Global Health Impact from Climate Change

M. M. Costello (Michael M. Costello)[1], D. West (Daniel West)[1], S. Szydlowski (Steven Szydlowski)[1], B. Ramirez (Bernardo Ramirez)[2]

Original Article

[1] Department of Health Administration and Human Resources, University of Scranton, USA
[2] School of Global Health Management & Informatics, University of Central Florida, USA

E-mail address:

Michael.costello@scranton.edu

Reprint address:

Michael M. Costello
Department of Health Administration & Human Resources
University of Scranton, USA
Room 227 McGurrin Hall
Scranton, PA 18510
USA

Source: Clinical Social Work and Health Intervention *Volume: 15* *Issue: 5*
Pages: 16 – 20 *Cited references: 19*

Reviewers:

Arab Naz
University of Malakand Chakdara Khyber Pakhtunkhwa PK
Vitalis Okoth Odero
Amoud University, Borama, Department of Public Health, KE

Keywords:

Global Health. Climate Change.

Publisher:

International Society of Applied Preventive Medicine i-gap

CSWHI 2024; 15(5): 16 – 20; DOI: 10.22359/cswhi_15_5_03 © Clinical Social Work and Health Intervention

Abstract:

The phenomenon of climate change is impacting the planet with notable effect. Polar ice is melting, ocean levels are rising, daily temperatures are increasing, forest fires are burning longer and destroying more residential areas, and urban air quality levels are deteriorating. At the same time, human health is experiencing the effects of exposure to changing climate. Research has indicated that extreme climactic conditions can shorten life expectancy and impact cardias, respiratory and mental health as well as facilitating the spread of some infectious diseases. The health related impacts of climate change merit serious attention in the patient and provider communities. Opportunities to effectuate meaningful changes are examined.

Introduction

Climate change is a global reality. February and March 2024 were the warmest of those months globally. (The Guardian, 2024). The physical evidence is readily apparent and the era of climate change skepticism should be in the past. Along with the physical manifestation of climate change should come the realization that human health is also impacted by climate change.

With climate variability and change, there are increased health risks impacting quality of life at the individual level. Population health is also impacted by weather variability. A wide range of climate-sensitive health outcomes are related to altered weather patterns, heatwaves, wildfires, floods and droughts, water quality and food insecurity. Without proactive outcomes to measure climate change, the burden of disease will increase. Climate change impacts food and water security through its impact on agriculture, food, health, biodiversity loss, soil degradation, land use and fresh water depletion.

Climate change poses a global challenge resulting in increased prevalence of acute and long term diseases. Changing patterns of infectious diseases are noted along with vector borne diseases. Some climate-sensitive infectious diseases include malaria, dengue fever, Lyme disease, West Nile virus and diarrhea diseases.

According to the World Health Organization (n.d.) environmental health "is concerned with preventing disease, death and disability by reducing exposure to adverse environmental conditions and promoting behavior change. It focuses on the direct and indirect causes of disease and injuries and to resources inside and outside the healthcare system to help improve health outcomes." The United Nations (n.d.) has formulated 17 Sustainable Development Goals (SDGs) in working with the global community related to a 2030 global agenda. Some SDGs have a very direct link to climate change and health:

Goal 6: clean water and sanitation
Goal 7: Affordable and clean energy
Goal 13: Climate action

Each of these goals has specific targets and activities. These goals impact health directly. For example, the third leading cause of death in low and middle income countries is COPD. Climate change has an enhancing effect on the poorest countries in food production and food supply. The effects of climate-sensitive change can be studied by level of impact at three levels: household, the community, or globally. Furthermore, there are cost effective ways of reducing the global burden of environmental health problems.

Discussion

According to the US National Oceanic and Atmospheric Administration (NOAA) (2021), indications of climate change are: an increase in global temperature of 1ºc from 1901 to 2020; a rise in sea level of 3.2mm per year since 1993; shrinkage of glaciers depth by more than 60 feet since 1980, a shrinkage of the area covered by Arctic sea ice of approximately 40% since 1979; an increase of atmospheric carbon dioxide of 25% since 1958 and earlier snow melt compared to long-term averages.

The Environmental Protection Agency (EPA) (2019) reports that in the month of July 2019 alone, Greenland lost over 197 billion tons of water from melting ice sheets. In the same report, the agency quoted the New York Times (December 12, 2018) as asserting that extreme rainfall, and the extreme lack of it, affects untold numbers of people, taxing economies, distrupting food production, creating unrest and prompting migrations.

The EPA indicated that "it is extremely likely (>95%) that human activities have been the dominant course of that (global) warming". The EPA claims that "Human activities have contributed substantially to climate change through greenhouse gas emissions and reflexivity or absorption of the sun's energy."

