when infectious disease vectors like mosquitoes broaden their geographic range, shifting weather patterns aid in the spread of infectious diseases. The review also explores the health implications of extreme weather events, such as hurricanes and floods, which can cause injuries, mental health disorders, and disruption of healthcare services. Moreover, climate change exacerbates air pollution, with significant respiratory and cardiovascular consequences. The health burden is further compounded by the displacement of populations brought about by extreme weather events and increasing sea levels, which increases the prevalence of waterborne illnesses, mental health disorders, and starvation in the impacted areas.

Keywords: Heat Waves, Air Quality, Food Security, Extreme Weather events, Human Health Impacts, Waterborne Diseases.

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INTRODUCTION

Globally, when Earth's climatic patterns change, there are serious risks to human health that impact many facets of well-being. Direct impacts include increased incidence of heat-related illnesses, while indirect consequences range from altered disease patterns to food insecurity. The goal of this in-depth investigation is to examine the complex connection between human health and climate change. The study will comprehensively examine both immediate and long-term health effects attributed to climate change. It will highlight vulnerable populations, such as low-income communities and the elderly, who often bear disproportionate health burdens. Emerging infectious diseases exacerbated

by climate factors will also be scrutinized, alongside the mental health implications stemming from environmental stressors [1].

Furthermore, the analysis will address how climate change exacerbates existing health disparities, magnifying inequalities in health outcomes. It will underscore the critical role of public health policies in mitigating these challenges and promoting resilience in communities facing climate-related health risks [2]. By emphasizing the urgent need to integrate climate change as a pivotal public health issue, this investigation seeks to raise awareness and prompt action. Understanding the intricate connections between climate and health is crucial for developing adaptive strategies and policies that can safeguard human health amidst a changing climate. Ultimately, this study aims to inform decision-makers, healthcare professionals, and the public about proactive measures needed to mitigate risks and enhance resilience in the face of ongoing climate challenges [3].

Since 2020, managing the vast literature on global climate change impacts, adaptation, and sustainable mitigation measures has posed significant challenges due to the sheer volume of publications. To navigate this complexity, a thorough database search yielded 95 relevant publications, which underwent rigorous screening to meet specific study criteria. Initially, articles focusing on “Global Climate Change Impacts” and related terms were prioritized, resulting in the inclusion of 55 studies after careful review and elimination of 40 duplicates and irrelevant papers identified through title, abstract, and full-text assessment. To bolster the comprehensiveness and reliability of the findings, a secondary search was conducted using the Web of Science and Google Scholar databases. This step aimed to verify cited papers, enhance search results, and ensure the inclusion of the most current and pertinent research available. Ultimately, this methodological approach yielded a total of 55 selected publications for detailed analysis and synthesis in the study. The reviewed literature encompasses a range of topics critical to understanding global climate change impacts, including adaptation strategies and sustainable mitigation measures. By systematically evaluating these publications, the study contributes to a comprehensive overview of current knowledge and emerging trends in climate science and policy. This thorough review not only consolidates existing research but also provides a foundation for informed decision-making and future research directions aimed at addressing the complex challenges posed by climate change on a global scale as shown in Figure 1.

