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# Health Effects of Climate Change: Prioritizing Mental Health

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**Abstract:**

***Background:***

- **When discussing climate change, it is essential to address its past, present, and future impacts. Historically, the emissions of each country matter because carbon dioxide has a long atmospheric life, persisting for over 100 years. In the present, countries must navigate how to equitably reduce their carbon footprint to make room for developing nations. In the future, we face the critical challenge of preventing further emissions to avoid overwhelming the atmosphere.**
- **From Temperature to Health: The connection between climate change and health was first highlighted in medical literature in 1989, when Professor Alexander Leaf of Harvard Medical School published an article in the New England Journal of Medicine titled "Potential Health Effects of Global Climatic and Environmental Changes." He raised concerns about the uncertainty surrounding the magnitude and pace of climate change, asking whether we could predict the consequences of global warming with enough certainty to act, or if the ambiguity justified delaying action.**
- **Mental Health: According to the World Health Organization (WHO), mental health is defined as a state of well-being that allows individuals to handle life's stresses, realize their abilities, learn and work efficiently, and contribute to their community. It is fundamental to our ability to make decisions, form relationships, and shape the world we inhabit. Mental health is not only a basic human right but is also essential for personal, community, and socio-economic development.**

***Why Mental Health Should Be a Priority*:**

- **Mental health is influenced by numerous factors, including individual, social, and structural elements. Psychological and biological factors, such as emotional resilience, substance use, and genetics, can make individuals more vulnerable to mental health problems.**
- **Moreover, unfavorable socio-economic, geopolitical, and environmental conditions—including poverty, violence, inequality, and environmental degradation—also heighten the risk of mental health issues.**

***Climate Change and Mental Health*:**

- **The link between climate change and mental health is becoming increasingly evident. Extreme weather events, droughts, wildfires, and floods have significant impacts on agriculture and human systems, contributing to anxiety and stress. Rising air pollution and temperatures increase the risk of neurological and psychiatric conditions such as strokes and dementia. Additionally, changes in food supply and infectious disease patterns are contributing to psychiatric illnesses.**
- **Climate change also threatens livelihoods, forces migration, and disrupts communities, all of which can harm mental health. The psychological toll of climate change, such as fear for personal and national security, is contributing to widespread distress. Even, Climate Change indirectly affects the mental health of pregnant women by causing anxiety and depression due to uncertainty about the environment and worries about how it will impact their children in the long term. Furthermore, climate impacts the mental health of mothers and their children in their growth and development.**

- **A growing lexicon has emerged to describe the psychological impacts of climate change. Terms like ecological grief and eco-anxiety capture the sense of loss and anxiety people feel about the loss of a stable future. Solastalgia describes the longing for landscapes and ways of life destroyed by environmental changes. While eco-anxiety is a natural response to the climate crisis, it can lead to feelings of hopelessness, particularly among young people.**
- **Global Efforts: World Environment Day, celebrated on June 5th, highlights the global need for environmental protection. This year's theme, "Land Restoration, Desertification, and Drought Resilience," is a key component of the UN Decade on Ecosystem Restoration (2021-2030). Restoring ecosystems is crucial not only for environmental sustainability but also for reducing mental health challenges exacerbated by climate change.**

***Conclusion:***

- **This discussion paper makes three key points. First, while linking specific mental health outcomes to climate change remains complex, more empirical research can advance this critical field. Second, the risks and mental health impacts of climate change are rapidly increasing, disproportionately affecting vulnerable/ marginalized populations. Third, interventions to address mental health and climate change should be coordinated and rooted in hope, addressing the issue holistically.**
- **The rising frequency of climate-related disasters can lead to post-traumatic stress disorder (PTSD), adjustment disorders, and depression. Climate-induced migration can result in acculturation stress, while increased rates of physical illness due to climate change can further contribute to psychological distress. Finally, the paper discusses the mental health implications of climate mitigation measures and proposes strategies to address these challenges.**
- **Rising ambient temperatures are expected to increase aggression and violent suicides, while prolonged droughts linked to climate change may lead to higher rates of farmer suicides and overall mental distress. Frequent climate-related disasters can cause PTSD, adjustment disorders, and depression. Additionally, climate-induced migration may result in acculturation stress, and an increase in physical illnesses from global warming could lead to further psychological distress. Potential mental health impacts of mitigation measures are also considered. The paper concludes with recommendations for addressing the anticipated mental health challenges stemming from climate change.**
- **Recommendations: Addressing the mental health consequences of climate change requires a multi-faceted approach that includes research, policy interventions, and coordinated global efforts. By taking proactive steps now, we can mitigate the mental health impacts of climate change on future generations.**

***Keywords:*** **Mental Health, Climate Change, World Environment Day, UN Decade on Eco-system Restoration, PTSD-Post Traumatic Stress Disorder.**

## 1. INTRODUCTION

***Background:***

- Global warming has been a decisive challenge for humanity and has far-reaching consequences throughout the past, the present, and the future. Historically, the emissions of each country matter because carbon dioxide has a long atmospheric life, persisting for over 100 years. In the present, countries must navigate how to equitably reduce their carbon footprint to make room for developing nations. Ultimately, preventing further emissions and depletion of atmospheric capacity is vital in order not to be in a situation when this capacity is fully exhausted.

