
CHANGING CLIMATE AND ITS IMPACT ON HEALTH OF PAKISTANI CITIZENS

Dr. Taha Shabbir

Assistant Professor, Federal Urdu University, Karachi

Umair Ansari

Lecturer Mass Communication, University of Karachi

Muhammad Imran Hafeez Abbasi

MS Applied Geophysics: Comsats University Abbottabad

Rasool Bux Chandio

Lecture SZABLC Murad Memon Goth, Malir, Karachi.

Saeed Memon

MPhil Area Study Center for Europe, Karachi

Abstract: Climate change jeopardies human health, impacting every area of society on a national and global scale. Climate change's environmental effects, both seen and predicted, such as sea-level rise, changes in precipitation leading in floods and drought, heat waves, more powerful hurricanes and storms, and poor air quality, will have a direct and indirect effect on human health. Addressing the impacts of climate change on human health in Pakistan is particularly difficult, since both the surrounding environment and individual choices have an effect on health. For example, increases in the frequency and intensity of regional heat waves—both of which are expected to occur as a result of climate change—have the potential to cause significant damage to a large number of people. Certain negative health consequences may almost certainly be avoided if choices taken prior to heat waves include the identification of susceptible groups such as children and the elderly and the provision of preventative measures such as air conditioning. This is a simplistic example; in real-world circumstances, a variety of other variables such as biological susceptibility, socioeconomic position, cultural competency, and the built environment all contribute to vulnerability. In a world of many "what if" possibilities around climate change, developing prudent health policy for the future becomes very difficult due to the uncertainty inherent in forecasting environmental change and human behavior. The need of solid research as a foundation for such policy becomes greater than ever.

Keywords: Human Health, Environmental Change, Pakistani People, Disease

Introduction

While examples of mitigation and adaptation research gaps are highlighted, these problems are not discussed in detail. These research and scientific requirements include a wide range of areas, including fundamental and applied science, technological innovation and capacity, public health infrastructure, and communication and education. Additionally, the possible form of a federal climate change and health research agenda is considered, as is the application and decision-making of scientific research findings. The aim of this article is to highlight research that is important for understanding the impact of climate change on human health in order to reduce and adapt to climate change's environmental impacts in the healthiest and most effective manner possible. While the organisation acknowledges the worldwide aspect of climate change's effects on human health, this report focuses primarily on the situation in the United States. This study is divided into 11 major areas of human health that are expected to be impacted by climate change. 3 The categories are listed alphabetically, and no hierarchy is implied—for example, in terms of frequency of occurrence, severity of consequences, or depth of existing understanding. Each category is divided into parts that introduce the subject, explain how it relates to climate change, and highlight the category's fundamental and applied research requirements, as well as any crosscutting problems. The majority of research on climate change and health has focused on environmental and ecological effects to extrapolate possible human health consequences; the study purposefully emphasized the importance of human health outcomes research above environmental impacts for this reason: This strategy establishes clear connections between climate change and government research objectives, which are often disease- or outcome-specific, and a focus on human health outcomes allows a comprehensive examination of climate change-related health effects. We acknowledge that the health implications listed in this paper are not comprehensive, and that some of the study requirements mentioned may be speculative, given the future nature of many climates change impacts. As new information becomes available, other research requirements may be discovered and others rejected; nevertheless, it is our intention that this study serve as a starting point for dialogue across agencies.

Discussion

Climate change brings many challenges globally. A country like Pakistan which is developing economy faces many issues with the change in climate. Some of the major issues related to human health are as follow:

1. Asthma, Respiratory Allergies, and Upper Respiratory Tract Infections

Respiratory allergies and diseases may become more prevalent as a result of increased human exposure to pollen (as a result of shortened growing seasons), molds (as a result of increased precipitation), air pollution and aerosolized marine toxins (as a result of increased temperature, coastal runoff, and humidity), and dust (from droughts). Mitigation and adaptation strategies have the potential to substantially decrease these hazards. The connection between climate change and the composition of air pollutant mixes should be investigated (e.g., how changing pollen counts and other impacts of climate change influence the severity of asthma) in order to develop models for identifying vulnerable groups. These methods facilitate the application of research to the knowledge of disease risks and, as such, are critical components of creating effective risk communication and messaging to vulnerable groups. In recent times when COVID-19 spread globally it creates more challenges and issues to people having asthma.

