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A SYSTEMATIC REVIEW OF ASSESSING THE IMPACT OF CLIMATE CHANGE ON MENTAL HEALTH IN PUBLIC HEALTH

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ABSTRACT

Climate change is a worldwide issue of urgency, threatening vulnerable societies and ecosystems, and leading to human diseases through natural disasters such as heatwaves, floods, and hurricanes. Lacking in importance is psychiatric research on mental illnesses due to climate change. The effect of climate change on mental health depends on several factors, such as local social, cultural, economic, and developmental context, spatial distribution of exposure, weather event type, duration and severity of events, and anticipated consequences for physical health and community well-being. While acute climatic change events such as hurricanes have had well-defined exposure areas and time periods, the initiation and course of mental health outcomes are obscure, and more research is needed in this pivotal field. It evaluates existing public health interventions, such as mental health service integration, community resilience programs, and policy initiatives aimed at mitigating these impacts. The findings highlight the urgent need for multidisciplinary approaches to address climate-related mental health challenges and emphasize the importance of incorporating psychological well-being into climate adaptation strategies. Recommendations for bolstering mental health systems, enhancing communication about climate change, and creating focused interventions to assist vulnerable groups are included in the review's conclusion.

Keywords: *Climate change, mental health, public health interventions.*

INTRODUCTION

Scientists have been studying the relationship between climate change and environmental determinants since the 1970s. Local effects of climate change are evident in severe weather conditions like heatwaves, flooding, and dry spells. Human activities that release greenhouse gases change the atmospheric balance,

creating an intense greenhouse effect [12] [21]. This sophisticated process initiates a chain reaction of effects that include mental health impacts deserving investigation and consideration [9]. Solar irradiance and other natural phenomena like volcanic eruptions are some of the factors contributing to climate change that are not caused by human action [14]. The majority of research focuses on the series of events that are mostly caused by global warming in the biosphere. Anthropogenic activities like the use of fossil fuels, pollution, and forest clearance have led to global warming, which will in all likelihood initiate universal emergencies in the future [10]. Such emergencies come in the form of severe climatic occurrences like droughts, wild fires, winter storms, and water catastrophes that inflict enormous effects on regional communities [13]. Global change has implications for every weather phenomenon, and over the last few years, global temperatures and variations in humidity have risen. While the scientific world continues to examine the connection between climate change and extreme weather phenomena, scientists are in consensus that human activities have led to the increase in disasters. The impacts of climate change are widespread, with environmental factors having a prominent role in psychiatry because of their ability to induce congenital malformations, impede neurodevelopment, and provoke neurological and psychosomatic disorders. Climate disasters like tornadoes, floods, and droughts can have a severe effect on human societies, producing specific psychological and psychopathological distress.

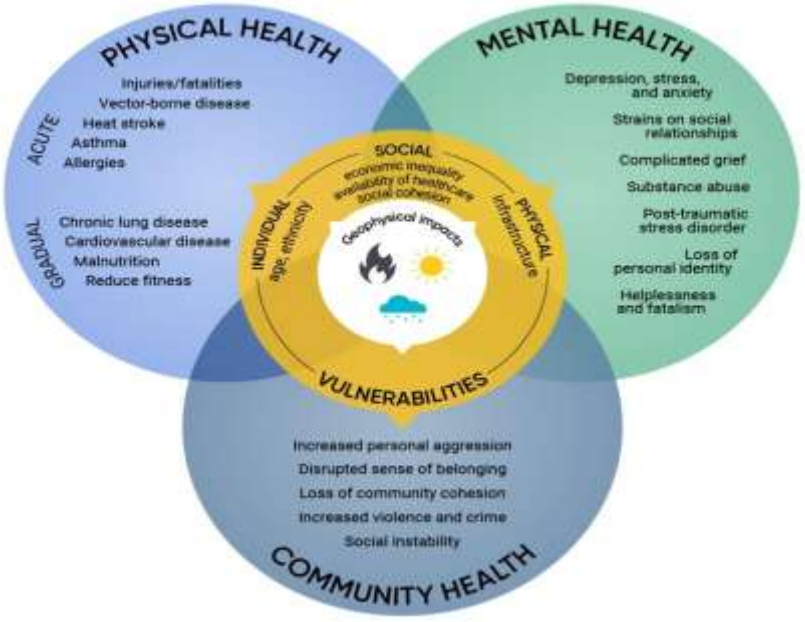

Figure 1: Interconnections between Physical Health, Mental Health, and Community Health