- The association of climate change and health was first highlighted by the American professor Alexander Leaf. He published an article in 1989 in the New England Journal of Medicine, titled as "Potential Health Effects of Global Climatic and Environmental Changes" in which he expressed deep concerns over how rapidly and how much global warming would occur. The WHO estimates that between 2030 and 2050, an additional 250,000 people will die annually because of the adverse climate effects, including health impacts due to heat exposure, vector-borne infection prevalence such as malaria and dengue, respiratory impact and extreme weather conditions. From these forecasts, the necessity of health-based approach to tackle climate change is quite clearly highlighted.

- The 2017 Lancet Countdown report on climate change and health points out the alarming and in some cases, the irreparable health consequences of climate change. The report calls for urgent steps to be taken to reduce these impacts, placing climate change as the greatest threat to world health in the 21st century and an opportunity for all to change the determinants of health. The framework towards achieving such goals is provided by the Paris Agreement of 2015 which aims at temperature rise of 'well below 2C'. The Lancet Countdown publishes new report every year with indicators monitoring 47 performance metrics related to climate impacts on health, health system response, mitigation and health engagement with climate change and these reports are endorsed by 52 academic and UN stakeholders.

- The IPCC report "A Threat to Human Well-being and Planetary Health – Immediate Action Can Secure Our Future[i] "has once again warned against ignoring the ticking climate clock. Development resilient to climate change becomes nearly impossible with a temperature rise of more than 1.5°C and infeasible in some regions above 2°C. Equitable and just actions, with ample financing, adequate technology, and appropriate political intentions, must be undertaken without delay to reduce emissions and adapt effectively. Climate risk management and activities to enhance health and well-being cannot be overlooked—managing healthy ecosystems is key. Conserving and restoring 30-50% of ecosystems could increase natural carbon dioxide absorption and support sustainable development if backed by sufficient finances and political power.

- Systemic root causes of climate change, includes faulty consumption patterns, urban sprawl, and socioeconomic disparity, hinder future advancements. Tackling these interrelated issues requires coordinated action by governments, the private sector, and civil society to reduce risks and address imbalances. Heatwaves, droughts, and floods are worsening, threatening ecosystems and exacerbating food and water scarcity in vulnerable regions. Bridging adaptation gaps in poorer areas will require drastic emission cuts and rapid resilience-building efforts.

- The IPCC emphasizes the critical role of cities, home to over half the global population, in combating climate change. Cities hold opportunities for resilience through green infrastructure, renewable energy, and sustainable urban planning, though poorly planned cities are highly vulnerable. Integrating Indigenous and local knowledge in adaptation measures is crucial to avoid unintended consequences.

- The effects of climate change on human health are already discernible, with the most disadvantaged communities being the most affected. The decisions taken today will shape how societies will fare in the future and how ecosystems will cope with worsening climate threats. Achieving a warming threshold of 1.5°C will still lead to significant threats and even more risks which may cause irreversible changes if surpassed. The world needs to act immediately and in an inclusive manner in order to create a thriving and sustainable future for humanity and the world as a whole.

***Mental Health: A Fundamental Human Right***

World Health Organization (WHO) defines mental health as a state of well-being that allows individuals to handle life's stresses, realize their abilities, learn and work efficiently, and contribute to their community. It is fundamental to our ability to make decisions, form relationships, and shape the world we inhabit. Mental health is not only a basic human right but also essential for personal, community, and socio-economic development.

In surveys, mental health was measured through self-reported ratings for general psychological distress; symptoms of depression, anxiety, and PTSD; resilience; and ability to adapt (as per one Lancet study).

***Why Mental Health Should Be a Priority***

Mental health is influenced by a range of factors, including individual, social, and structural elements. Psychological and biological aspects such as emotional resilience, substance use, and genetics can increase vulnerability to mental health issues. Unfavorable socio-economic, geopolitical, and environmental conditions—poverty, violence, inequality, and environmental degradation—further exacerbate mental health risks.

