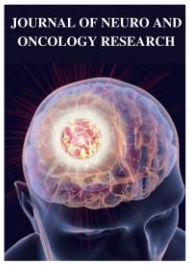

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Review Article

Detrimental Effect of Climate Change on Mental Health

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Abstract

Climate change is recognized as a significant threat to biological subjects and global health, including mental health. Rising temperatures, extreme weather occurrences and altered ecosystems negatively impact mental health. People who have been affected by detrimental effects of climate change, including heat waves, floods, tornadoes, hurricanes, droughts, wildfires, glaciers, changes in agricultural conditions and river disappearance, are more likely to develop increased mental problems such as Post-Traumatic Stress Disorder (PTSD), depression, grief, stress, anxiety, trauma, suicidal thoughts and despair. Rising ambient temperatures are also expected to increase rates of aggression and violent suicides. This review delves into the detrimental effects of climate change on mental health, highlighting the complex interplay between environmental, psychological and social factors. Climate change induced shifting land use and residence, eroding facilities, causing financial and relationship stress and displacing entire communities. Moreover, psychiatric research on mental illnesses associated with climate change is conspicuously lacking.

Keywords: Climate Change; Mental Health; Psychological Effects; Suicides; Adaptation

Introduction

Climate change is one of the most significant threats to mental health. The entire scientific field is concerned about the effects of climate change on fragile communities and exposed biological sources [1]. This review article outlines how climate change might harm mental health and proposes solutions to prevent the adverse effects. Gradual temperature shifts are a common feature of climate change and large sample sizes are necessary to identify the effects of these minor changes on mental health [2]. According to the World Health Organisation, Climate change is the greatest hazard to human health [3]. It is defined as the shift in the climate that is caused by human activity that impacts the composition of the global atmosphere, either directly and indirectly, as shown by numerous deaths and diseases brought due to the rise in the frequency of extreme weather events like heatwaves, floods, hurricanes, wildfires and rising sea level [4,5]. An increase in zoonoses, food, water and illnesses by vector-borne (e.g., fever, dengue, malaria), as well as mental illness, mental problems and psychosocial (depression, anxiety, stress disorder, post-traumatic and suicide), this comprises mental wellness, emotional resilience and psychosocial wellbeing [6]. Due to human (anthropogenic) emissions, it has been noted that the average global temperature is expected to increase by 0.5° C by the end of the 21st century [7]. A major contributor to climate anxiety is knowing that danger is coming but lacking the necessary scripts, abilities or direct agency to reduce it. Anxiety related to the existential threat posed by the climate and ecological catastrophes (disaster) is known as "eco-anxiety" [8]. The rising prevalence of eco-anxiety highlights the necessity to investigate its association with mental health outcomes. while underlining the variance amongst adaptive and maladaptive types and the significance of considering the necessary societal reaction to deal with climate change [9].

Our perspective on mental health is broad, which affirms the fact that emotional and mental health are a range, which means that anyone can experience better or worse mental health at any time. Additionally, it accepts that having good mental health is a state of well-being that allows one to thrive in every element of their daily existence [10]. The current world population is 41% young, with 15.5% being between the ages of 15-24 and 25.4% being between the ages of 0-14 [11]. Mental health issues raise stigma and social discrimination, interfere with youthful access to education and employment and are linked to higher lifetime suicide risk, early mortality and increased health burden [12]. Since they are still going through a lot of neurological and cognitive development, children and young people may not be able to handle stress and uncertainty as well as adults and may lack experience. As the prevalence of adults rises, smoking rates are escalating about mental health [13,14].

Like PTSD, suicide and suicidal ideation rates rise after climate change-related events, with heatwaves and droughts being especially troubling. Unfortunately, a recent study found that almost 60,000 suicides in India during the previous 30 years may have been caused by rising temperatures [15]. Farmers have the highest suicide rate of any industry and there is growing evidence that those who engage in farming are more likely to experience mental health problems, including estimates of lost economic productivity. However, these growing statistics highlight how crucial it becomes to create efficient mitigation and adaptation plans [15].

Since the industrial revolution, the utilisation of fossil fuels has enabled humans to make decisions about where and how to live without relying on the local climate and to explore strategies for operating at a population level to advance research and policy formulation at the intersection of mental health and climate change.

The impact of climate change aids people and communities in creating resilience frameworks that permit the investigation and expression of their feelings.