2. Cancer

Numerous direct consequences of climate change on cancer risk are well known, such as increased duration and intensity of ultraviolet (UV) radiation; however, the potential influence of climate change on chemical and toxin exposure routes needs further research. Science should investigate the effects of mitigation and adaptation measures on cancer incidence in order to develop and implement the most effective strategies; for example, research should be conducted to inform understanding of the benefits of alternative fuels, new battery and photovoltaic cells, and other technologies, as well as any potential adverse risks associated with exposure to their components and wastes. Additionally, a better knowledge of the effects of climate change on the ocean and coastal systems' ability to supply cancer curative agents and other health-enhancing products is required.

3. Stroke and Cardiovascular Disease

Climate change has the potential to aggravate pre-existing cardiovascular illness by raising heat stress, increasing the body burden of airborne particles, and altering the distribution of zoonotic vectors that transmit infectious diseases associated with cardiovascular disease. It is necessary to conduct research into the cardiovascular effects of increased temperatures, heat waves, extreme weather, and changes in air quality on health, and to apply this new knowledge to the development of health risk assessment models, early warning systems, health communication strategies targeting vulnerable populations, land use decisions, and strategies to meet air quality goals related to Cardiovascular and stroke risks associated with climate change may be mitigated in certain places by decreases in air pollution associated with climate change mitigation.

4. Nutrition and Foodborne Diseases

Climate change may be linked to shortages of basic foods, hunger, and food contamination (of seafood from chemical contaminants, biotoxins, and pathogenic microbes, and of crops by pesticides). The science research needs in this area include a better understanding of how changes in agriculture and fisheries may affect food availability and nutrition, improved disease surveillance, and the identification and mapping of complex food webs and sentinel species that may be vulnerable to climate change. This study may be utilized to better prepare the public health and health care sectors for new diseases, changing monitoring requirements, and increasing disease incidence, as well as to create more effective outreach to impacted populations.

5. Morbidity and Mortality Due to Heat

Although heat-related disease and death are expected to rise as a result of climate change, proactive public health measures such as heat wave response plans and health alert warning systems may help reduce morbidity and mortality. Additional research should be directed on creating and extending these tools across many geographic areas, particularly by defining environmental risk factors, identifying susceptible people, and establishing effective risk communication and preventive measures.

6. Effects on Human Development

Two potential consequences of climate change would impair normal human development: malnutrition—particularly during the prenatal period and early childhood as a result of reduced food supplies—and exposure to toxic contaminants and biotoxins as a result of extreme weather events, increased pesticide use for food production, and increased harmful algal blooms in recreational areas. The relationship between human development and climate change adaptations should be examined, including changes in agriculture and fisheries that may affect food availability, increased pesticide use to control disease vector range expansion, and prevention of toxic waste site leaching into floodwaters during extreme weather events, in order to avoid developmental consequences

7. Mental Health and Disorders Associated with Stress

Climate change, by creating or contributing to severe weather events, may result in population relocation, property destruction, loss of loved ones, and chronic stress, all of which may have a detrimental effect on mental health. Among the research requirements include identifying critical mental health consequences and vulnerable groups, as well as establishing migration monitoring networks to guarantee the provision of adequate health care assistance. In Pakistan it is evaluated that every third person is associated with mental stress and tension.

8. Diseases and Disorders of the Nervous System

Climate change, together with efforts to prevent and adapt to it, may result in a rise in the prevalence of neurological illnesses and disorders in humans. This area of research should focus on identifying vulnerable populations and elucidating the mechanisms and effects of human exposure to neurological hazards such as biotoxins (from harmful algal blooms), metals (found in new battery technologies and compact fluorescent lights), and pesticides (used in response to agricultural changes), as well as the potentially exacerbating effects of malnutrition.

9. Diseases Spread by Vectors and Zoonosis

Climate change may increase disease risk by expanding vector ranges, decreasing pathogen incubation times, and disrupting and relocating large human populations. The research should improve the existing infrastructure for pathogen/vector control, including vector and host identification; integrate human, terrestrial, and aquatic animal health surveillance systems; incorporate ecological studies to develop more predictive models; and improve risk communication and prevention strategies.