***Climate Change and Mental Health***

Mental health, described by the 2016 Lancet report as the "most neglected of all human health conditions," is deeply intertwined with climate change. Extreme weather events, more frequent and intense under a changing climate, contribute to post-traumatic stress disorder (PTSD), major depressive disorder (MDD), anxiety, and depression. These events also result in complicated grief, survivor guilt, vicarious trauma, and recovery fatigue.

The most common climate variable investigated, (59%), was a change in ambient temperature (minimum, mean, and maximum, or most frequently by month). (30%) studies examined mental health following acute events such as hurricanes, floods, typhoons, dust storms, and heat waves. Eight (14%) studies investigated subacute events, including drought and the associated effects on farming productivity. Four (7%) other studies considered long-term changes in humidity, precipitation, hours of sunshine, wind, air pollution, and noise pollution. In addition, one (2%) study assessed perceived changes in the environment.

Human and agricultural systems are threatened by extreme weather conditions, resulting in increased levels of anxiety, stress and depression. The growing levels of air pollution, rising temperatures, increase the likelihood of having neurological and psychiatric conditions like stroke and dementia. Changes in the availability of food resources, as well as a shifting

pattern of infectious diseases, resulting from environmental changes, are also associated with mental disorders. Besides, it destroys sources of income, necessitates the displacement of people, and tries to break apart societies which makes it, even more, difficult to cope with mental health issues.

Additionally, no studies to date, have examined the experience of anxiety and depression from a climate perspective for pregnant women regarding climate effects on children. What is more, many of these children and mothers will experience long-term psychological and developmental disturbances. The terms ecological grief, eco-anxiety, and solastalgia warrant greater interest in the context of climate change especially by the younger generation and its emotional burdens.

**Global Efforts:** World Environment Day, celebrated on June 5th, highlights the global need for environmental protection. This year's theme, "Land Restoration, Desertification, and Drought Resilience," is a key component of the UN Decade on Ecosystem Restoration (2021-2030). Restoring ecosystems is crucial not only for environmental sustainability but also for reducing mental health challenges exacerbated by climate change.

***Challenges:***

- Another challenge to mental health brought about by climate change has to do with the time lag that exists between the psychosocial consequences of climate-related hazards and their association with climate change. ii
- As pointed out by the scholars (Albrecht et al.), climate change is a "creeping problem" which means it has no clear cut start or end. This ambiguity creates a perception that action can be delayed, reducing the urgency to address its mental health impacts. Emotional distress caused by awareness of climate change is expressed through terms like ecoanxiety (anxiety from facing complex climate issues), ecoparalysis (a feeling of helplessness in mitigating risks), and solastalgia (distress due to changes in one's home environment). These challenges are compounded by cultural, social, economic, and geographical differences, as well as the severity, type, and duration of climate events.

***Impact of Climate Change on Mental Health***

- A few of the points are the main impact [iii]
- Rising Temperatures: Extreme heat is linked to increased aggression, criminality, suicides, and mental disorders such as anxiety and mood disorders. Heat waves exacerbate psychological distress, particularly for individuals working in exposed environments.
- Natural Disasters: Events such as floods, hurricanes, and droughts often lead to PTSD, anxiety, and stress-related disorders. Survivors face long-term psychological challenges, with some requiring trauma care even decades later, as seen with Hurricane Katrina survivors.
- Economic Hardship: Droughts and agricultural losses result in economic strain, especially in rural areas, leading to increased suicide rates among farmers and financial stress that limits access to mental health care.
- Migration: Climate-induced migration causes acculturation stress and increases mental health challenges, such as depression and schizophrenia, among displaced populations.
- Physical and Behavioural Health Link: Rising temperatures and extreme weather events exacerbate physical illnesses like respiratory and cardiovascular diseases, indirectly affecting mental health. Malnutrition in children, for instance, can lead to cognitive decline and depression.
- A recent news article suggests that over 7000 people who experienced Hurricane Katrina in 2005 are still receiving mental health care for trauma associated with the Hurricane. Survivors of Cyclone Fani in Odisha are grappling with stress disorders, depression, and post-traumatic stress disorder (PTSD), as the state works to rebuild after the severe storm struck on May 3, 2019. The cyclone, with winds exceeding 200 km/h, devastated Puri district, claimed at least 60 lives, and severely affected 13 other districts. Mental health experts, including teams from the state health department, have identified areas like Satapada near Chilika lagoon as needing urgent intervention, particularly among those in temporary shelters facing anxiety, sleeplessness, and deteriorating conditions.
- Reports highlight that many survivors, especially those who lost homes, livelihoods, and livestock, exhibit symptoms of PTSD, adjustment disorders, and acute stress. Past disasters, like the 1999 super cyclone, showed that 26% of affected adolescent girls experienced PTSD a year later, underscoring the long-term impact of insufficient psychological support. Research indicates that survivors of major storms experience a 25% increase in depression rates, with vulnerable groups such as pregnant women, children, individuals with disabilities, and those with pre-existing mental health conditions being the hardest hit.