According to the National Institute of Environmental Health Sciences (NIEHS) (2021):

> Climate change impacts human health in both direct and indirect ways. Extreme heat waves, rising sea levels, changes in precipitation resulting in flooding and droughts, and intense hurricanes can directly cause injury, illness and even death. The effects of climate change

> can also indirectly affect health through alterations to the environment. For example, worsening air pollution levels can have negative impacts on respiratory and cardiovascular conditions. Changes in temperature and rainfall can alter the survival, distribution, and behavior of insects and other species that can lead to changes in infectious diseases.

Writing in the open access journal PLOs Climate, Amit Roy claims that "the cost of climate changes may take six months off the average human life span." (Public Library of Science, 2024). According to the World Health Organization (WHO) (2023) approximately 3.6 billion people are residing in areas "highly susceptible to climate change". The WHO also estimates that between 2030 and 2050 climate change will cause an additional 250,000 deaths annually from undernutrition, malaria, diarrhea and heat stress alone. Asia Today (2024) estimates that climate change will cause four million deaths in 2024.

In a report entitled "Addressing climate change and health in the Europe and Central Asia region," the WHO (2024) states:

> Climate change is one of the greatest threats to human health worldwide, and the risks are on the rise. It threatens the essential ingredients of good health- clean air, safe drinking water, nutritious food supply and safe shelter- and has the potential to undermine decades of progress in health, globally, regionally, nationally and locally.

In Africa, Opaku, Filho, Hubert et al (2021) surveyed health professionals in six countries (Ghana, Nigeria, South Africa, Namibia, Ethiopia and Kenya) and found that 93 persent of respondents indicated that climate change had been experienced in their country. Respondents indicated their belief that inadequate resources existed to combat climate change and that there was a need to improve the skills of health professionals.

The study pointed to extreme weather events in Africa which have resulted in an increase in malaria and other "vector-borne" diseases. Drought and its impact on food production and food supply has also been cited (ibid).

Irfan (2012) looked at differences between the ages of death and life expectancy due to temperature extremes in Australia. He cited research by Adrian Barnett of Queensland University of Technology in Australia who looked at temperature-related fatalities in the city of Brisbane over an eight year period. In looking at deaths on days when the temperature dropped to 10 degrees celsius or rose to 30 degrees Celsius, Barnett determined that the deaths in Brisbane resulted in a reduction in expected life years for both men and women.

Peters and Schneider (2020) assessed the impact of cold and heat on myocardial infarctions for two time periods: 1987-2000 and 2001-2014. They noted that in the earlier period, myocardial infarctions were brought on by "cold exposures only". During the second period they observed "significant effects of temperatures less 18ºc on the risk of myocardial infarction." They wrote that the increased risk was "attributable to the greater vulnerability to cardiovascular disease of individuals with Type 2 diabetes mellitus or hypertension."

Jacobsen, Khiew, Duffy et al (2022) noted that "climate change-related cardiovascular disease is mediated by air pollution, increased ambient temperatures, vector-borne disease and mental health disorders."

The American Lung Association (n.d) cautions:

> Climate change creates conditions, including health and stagnant air, which increase the risk of unhealthful ozone levels. Ground level ozone, often called smog, forms in the atmosphere when gases emitted from sources like smokestacks and tailpipes mix in the air. Hotter weather and stagnant air create conditions that make ozone more likely to form.

The association also cautions that climate change can increase the level of allergens:

> As temperatures rise, plants produce more pollen, increasing ragweed and other allergens….Warmer temperatures also allow allergens to flourish in new regions and for allergy seasons to last longer.

According to Jacobsen et al, solastalgia "refers to the distress that is produced by environmental change while climate anxiety refers to the typical anxiety symptoms such as obsessive thinking, insomnia and panic attacks related to the global climate crisis and the threat of environmewntal disaster.

In addressing the mental health impact of climate change, the Commonwealth Fund (2023) states that experiencing an extreme weather event can be "traumatizing." The Fund states that:

> The destruction, loss and displacement people experience can sometimes lead to an array of mental health problems, from anxiety and feelings of helplessness to depression, post-traumatic stress disorder (PTSD) and suicidal thoughts.

The Fund also states that those at higher risk of experiencing mental health issues resulting from climate change are people of color, the homeless, young children and older adults.

Conclusion

Weather and climate disasters are increasing death rates and impacting all regions of the world. Aside from the actual natural disasters, there are latent implications and effects. Environmental risk impacts occur at different levels and require different adaptive strategies to mitigate adverse effects. The key essential latent health issues are: the lack of safe water and sanitation, poor access to hand washing facilities, household air pollution and ambient particulate matter pollution. Efforts are needed to reduce water disease especially diarrhea and parasitic diseases.