- Incorporate climate concerns into mental health initiatives
- Expand on global responsibilities
- Combine climate action with mental health support
- Create community-based strategies to decrease susceptibilities
- Bridge the significant budget gap for mental health and psychosocial support

Materials and Methods

Search Strategy

This review aimed to examine the literature for relevant studies that addressed how climate change affects the mental health of children and young people. Before starting the search, author S.H sought terms and search strategy advice. The initial search was carried out on 7/3/2025 using three online databases: PubMed, Google Scholar and Web of Science. The search engines (PubMed; January 1996 to 23/5/2023, there were almost 35 million citations and abstracts, 1971-1997 are primary facilities. 10.9 million of articles, during the last six years December 31st 2019, an average one million records were added annually), (Google scholar; is a bibliographic database released on 20 November 2004, previous statistical estimate published in PLOS One utilising a mark and recapture method between 79- 90% of all English-language articles, with an estimated 100 million. December 2006 was linked to significant open, large, freely accessible libraries. By their publishers, Acharya declared in 2007 that Google Scholar has begun a campaign to digitise and host journal articles. 2012 scholars create personal citations but do not display DOIs) and (Web of Science; 9,200 periodicals throughout 178 scientific areas with acceptance from 1900 to the current day, comprising around 53 million datasets), by experts to identify the main ways in which climate change may impact mental health. Several crucial methodological are temperature, water, air pollution, hurricane, natural disaster, drought, floods, heatwaves, rising sea level, mental health, mental illness, mood disorder, depression, grief, anxiety, trauma, suicide, wellbeing, posttraumatic stress disorder PTSD, psychological adaptations [10,11].

Inclusion criteria for the selection of studies

- Research conducted in adult human populations from any region, including the entire population, society or mental health context
- It is crucial to emphasize that climate change does not have the same impact on various mental health conditions
- There were no constraints on intervention target demographics or geographical contexts

- It provided information from reality or case studies that supported clinical applications
- Emerges from the effect of climate change on mental health awareness/research programs

Exclusion criteria for the selection of studies

- Every source except primary research and review papers (such as publications, observations, grey literature, government, etc)
- Articles that talk about preventative and care initiatives and policies related to climate change, but they don't assess mental health outcomes directly
- Only the introduction and discussion of the paper-not the aim statement, methods section or outcomes section-discussed human health
- Full text is unavailable

Data Extraction (Data analysis or synthesis)

The data were extracted from the articles (such as the year of publication and the institutional affiliations of the authors) and study attributes (such as primary or secondary research, the country of study, the geographic scope of study and methodology), except for Nature and Scopus, which searched the same database. Furthermore, data relevant to the scoping review goal was gathered, such as the following categories of mental health topics: the impact of climate change on mental disorders. We analysed and evaluated a data extraction chart using Microsoft Word/Excel (personal computer software) 2014-2020; to depict and summarize the study characteristics. Articles that qualify are compiled and categorized based on their results (Table 1).

Author(s)	Region and Climate Related Disaster	Dependent variable	Result	Reference No.
Stanke, et al., 2012	European Union/ Coastal flooding	1.6 million more people suffer economic stress. 2005 examined depression, anxiety, PTSD and suicide	Psychosocial support and improved primary and secondary mental healthcare. HPA discovered dramatic consequences on the health of those affected.	16
Addison, et al., 2024	Europe/Rising heatwave	5% anthropogenic, 31% infectious disease and 18% cardiorespiratory diseases.	Explored physiological change, neurotransmitter involvement and neuro development impacts like to create a change roadmap guide (politicians and policymakers).	17
Corvetto, et al., 2024	Brazil (Curitiba)/ heat events/vulnerability, temp-17.8℃ were (167 days) moderate and 19 (days) extreme heat.	Private emergency centre on (2017-2021) due to higher MH patients (heatstroke/ dehydration), (0.41%) alcohol	Benefit from policies, extended to other similar countries. Indicate the policymakers and healthcare planners, allowing	18

		misuse, (0.28%) schizophrenia hospitalized, neurotic disorders and suicide attempt, one 60% were private (154,954) and 40% were public sector patients (101,452).	free access to public transportation with proof identity, over 65 aged actively search during the extreme times and early warning (alert) system.	
Obrien, et al., 2014	Australia/prolonged drought (2001-2008) BIG DRY	'Agricultural drought' can be measured in perspective. Local farmers' suicide rate (hypothesis). Psychological distress (low:10-15; moderate: 16- 21; high: 22- 30; very high: 30 plus), fatigue, depression, nervousness.	HILDA survey was funded over 14 years in 2001 (wave 1, N=13,969) and participants under 18 years (6.98%), 90% in whole years. Wave 7 HILDA response rate 94.7% and 13,590 respondents, of whom 5012 were selected.	19
Alibudbud, et al., 2023	Philippines/Typhoon Haiyan (Yolanda 2013)/20 typhoons every year/extreme drought/ rising sea level;(Hurricane 2005); Eastern Visayas critical region.	May worsen anxiety, distress, suicide rates, rising cases PTSD/ one million home destroyed/four million people displaced/killed 6000. (14.5%) depression; (0.4%) schizophrenia before typhoon; (7-24%) PTSD natural disasters; WHO estimated over 800000 people suffered from mental health.	Total government spend (3-5%), health act on 2018 for filling the gaps of mental health services/ grant from any funding agency.	20

Table 1: Studies categorized by type of climate change-related event.