- Odisha, having faced 128 cyclones in the past two centuries, continues to bear the dual burden of rebuilding while ensuring basic survival needs like clean water and sanitation in shelters. Although India's disaster management framework incorporates psychosocial support, climate-induced disasters highlight the urgent need for stronger mental health services to address the growing psychological toll.

***The effect of a climate change*** event on mental health is associated with

✓ the local cultural, social, economic, and developmental context

✓ the spatial distribution of the exposure

✓ the type of meteorological event

✓ the duration and severity of the event

✓ the anticipated acuity and chronicity of the associated consequences for physical health and community wellbeing .

✓ Acute climate change events (eg, hurricanes) have a well-defined area and duration of exposure, but the timeline for the onset and course of subsequent mental health effects is less clear.

***The Direct and Indirect Effects of Climate change:***

*Direct effects:*

- There is now an extensive and rapidly expanding body of research exploring the current mental health consequences of climate change-related extreme weather events.
- Extreme heat events and humidity have been noted to increase hospital admissions for mood and behavioural disorders, including schizophrenia, mania, and neurotic disorders.

*Indirect effects:*

- The indirect mental health consequences of climate change can occur as a result of damages to physical and social infrastructure, physical health effects, food and water shortages, conflict, and displacement from acute, subacute, and chronic climactic changes
- Vulnerable groups: Indirect effect on Maternal & Child Health: [iv]
- Post-traumatic stress disorders after natural disasters, are due to the following points as depicted below after natural disasters.
  - Flood
  - Food system impact
  - Rising temperature causes a draught, which may lead to miscarriage, stillbirth, premature delivery, etc.
  - Exposure to dust, smoke, and ground levels of ozone leading to respiratory diseases
  - Mental health issues
- Trauma from extreme weather events can cause psychological stress, worsen mental illnesses, and add emotional stress for pregnant and postpartum women. One study found that compared to men, women were at increased risk for PTSD and other mental health effects after a disaster. In addition, extreme weather events can disrupt support networks, behavioural health services, and treatment access—all of which may affect women's ability to cope.

## 2. DISCUSSION

Addressing Climate Change and Mental Health: Key Considerations

- Mitigation and Adaptation: Given the significant mental health impacts of climate change, reducing global warming and developing adaptive strategies are essential. This includes cutting greenhouse gas emissions through reduced fossil fuel dependence, expanding efficient alternative energy sources, and preserving green spaces. The global push to lower per capita carbon footprints highlights the importance of addressing disparities between wealthy and developing nations, requiring collaboration across sectors and countries.

o Air Quality and Mental Health in Delhi: The National Green Tribunal (NGT) recently requested responses from the Delhi government and CPCB on air quality's psychological impact. Delhi's report linked air pollution to increased sadness, cognitive challenges, and reduced resilience, particularly affecting rural and vulnerable populations. The report suggested general measures like staying active and accessing therapy, with specific options for psychiatric services at government hospitals.

o India's Climate Response: India's National Action Plan on Climate Change (NAPCC) outlines eight missions, including solar energy, energy efficiency, sustainable habitat, water resources, and agriculture, aiming to reduce climate impacts and promote sustainable development.

o Mental Health Infrastructure for Disasters: Adequate mental health treatment infrastructure is vital, especially during natural disasters, which often strain local healthcare resources. This underscores the need for external professional support to manage climate-related mental health issues effectively.

o Promoting Resilience: Strategies like yoga, which is culturally rooted, can promote resilience and help people cope with climate stress. For farmers impacted by climate change, economic relief measures such as debt forgiveness, cooperatives, and subsidies during droughts can ease financial and psychological burdens.

o Evidence-Based Solutions: Responding to climate change requires implementing and refining effective solutions, informed by systematic evidence, to create a cohesive and actionable approach.

o Addressing Pre-Disaster Mental Health Effects: While in many disasters mental health research focuses on crisis, post-impact, and recovery phases, less attention is given to pre-disaster psychosocial phenomena. Feelings of anxiety, doom, and hopelessness can arise in anticipation of extreme events or due to subacute environmental changes like rising temperatures and episodic droughts, underscoring the need for proactive mental health interventions during this phase.