Aside from common climatic phenomena, some other environmental transformations like ocean acidification, acid rain, super fog, glacial melting, and biomass extinction could also leave deep impressions on mental health [11]. Despite the present limitation and infancy of research work linking climate phenomena to psychiatric disorders, the subject is now coming to be considered seriously by psychiatry. The decline in biodiversity, for example, can induce depression and hopelessness. Cultural and contextual elements of a person's relationship with his or her environment are essential in determining their mental health consequences. Destruction of this symbolic space can give rise to multifaceted psychopathological

consequences, such as dissociative syndromes, identity disorders, and personality changes over time, typically observed among people who have undergone trauma because of extreme climatic events, migration, or loss of home landscapes. Both short-term and long-term effects of climate change on mental health result in considerable psychological suffering for all communities. Direct trauma from extreme weather disasters like hurricanes, floods, droughts, and wildfires can result in PTSD, anxiety, despair, and an increased risk of suicide. Displacement due to rising sea levels, habitat destruction, and environmental degradation forces millions to leave their homes, leading to a loss of social connections, financial insecurity, and heightened emotional distress. In rural and Indigenous communities, climate change threatens traditional ways of life, contributing to solastalgia—a deep sense of loss and anxiety over environmental destruction.

Literature review

Extreme weather events brought on by climate change have an immediate and direct effect on people's mental health. But changes might also happen gradually, as in the case of rising temperatures. Climate change will severely change the historic and traditional image of areas, as known and lived by local people. The loss of cultural and spatial borders will have negative consequences for human life, potentially demanding radical changes in way of living. Additionally, people might lose their knowledge of the ordinary characteristics of the environment, its products, and places. The changes in landscapes will be caused by numerous reasons such as deforestation, deglaciation, river loss, water scarcity, desertification, the expansion of infectious diseases, and extinction of biomass, finally having a deep influence on cultural, social, and natural textures of concerned communities. Desertification alone could lead to disputes over resources. The anthropogenic impact of greenhouse gasses, which change the dynamics of CO2, could cause the earth to go extremely hot. Furthermore, recent research has shown that global warming and climate change are nonlinear processes [1-3]. Like insolation and heat stroke, the central nervous system can be notoriously compromised by an increase in ambient temperature. The loss of plant biomass brought on by natural disasters and human activity, such as mining, agriculture, and animal grazing, are the main causes of deforestation.[4] Human activities has resulted in a massive loss of forests. Because of the heightened ecological consciousness, news about such occurrences has a stressogenic effect on people in the West. Natural environments' degradation has created an atmosphere of loss and damage to world heritage, which is now accepted as a biospheric issue. Deforestation affects indigenous peoples greatly, resulting in maladaptive disorders, depression, and separation from their heritage. Forests are generally regarded as a health, well-being, and stress-protecting source. Yet, environmental and ecological shifts can have disastrous effects, such as economic crises, rising suicide rates, and mental illness, especially among susceptible groups like working men. The additive stress of economic adversity, restricted resource availability, and ill health can degrade a person's ability to cope, resulting in physical, cognitive, psychological, and social dysfunction [17-18]. Chronic or simultaneous economic adversities can greatly reduce well-being and health. Climate change has disparate effects on the mental health of vulnerable groups such as children, the elderly, people with chronic diseases, mobility impairment, pregnant and postpartum women, people with mental disorders, and people from poorer socioeconomic groups [20]. These groups are at greater risk of experiencing the psychological impacts of climate change and thus require interventions and support targeting their needs. Thus, global economic disparity has gotten worse due to climate change [16].

Objectives

- To identify the mental health disorders associated with climate change, including anxiety, depression, PTSD, and eco-anxiety [15].
- To examine the impact of climate-related stressors (e.g., extreme weather events, displacement, environmental degradation) on mental well-being [19].

Research question

- How does climate change impact mental health outcomes in public health, and what strategies can be implemented to mitigate its psychological effects?
- Which populations are most vulnerable to climate change-related mental health impacts, and what factors contribute to their susceptibility?

Methodology

Large storms, flooding, droughts, and heat waves are examples of extreme weather that climate change can cause. It also affects mental health in addition to physical health (e.g., poor air quality) by spreading diseases and causing pre-existing ones to resurface. The effects of natural disasters on mental health encompass a broad spectrum of conditions [6]. Significant environmental and behavioral changes will result from climate change, which will also lead to environmentally driven migration (climatic refugees and random asylum seekers). These migrant populations already have psychological vulnerabilities of their own [7-8]. They might even struggle to determine which emotional regulation is appropriate for a certain climate change. Severe events caused by climate change have extensive impacts on mental health, with acute, sub-acute, and long-term consequences that can present as different psychopathological responses over time. Mental adaptation and the formation of certain behavioral tendencies take place in three stages: pre-alert, during the catastrophe, and after the catastrophe. Yet, the identification of long-term consequences of these events is still a problem. Consequences of climate change, like economic and social disadvantage, are the cause of a higher prevalence of mental illnesses in not just the population affected but also in generations that follow. Studies are generally less concerned with general categories of climatic events because some of the resultant disorders are event-specific whereas others are found across extremity of different types of events. Understanding this intricate interplay allows for the planning of early interventions and activities to facilitate the mental health of impacted populations [5].