10. Diseases Spread by Water

Increases in ocean temperature, precipitation frequency and severity, evaporation-transpiration rates, and changes in the health of coastal ecosystems all have the potential to increase the incidence of water pollution with hazardous pathogens and chemicals, thus increasing human exposure. The research should be directed toward determining where changes in water flow will occur, how water will interact with sewage in surface and underground water supplies as well as drinking water distribution systems, which food sources may become contaminated, and how to better predict and prevent human exposure to waterborne and ocean-related pathogens and biotoxins.

11. Morbidity and Mortality Associated with the Weather

Increased frequency and severity of severe weather events such as hurricanes, floods, droughts, and wildfires may have a negative effect on people's health during and after the event. To ensure that risks are recognized and that optimum solutions are developed, communicated, and executed, research focused at enhancing the capacity of healthcare and emergency services to handle disaster planning and management is required.

12. Skin Related Issues

The skin is the largest organ of the body, with a total area of about 20 square feet. The skin protects us from microbes and the elements, helps regulate body temperature, and permits the sensations of touch, heat, and cold. Skin which is one of the important parts of human body is also affected with impure climate. In recent years many skins related disease found in citizens of Pakistan. There are many different types of skin disorders found due to the climate affect such that: 1. Acne 2. Cold sore 3. Blister 4. Hives 5. Actinic keratosis 6. Rosacea 7. Carbuncle 8. Latex allergy 9. Eczema 10. Psoriasis

Recommendations

Along with the research needs identified in the individual research categories, there are several crosscutting issues that are critical for preventing or avoiding many of the potential health consequences of climate change, including identifying susceptible, vulnerable, and displaced populations; strengthening public health and health care infrastructure; developing capacities and skills in modelling and prediction; and Such study will result in more effective early warning systems and increased public knowledge of the health risks posed by climate change to a person or community, which should result in more successful mitigation and adaptation measures. For instance, health communications research is required to develop and deploy effective health alert warning systems for severe heat events and air pollution, which disproportionately impact individuals with pre-existing illnesses such as cardiovascular disease. Such a risk communication pilot project may show successful communication techniques across many domains and contribute to the development of a complete strategy for tackling different health hazards concurrently. Other techniques, such as predictive models to enhance forecasting and prevention, vulnerability assessments of health care and public health systems and infrastructure, and health impact assessments, are required and should be used across various categories to address knowledge gaps. Transdisciplinary development would contribute to the creation of instruments such as better baseline monitoring that are more broadly applicable and therefore more efficient and cost effective than presently existing methods. Indeed, many of the stated scientific requirements will need cross-

disciplinary solutions. For instance, studying how heat waves affect ambient air pollution and the combined effect of heat and pollution on human disease and mortality would need knowledge in atmospheric chemistry, climate patterns, environmental health, epidemiology, and medicine, among other areas of research. Given the complexity of scientific requirements and the possibility for cross-disciplinary research topics, encouraging cross-disciplinary cooperation across and within government agencies makes sense and should be a high priority. The National Research Council recently released a study outlining ways in which government research and science may be enhanced to better inform decision- and policy-making on climate change and human health. The research specifically calls for a more comprehensive inventory of climate change-related health impacts, increased predictive power of models, improved integration of climate observation networks and health impact surveillance tools, and improved interactions between stakeholders and decision makers. The main responsibility came under ministry of Climate and collectively the prime minister of Pakistan to take remedial measures in order to tackle the boon of climate change. Government should make emergency in order to face any possible threat related to climate change.

Conclusion

Over time, humans have effectively adapted to environmental change, from developing natural physiological reactions to using science, technology, and knowledge to enhance our lives and progress our health. Since the beginning of the industrial era, humans have made tremendous advances in improving their health and achieving a much higher quality of life. These advancements, however, have come at a cost that must now be recognized and handled. Climate change will compel people to interact with their changing environment in ways never seen before, in order to alter it for both short- and long-term health protection. There is no question that we are capable of avoiding many of the worst health consequences of climate change, and indeed, given their universality and potential enormity, we have an ethical obligation to do so. The research requirements outlined in this paper should serve as a guide, assisting us in developing the necessary tools and making informed decisions that will eventually result in improved health and life for people of the United States and the globe.