Result

A total of 80 studies were selected for quantitative and qualitative analysis, emphasizing the serious health hazards caused by climate change [16-21]. The studies covered numerous geographical areas, but communities with low incomes, Indigenous peoples, coastal areas, women, children and the elderly were given particular attention. The global warming phenomenon has both direct and indirect repercussions, all of which endanger mental health, particularly for vulnerable groups with poor coping capacities and pre-existing mental problems. To close this vacuum in the literature, the current position paper makes recommendations for sustainability in mental health care, research and EPA transmission. Climate change has serious implications for mental health, particularly among vulnerable groups [5]. The notion of psychological detachment from climate

change can stifle citizen participation.

This review included Fig. 1 (1990-2021); South Asian nations have seen remarkably strong economic expansion. However, the world's greatest population of destitute, hungry and uneducated people lives here. The percentage of the population with mental health disorders like depression, anxiety, bipolar disorder, eating disorders and schizophrenia in South Asia was 1990 (13.5) and 2021 (14.4). As a result, mental health services are often underutilized, even when they are available. Compared to those whose mental health remained stable, Australia cases in 1990 (18.6) and 2021 (19.0) received mental health care. The budget for 2022-2023 also included $547 million to support the five pillars of the National Mental Health and Suicide Prevention Agreement. Additionally, $586.9 million was set aside for action and expansion projects in the 2023-2024 Budget resources from the Australian Government, Australian Institute of Health and Welfare. In the United States, mental diseases are widespread; more than one in five adults are predicted to have a mental disorder in 1990 (15.7%) and 2021 (18.5%). But the U.S. has the highest suicide rate compared to Australia. According to the Table 1, Mauritania is a small country with abundant resources. This reported having lower mental health in the 1990 (9.2%) population with mental health comprised depression, anxiety, bipolar, eating disorders and schizophrenia and is expected to rise to 9.9% by 2021. UNICEF (United Nations Children's Fund) relies entirely on voluntary contributions from individuals, governments, civil society and the commercial sector.

The first search Global Burden of Disease study offers a thorough analysis of worldwide health patterns. GBD (collaborative network) studied on 2021, Institute for Health Metrics and Evaluation (IHME) in the United States, 2024. The most recent update involved more than 12,000 researchers from more than 160 nations and territories.

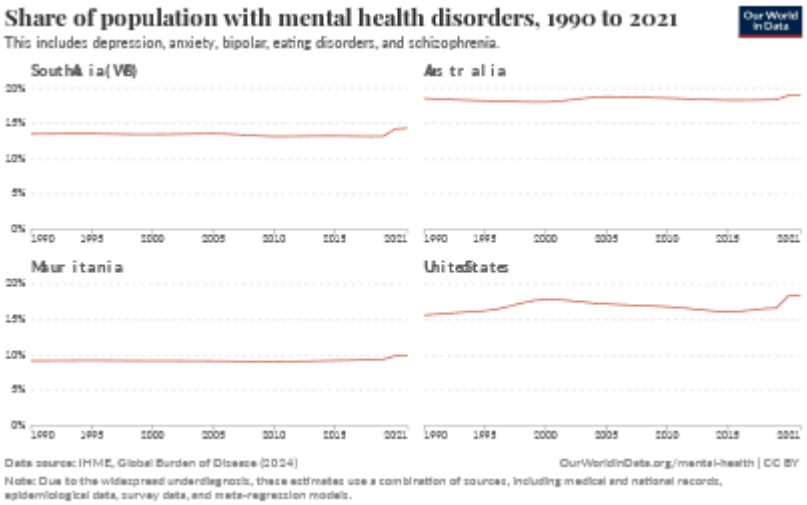

Figure 1: Share of population with mental health disorders, 1990 to 2021period. Source: IHME, Global Burden of Disease (2024) - with major processing by Our World in Data. "Share of population with mental health disorders" [dataset]. IHME, Global Burden of Disease, "Global Burden of Disease - Prevalence and Incidence" [original data]. (Retrieved March 9, 2025) from https://ourworldindata.org/grapher/share-with-mental-and-substance-disorders

As shown in Fig. 2, the geographies which represented the four lowest countries Mauritania (n = 9.9), Mali (n = 9.2), Niger (n = 9.4), Nigeria (n = 9.6) and eleven are the highest countries United states (n = 18.5), Greenland (n = 19.5), Brazil (n = 19.4), Spain (n = 18.9), Portugal (n = 21.0), Switzerland (n = 18.3), Tunisia (n = 19.0), Greece (n = 19.1), Iran (n = 20.7), Australia (n = 19.0), New Zealand (n = 18.3) on the effect of mental disorder outcomes. Although this review focused on the mental health occurs due to climate change like depression, anxiety, trauma, PTSD etc. reported by an increase in the number of persons suffering from poor mental health and emotional well-being, whether in the short or long term [11].