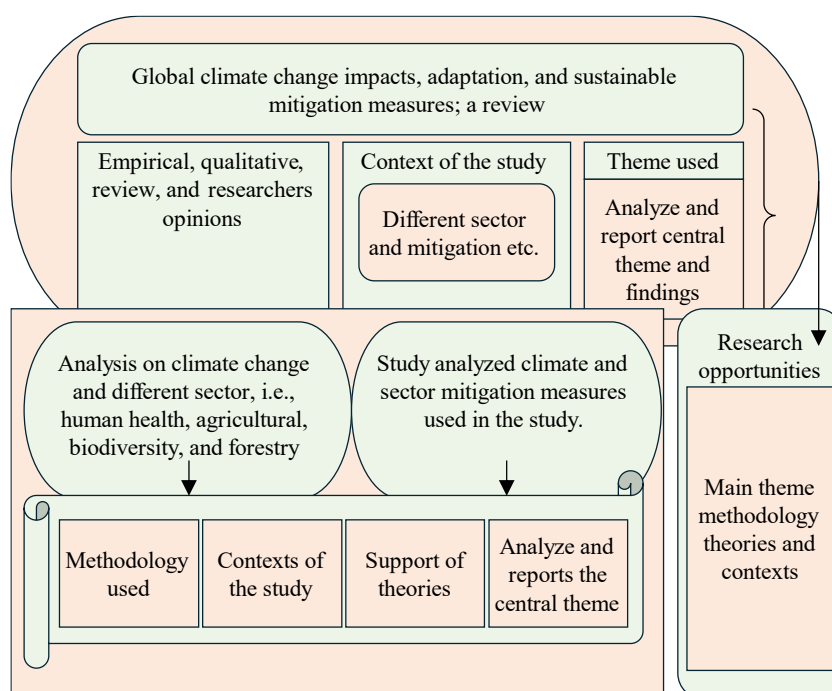


Figure 1. Shown global climate change impacts.

REVIEW LITERATURE

The literature on climate change and its effects on human health is extensive and continually evolving. Here are some key points and areas of concern often covered in comprehensive reviews:

1. *Heat-related illnesses*: Increasing temperatures contribute to more frequent and severe heat waves, leading to heat exhaustion, heatstroke, and exacerbation of cardiovascular and respiratory conditions [4].
2. *Air quality*: Climate change influences air quality through increased levels of ground-level ozone due to higher temperatures and altered weather patterns, exacerbating respiratory diseases like asthma and chronic obstructive pulmonary disease (COPD).
3. *Vector-borne diseases*: Changes in temperature and precipitation patterns affect the seasonality and geographic distribution of diseases spread by mosquitoes and ticks, such as West Nile virus, dengue fever, Lyme disease, and malaria [5].
4. *Waterborne diseases*: The availability and quality of water are impacted by shifting precipitation patterns, which in turn affects the spread of waterborne illnesses such as cryptosporidiosis and cholera.
5. *Food security*: Climate change affects crop yields, nutritional quality of food, and food distribution systems, leading to potential malnutrition and food insecurity, especially in vulnerable populations.
6. *Mental health*: Events linked to climate change, such as severe weather and relocation, have been linked to higher levels of stress, anxiety, depression, and PTSD [6].
7. *Vulnerable populations*: Certain groups, including children, elderly individuals, those with chronic illnesses, and socioeconomically disadvantaged communities, are particularly vulnerable to the health impacts of climate change.
8. *Healthcare infrastructure*: Climate change challenges healthcare systems' capacity to respond to increased demand during extreme weather events and ongoing health issues related to climate impacts [7].
9. *Policy and adaptation strategies*: Effective policies and adaptation strategies, such as improving urban planning, enhancing early warning systems, promoting sustainable practices, and investing in public health infrastructure, are critical for mitigating climate-related health risks.
10. *Global health equity*: Addressing climate change and its health impacts requires global cooperation and efforts to ensure health equity, recognizing the disproportionate burden borne by developing countries and marginalized populations. These topics reflect the interdisciplinary nature of climate change and its implications for human health, highlighting the importance of integrated approaches to mitigation, adaptation, and public health policy [9].

METHODOLOGY

To conduct a comprehensive review on “Climate Change and Its Effects on Human Health,” you would typically follow these steps for methodology. References compile a comprehensive list of references cited in your review following a consistent citation style (e.g., APA, MLA). This methodology ensures a structured and rigorous approach to reviewing the literature on climate change's impacts on human health, providing a foundation for evidence-based insights and recommendations. Objectives Clearly state the aims and purposes of your review. Which specific areas do you wish to discuss in relation to human health and climate change?