The required study on the health consequences of climate change, the health consequences of mitigation, and the development of suitable adaptation measures will not emerge spontaneously or in isolation. A good overall research programme must be integrated, focused, multidisciplinary, funded, and sustained, while being adaptable to new knowledge and wide enough to include the very varied components outlined in this paper. Additionally, the endeavor must be international, multiagency, and interdisciplinary in nature, bringing the capabilities of all partners together. Additionally, the endeavor must encourage user-driven research that closely matches future research objectives with decision makers' requirements by enabling bidirectional communication among information producers, suppliers, and end users. This study will need the development of capability in a variety of areas, most notably climate sciences and disease and ecosystem monitoring, in order to assist the health sciences in addressing these problems. Finally, both efforts and results must be assessed using well-defined metrics that are connected to assessment questions and outcome indicators to verify they are valid, effective, and accomplish the intended objectives. Natural systems either adapt or perish in response to environmental changes. Climate change jeopardies a large number of natural and manmade systems that safeguard and maintain our nation's health. The infrastructure that we have developed in the United States to preserve health and promote well-being is very varied and includes hospitals, clinics, public health agencies, trained people, roads and transit networks, the electrical grid, and water treatment systems, among others. Climate change poses a variety of challenges to these systems, ranging from physical infrastructure (natural and constructed) to intangible or organizational structures (human and social capital) that are needed to sustain resilience to environmental hazards. Climate change may have severe consequences for public health systems that are not adequately reinforced. Research on these systems' susceptibility will be essential for identifying areas that need immediate attention, reducing errors, minimizing human suffering, and ultimately saving lives.

There is ample evidence that human activities are changing the earth's climate and that climate change will have major health consequences on a global and local scale. While not all of the changes connected with this process are predictable, the choices we do now will undoubtedly impact our surroundings over the next decades. Climate change is inevitable to some extent, and we must adjust to its health consequences; nevertheless, strong mitigation measures may substantially mitigate the worst of the anticipated exposures. Nonetheless, there will be consequences for the health of Americans, some of which are likely already beginning. As serious as the domestic dangers to public health in the United States are, the global risks are much worse. Climate change and health problems are global in scope, and the health consequences of climate change in other nations are likely to have an effect on health in the United States as well. Famine, drought, extreme weather events, and regional conflict—all of which are likely consequences of climate change—are among the

factors that increase the incidence and severity of disease, as well as contribute to other negative health consequences, making it critical to address climate change-related decision-making at the local, regional, national, and global levels. The complex interaction of these and other variables must be taken into account when defining the scope and emphasis of both fundamental and applied climate change and health research.

There is an urgent need for research to assist in directing adaptation efforts and informing future mitigation options. Among these needs are integrating climate and health sciences; integrating environmental, public health, and marine and wildlife surveillance; applying climate and meteorological observations to real-time public health issues; and downscaling long-term climate models to estimate human exposure risks and disease burden. Integrated data systems should consider a broad range of environmental factors in addition to sociodemographic variables such as population, income, and education.