Statistical Techniques to be Employed

Various statistical methods will be used to accomplish the goals of the current investigation. First, specific descriptive statistics, such as Pearson correlation, will be computed on the mental health scores of senior secondary school pupils in order to verify the data's normalcy.

Table 1: Pearson correlation

SMM and EBBE	**Correlation coefficient (r)**	**P value**
Climate Change-Specific Factors:		
Climate change awareness and concern: Knowledge and worry about climate change can influence mental health responses.	0.369	0.00
Climate-related displacement and migration: Forced relocation can lead to mental health impacts.	0.394	0.00
Climate-related economic impacts: Economic losses and instability can contribute to mental health stress.	0.483	0.00
Environmental Factors:		
Climate-related social and cultural impacts: Changes to social and cultural practices can influence mental health outcomes.	0.430	0.00
Climate change policy and governance: Effective policy and governance can reduce climate-related mental health risks.	0.311	0.00
Environmental degradation: Land degradation, soil erosion, and loss of natural resources can contribute to mental health impacts.	0.524	0.00
Social and Community Factors:		

Social support networks: Strong community bonds and social support can mitigate mental health impacts.	0.300	0.00
Community cohesion: Communities with high levels of trust, cooperation, and collective efficacy may be more resilient.	0.271	0.00
Cultural and traditional practices: Indigenous communities' cultural practices and traditional knowledge can influence mental health responses.	0.393	0.00
Individual Factors:		
Socio-economic status: Low-income individuals and communities may have limited resources to adapt to climate change.	0.450	0.00
Education and awareness: Knowledge and understanding of climate change can influence mental health responses.	0.264	0.00
Personality traits: Coping styles, resilience, and adaptability can affect mental health outcomes.	0.397	0.00

Data will be evaluated using SPSS and the "Analysis of Variance" procedures in two ways to determine the interactional effects of gender, family type, location, and self-concept on senior secondary school students' mental health.

Table 2: Reliability Statistics

Items	Cronbach Alpha Value
How do mental health conditions like anxiety, depression, and post-traumatic stress disorder (PTSD) relate to climate change across different populations?	0.740
What effects do natural disasters like hurricanes, wildfires, and floods have on the mental health of the communities they affect?	0.772
What effects do migration and displacement brought on by climate change have on mental health?	0.733
What effects can climate change-related stressors like heat stress, drought, and air pollution have on the mental health of precarious groups like children, the elderly, and people with pre-existing mental health conditions?	0.725
What are the effective strategies for mitigating the mental health impacts of climate change, and what role can public health professionals play in promoting mental health resilience?	0.780
How can climate change-related mental health risks be assessed and monitored in public health surveillance systems?	0.872
What socioeconomic and cultural elements affect how climate change affects mental health, and how can public health treatments be modified to take these aspects into account?	0.942
What effects will climate change have on public health infrastructure and resource allocation, and how can it be integrated into mental health policy and planning?	0.782
What are the consequences for public health messaging and education, and how can the public be made aware of the hazards to mental health associated with climate change?	0.799
What are the best ways to lessen the negative effects of migration and displacement brought on by climate change on mental health?	0.714
In light of climate change, how can public health practitioners support mental health adaptation and resilience?	0.758
What effects can food and water insecurity brought on by climate change have on mental health?	0.929
What effects do social and community network disruptions brought on by climate change have on mental health and wellbeing?	0.942
What connection exists between the effects of climate change and the mental health of particular groups, such as farmers, urban dwellers, and indigenous communities?	0.799

Extreme weather events will become more frequent in the future due to climate change. We are aware that psychopathological abnormalities including meteoropathic illnesses, seasonal affective disorders, and weather sensitivity can be brought on by variations in the weather. Subclinical symptom patterns can develop in reaction to a wide range of atmospheric disturbances and changes, such as temperature, humidity, precipitation, barometric pressure, brightness, air circulation, air ionization, and thunderstorms, as well as sudden changes in these environmental factors.

Conclusion

Climate change has been identified as a social determinant of mental health with a strong link between natural disasters and mental disorders. There are people who are biologically more predisposed to the effects of atmospheric events on their physical and mental health. Such people are referred to as meteoropathic subjects who are prone to various psycho-physical symptoms such as mood swings, restlessness, anxiety, physical as well as mental weakness, headache, hypertension, hyperalgesia, pains, and autonomic symptoms. In addition, air pollution exposure can lead to neurological instability and worsen the mental health impacts of climate change. It has been discovered that low average temperatures and little rain cause more psychiatric visits to emergency rooms. Everyday activities can be affected by the weather, and physical aspects of the surroundings might cause behavioral changes. These psychopathological problems resulting from sensitivity to typical weather conditions can now be researched from a larger perspective due to global climate change.

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