## 3. RECOMMENDATION

- ***Sustainable mental health care*** in developed and developing nations is urgently needed as the realities of climate change become more and more apparent—especially for those most marginalized. Further, there are research needs in this domain where the efficacy and accessibility of mental health interventions related to climate change are assessed.

- Addressing the mental health consequences of climate change requires a multi-faceted approach that includes research, policy interventions, and coordinated global efforts. By taking proactive steps now, we can mitigate the mental health impacts of climate change on future generations.

- Triple P (Policy, Preparation & response, Practice), Double S (Surveillance & special training) & finally C, (which stands for Community-interventions).

support population-level mental health in a changing climate:

o Policy Measures: Enhance access to and funding for mental health care services.

o System Preparedness: Integrate climate change adaptation and resilience planning into mental health systems.

o Targeted Practice: Employ a stepped-care approach, commonly used in disaster mental health, to deliver tailored interventions based on disaster timing and distress levels.

o Surveillance and Monitoring: Conduct epidemiological surveys post-extreme weather events and track emergency department visits during heatwaves or other extreme conditions.

o Specialized Training: Provide care providers and first responders with training in psychological first aid and related skills.

o Community Interventions: Develop community-based resilience plans that prioritize psychosocial well-being.

- **Call for action at facility level:**

o Concrete Actions for Climate and Mental Health: The International Journal for Mental Health highlights actionable steps such as communicating the relevance of climate change to mental health, advocating for reduced greenhouse gas emissions in healthcare facilities, minimizing the sector's environmental footprint, and preparing for extreme events through adaptation measures.

- Sustainable Health Systems: According to an ISQua Green Paper[v], environmentally mature health systems are adopting accreditation standards like the Sustainable Healthcare Certification (USA), setting net-zero health service goals under national policies (e.g., Greener NHS in England), utilizing carbon footprint metrics (e.g., Aga Khan Health Services), and building climate-resilient systems via Health National Adaptation Plans in both Global North and South countries.

- Community Interventions: A notable example from Japan is shinrin-yoku or "forest bathing," a practice shown to lower cortisol levels, pulse rates, and negative emotions while enhancing positive feelings. Research on interactions with ecosystems, like World Heritage Areas, has demonstrated benefits such as improved quality of life, sense of place, self-identity, and emotional restoration.

- Global Commitments: Initiatives like the Paris Accord, SDGs, and the Sendai Framework support mental health and climate action, but better coordination and actionable steps from health practitioners are needed to address these challenges holistically and effectively.

- Public Awareness: Since 2007, media coverage on climate and health has risen by 78%, and academic research has tripled. While awareness of climate change's impact on physical health has grown, mental health remains underrepresented, reflecting broader global neglect of mental health compared to physical health in climate discourse.

## 4. CONCLUSION

- This discussion paper makes three key points. First, while linking specific mental health outcomes to climate change remains complex, more empirical research can advance this critical field. Second, the risks and mental health impacts of climate change are rapidly increasing, disproportionately affecting vulnerable/ marginalized populations. Third, interventions to address mental health and climate change should be coordinated and rooted in hope, addressing the issue holistically.

- The rising frequency of climate-related disasters can lead to post-traumatic stress disorder (PTSD), adjustment disorders, and depression. Climate-induced migration can result in acculturation stress, while increased rates of physical illness due to climate change can further contribute to psychological distress. Finally, the paper discusses the mental health implications of climate mitigation measures and proposes strategies to address these challenges.

- Concluding Remarks and Future Directions

- To better address the intersection of climate change and mental health, future efforts should focus on the following priorities:

  - Establishing consistent, robust measures for climate events, geographical analysis, and mental health outcomes across studies.

  - Investigating the amplifying effects of climate change on mental health disparities to guide targeted interventions.

  - Examining the long-term impacts of climate change on developmental trajectories and related mental health outcomes.

  - Exploring community-level mental health impacts to inform public health interventions, systems planning, and policy development.

  - As climate change continues to drive droughts, floods, rising sea levels, and higher temperatures, its psychological toll will manifest through economic strain, migration stress, reduced social cohesion, and trauma. Expanding access to mental health services and implementing effective climate mitigation strategies are essential for building resilience and reducing these challenges. Addressing these interconnected issues requires a unified response across research, policy, and practice.

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[i] https://www.ipcc.ch/2022/02/28/pr-wgii-ar6/

[ii] https://ijip.in/pdf-viewer/?id=12924

[iii] https://pmc.ncbi.nlm.nih.gov/articles/PMC4446935/

[iv] https://www.epa.gov/climateimpacts/climate-change-and-health-pregnant-breastfeeding-and-postpartum-women

[v] https://isqua.org/resources-blog/isqua-green-paper