Bibliography

1. Aagaard-Tillery, K.M., et al., Developmental origins of disease and determinants of chromatin structure: maternal diet modifies the primate fetal epigenome. *Journal of Molecular Endocrinology*, 2008. 41(2): p. 91-102.
2. Abdel-Wahab, M.F., et al., Changing pattern of schistosomiasis in Egypt 1935–79. *Lancet*, 1979. 2(8136): p. 242-4.
3. Abraham, W.M., et al., Effects of inhaled brevetoxins in allergic airways: toxin-allergen interactions and pharmacologic intervention. *Environmental Health Perspectives*, 2005. 113(5): p. 632-637.
4. Adler, P. and W. Wills, The history of arthropod-borne human disease in South Carolina. *American Entomologist*, 2003. 49: p. 216-228.
5. Ahn, Y.H., et al., Application of satellite infrared data for mapping of thermal plume contamination in coastal ecosystem of Korea. *Marine Environmental Research*, 2006. 61(2): p. 186-201.
6. al-Harhi, S.S., et al., Non-invasive evaluation of cardiac abnormalities in heat stroke pilgrims. *Int J Cardiol*, 1992. 37(2): p. 151-4.
7. Albrecht, G., et al., Solastalgia: the distress caused by environmental change. *Australasian Psychiatry*, 2007. 15: p. S95-S98.
8. Allen, M.R. and W.J. Ingram, Constraints on future changes in climate and the hydrologic cycle. *Nature*, 2002. 419(6903): p. 224-+.
9. Altevogt, B.M., S.L. Hanson, and A.I. Leshner, Autism and the environment: Challenges and opportunities for research. *Pediatrics*, 2008. 121(6): p. 1225-1229.
10. American Heart Association. Cardiovascular disease cost, 2009. 2009 [cited 2009 July 22]; Available from: <http://www.americanheart.org/presenter.jhtml?identifier=4475>.
11. American Heart Association. Cardiovascular disease statistics, 2006. 2009 [cited 2009 July 22]; Available from: <http://www.americanheart.org/presenter.jhtml?identifier=4478>.
12. Antoni, M.H., et al., The influence of bio-behavioural factors on tumour biology: pathways and mechanisms. *Nat Rev Cancer*, 2006. 6(3): p. 240-8.
13. Ashley, S.T. and W.S. Ashley, Flood fatalities in the United States. *Journal of Applied Meteorology and Climatology*, 2008. 47(3): p. 805-818.
14. Attwood, S.W., A Demographic-Analysis of *Y-Neotricula Aperta* (Gastropoda, Pomatiopsidae) Populations in Thailand and Southern Laos, in Relation to the Transmission of Schistosomiasis. *Journal of Molluscan Studies*, 1995. 61: p. 29-42.
15. Baccarelli, A., et al., Exposure to particulate air pollution and risk of deep vein thrombosis. *Archives of Internal Medicine*, 2008. 168(9): p. 920-927.
16. Bacon, R.M., K.J. Kugeler, and P.S. Mead, Surveillance for Lyme disease--United States, 1992-2006. *MMWR Surveill Summ*, 2008. 57(10): p. 1-9.
17. Balbus, J.M. and C. Malina, Identifying vulnerable subpopulations for climate change health effects in the United States. *Journal of occupational and environmental medicine / American College of Occupational and Environmental Medicine*, 2009. 51(1): p. 33-37.
18. Ballester, F., J. Diaz, and J.M. Moreno, [Climatic change and public health: scenarios after the coming into force of the Kyoto Protocol.]. *Gac Sanit*, 2006. 20 Suppl 1: p. 160-74
19. Groisman, P.Y., et al., Changes in the probability of heavy precipitation: Important indicators of climatic change. *Climatic Change*, 1999. 42(1): p. 243-283.
20. Gustin, M.S. and K. Ladwig, An assessment of the significance of mercury release from coal fly ash. *J Air Waste Manag Assoc*, 2004. 54(3): p. 320-30.
21. Haines, A., et al., Climate change and human health: impacts, vulnerability, and mitigation. *Lancet*, 2006. 367(9528): p. 2101-2109.
22. Haines, A., et al., Public health benefits of strategies to reduce greenhouse-gas emissions: overview and implications for policy makers. *Lancet*, 2009.

23. Handal, A.J., et al., Neurobehavioral development in children with potential exposure to pesticides. *Epidemiology*, 2007. 18(3): p. 312-20.
24. Shabbir, T., M Nadeemullah, & Saeed Memon. (2020). Uses and Impact of 'Open Data' Technology for Developing Social Sector in Pakistan. *Pakistan Journal of Multidisciplinary Research*, 1(1), 50-64. Retrieved from <https://www.pjmr.org/pjmr/article/view/24>
25. Noyes, P.D., et al., The toxicology of climate change: Environmental contaminants in a warming world. *Environment International*, 2009. 35(6): p. 971-986.
26. NTP Report on Carcinogens. *Rep Carcinog*, 2005(11).
27. O'Neill MS., et al., Air pollution and inflammation in type 2 diabetes: a mechanism for susceptibility. *Occupational and Environmental Medicine*, 2007. 64(6): p. 373-379.
28. Orenstein, W.A., et al., Immunizations in the United States: success, structure, and stress. *Health Aff (Millwood)*, 2005. 24(3): p. 599-610.
29. Paerl, H.W. and J. Huisman, Climate. Blooms like it hot. *Science*, 2008. 320(5872): p. 57-8.
30. Paik, Y.H., H.I. Ree, and J.C. Shim, Malaria in Korea. *Jpn J Exp Med*, 1988. 58(2): p. 55-66.