All health systems and organizations have a responsibility to address climate change health related issues by mobilizing the community and implementing sustainable initiatives. The importance of SDGs must be realized and embraced to collectively impact climate-sensitive health problems. Disaster and climate related health have an impact on the economic stability of healthcare providers and systems. There are impacts on workforce employment, ED use, hospitalization rates, length of stay (LOS), supply chain management, drugs, medical devices, ventilator usage, IV bags and microchips. There are opportunities to effect meaningful change in the healthcare system and community through sustainable and resilience interventions. Some examples include increasing the need for accurate information based on science, improved health literacy, addressing concerns over conflicts about resources, and changes in health policy. There is a cost to be paid for inaction and measurable benefits to taking action. There will be interactions between climate and migration patterns, demography, socioeconomic factors and ethical concerns. Health protections are needed along with strong efforts at prevention strategies and preparedness strategies.

When discussing climate related health changes, adaption and mitigation can be transformational. Adaptation "is a process of adjustment to actual or expected climate change and its effects. In human systems, adaption seeks to moderate or avoid human or exploit beneficial opportunities." (Eli & Hess, 2024). Concrete examples include providing the workforce with climate resilience knowledge, health information system, risk management, adequate financing to limit indirect health effects, and mental health services as needed. Adaptation can involve modifying existing systems, creating early warning and response systems, early outbreak detection. As noted by Berry, Enright, Shumake-Guillemat, et.al. (2018) "Key approaches to understanding and managing the health risks of climate change include conducting vulnerability, capacity, and adaptation assessments and developing the health component of national or regional adaptation plans. Increasing public awareness is an essential strategy along with the use of implementation science. Finally, hospitals and health systems are positioned to "effectuate positive and widespread change" to impact the effects of climate change. (Wade, 2023).

References

1. AMERICAN LUNG ASSOCIATION. 2024. "Climate Change and Lung Health" www.lung.org Retrieved February 15, 2024.
2. ASIA TODAY. 2024. "Impact of Climate Change, 4 Million Human Deaths Predicted to Occur in 2024 www.asiatoday.id Retrieved February 15, 2024.
3. BERRY, P., ENRIGHT, PM, SHUMAKE-GUILLEMAT, J., VILLALOBAS PRATS E., CAMPBELL-LENDRUM, P. 2018. Assessing health vulnerabilities and adaptation to climate change: a review of international progress. Int. J. Environmental Res Public Health, 2018; 15(12): 2626.
4. COMMONWEALTH FUND. 2023. "How Climate Change Affects Our Mental Health, and What We Can Do About It" www.commnwealthfund.org Retrieved February 14, 2024.
5. ELI, K. & HESS, J. 2020. Health risks due to climate change: Inequity in causes and consequences. Health Affairs, 39(12): 2056-2062.
6. ENVIROMENTAL PROTECTION AGENCY. 2021 "Causes of Climate Change" www.epa.gov Retrieved February 20, 2024.
7. THE GUARDIAN. 2024. "February was warmest on record globally, say scientists" www.theguardian.com Retrieved March 7, 2024.
8. IRFAN, U. 2012. "New Study Calculates Years of Life Lost to Extreme Temperature. Scientific American www.scientificamerican.com Retrieved February 15, 2024.
9. JACOBSEN, A, KHIEW, Y., DUFFY, E. 2022. "Climate change and the prevention of cardiovascular disease" American Journal of Preventive Cardiology www.ncbi.nim.nih.gov Retrieved February 15, 2024.
10. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION. 2021. "Climate change impacts." www.noaa.gov Retrieved February 20, 2024.
11. OPOKZ, S, FILHO, W, HUBER, F et al. 2021. "Climate Change in Health Preparedness in Africa: Analyzing Trends in Six African Countries" International Journal of Environmental Research in Public Health May 2021 18(9): 4672 doi: 10.3390/ijerph18094672.
12. NATIONAL INSTITUTE OF ENVIROMENTAL HEALTH SCIENCES. 2022. "Human Health Impacts of Climate Change" www.niehs.nih.gov Retrieved February 20, 2024.
13. PETERS, A SCHEIDER, A. 2020. "Cardiovascular risk of climate change" www.nature.com Retrieved February 20, 2024.
14. PUBLIC LIBRARY OF SCIENCE. 2024. "Climate change may reduce agerage life expectany by half a year, study: (2024, January 18) https://phys.org Retrieved February 15, 2024.
15. UNITED NATIONS (n.d.). Sustainable Development Goals. Retrieved from https://www.un.org/sustainable development/.
16. WADW, R. 2023. Climate change and healthcare: creating a sustainable and climate-resilient health delivery system. Journal of Healthcare Management, 68(4), 227-238.
17. WORLD HEALTH ORGANIZATION (n.d.). Public Health, environmental and social determinants of health. Retrieved from http://www.who.int/phe/en.
18. WORLD HEALTH ORGANIZATION. 2020. "Addressing climate change and health in the Europe and Central Asia region" www.who.int Retrieved February 15, 2024.
19. WORLD HEALTH ORGANIZATION. 2023. "Climate change" www.who.int Retrieved February 15, 2024.