1. *Literature search*: Utilize databases such as PubMed, Google Scholar, Web of Science, and others to perform a thorough literature search. Use keywords related to climate change impacts on human health [10].
2. *Inclusion/exclusion criteria*: Define criteria for selecting studies, such as publication date range, language, study design (e.g., observational studies, reviews, meta-analyses), and relevance to your topic.
3. *Screening and selection*: Screen titles and abstracts of retrieved articles against your inclusion/exclusion criteria. Select studies that meet your criteria for full-text review [11].
4. *Data extraction*: Extract relevant data from selected studies, including study characteristics (e.g., author, year, location), methodology, key findings related to climate change impacts on human health.

5. *Quality assessment*: Assess the quality and validity of included studies, considering factors like study design, sample size, bias, and relevance to your research questions.
6. *Synthesis of findings*: Summarize and synthesize findings from the selected studies. Find recurring themes, patterns, and gaps in the literature [12].
7. *Critical analysis*: Critically analyze the strengths and limitations of the evidence reviewed. Talk about the consequences for future research, practice, and public health policy.

APPLICATION

An application or review on “Climate Change and Its Effects on Human Health” would comprehensively examine impacts such as increased heatwaves, vector-borne diseases, and air quality degradation. It would analyze mitigation strategies, public health policies, and adaptation measures to address these challenges and protect human well-being in a changing climate. Here’s how you could approach an application or review based on this topic:

1. *Impact on physical health*: Air pollution-related respiratory problems, vector-borne illnesses (including malaria), heat-related ailments, etc. Food and water insecurity, displacement and migration, mental health issues (anxiety, PTSD), etc. Effect on Communities at Risk Those with pre-existing medical illnesses, the elderly, children, and low-income groups are frequently more vulnerable.
2. *Regional variability*: Talk about how different regions are affected by climate change in different ways (e.g., tropical vs. temperate climates). Reducing greenhouse gas emissions through policies, behaviors, technology, and adaptation and mitigation measures. Interventions in public health to reduce health effects and increase resilience.
3. *Future research directions*: Areas needing further study (e.g., long-term impacts, synergistic effects with other factors like pollution).
4. *Policy making*: Inform policymakers about the urgency of climate action for public health protection.
5. *Healthcare planning*: Guide healthcare providers in preparing for climate-related health challenges.
6. *Public awareness*: Inform people about the dangers that climate change poses to their health in order to promote advocacy and behavior change. Use peer-reviewed articles, reports from reputable organizations (WHO, IPCC), and recent studies to support findings. Include data visualizations (graphs, maps) to illustrate trends and impacts. It sounds like you're interested in an application related to the effects of climate change on human health.

CONCLUSION

There are serious concerns associated with climate change to human health in a number of ways. Its impacts are wide-ranging and varied, ranging from making respiratory conditions worse because of elevated air pollution to having an adverse effect on mental health as a result of severe weather and relocation. Risks are higher for vulnerable groups, such as the elderly, kids, and people with underlying medical issues. Global action is desperately needed to slow down climate change and prepare for its unavoidable effects. This entails lowering greenhouse gas emissions, supporting sustainable energy sources, strengthening the resilience of the healthcare system, and giving equitable adaptation plans first priority.

By taking a holistic approach to combating climate change, we can protect human health and create a more sustainable future for all. A multimodal approach is needed to address climate change, one that includes adaptation measures to shield populations from the inevitable effects and mitigation attempts to lower greenhouse gas emissions. Policies that support resilience and sustainability must be implemented with cooperation at the local, national, and international levels. Education and public awareness campaigns are also essential for encouraging behavioral changes that improve population health and the health of the environment. Climate variables like temperature and precipitation have an impact on changes in infectious disease patterns, particularly the spread of vector-borne illnesses like

dengue fever and malaria. Disruptions to food and water sources can also make malnutrition worse and raise the possibility of contracting waterborne infections.

Indirect effects on mental health are also significant, as climate-related events can lead to displacement, loss of livelihoods, and increased stress and anxiety. Addressing climate change requires comprehensive strategies that integrate health considerations into mitigation and adaptation efforts. This includes reducing greenhouse gas emissions, strengthening public health infrastructure, enhancing early warning systems, and promoting community resilience. If we are successful in mitigating the effects of climate change on human health, we can also build a more sustainable future for coming generations.

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