The correlation between economic losses via lost job opportunities, income, productivity losses linked to property damage, forced relocation and a diminished sense of belonging to the local natural environment are some of the ways that climate change can affect the well-being of communities [22]. Seasonal environmental variations connected to water security have been shown to cause significant emotional discomfort for populations in low-income countries who rely heavily on the local environment to

support fundamental human and animal requirement. In this graph, Fig. 3, which is represented by the cases of mental disorders per 100 people (including anxiety, depression, PTSD and schizophrenia) in 1990, 1995, 2000, 2005, 2010, 2015 and 2021 datasets, was carried out for mental disorders in high-income countries, lower middle income, upper middle income and low-income countries (classified by the World Bank) evidence suggests that low- and middle-income countries are more vulnerable to climate change-related disasters and have fewer resources to address these stresses [23].

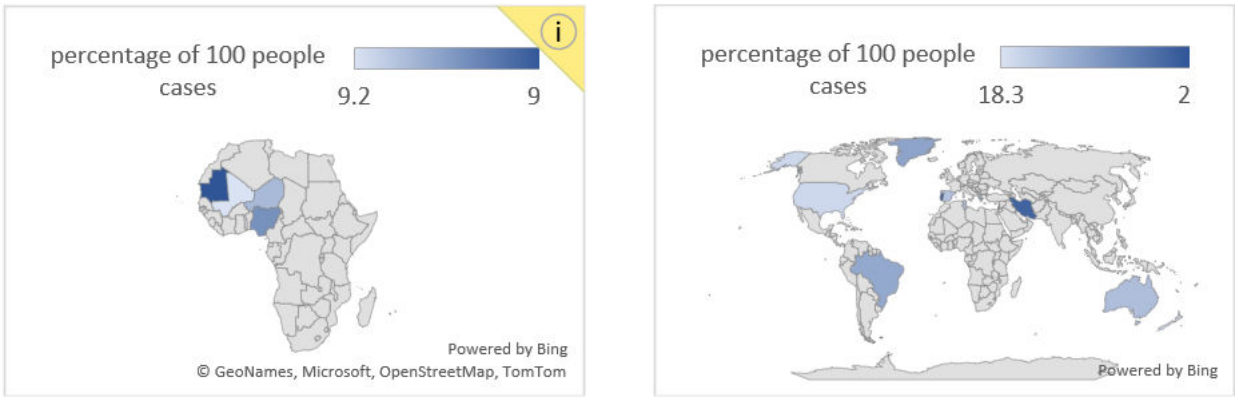

Figure 2: Showing countries lowest and highest percentage have reported on mental disorder cases in 2021.

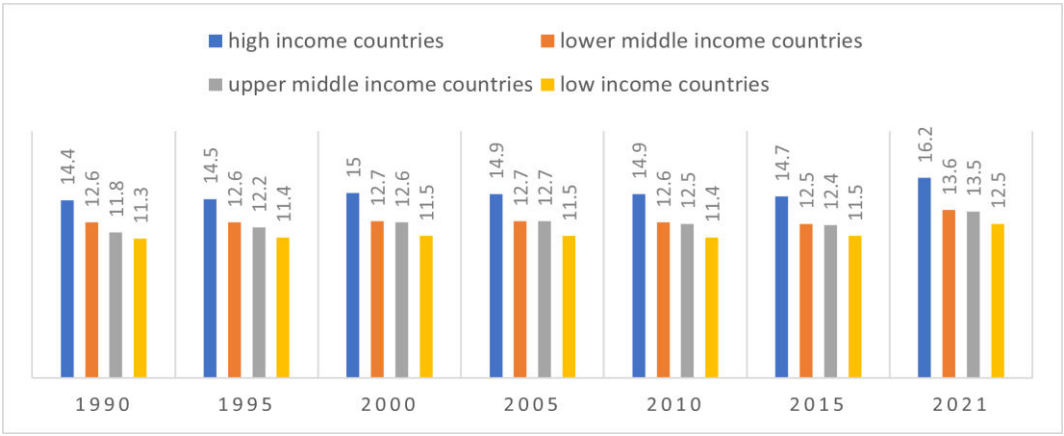

Figure 3: Current cases of mental illness per 100 persons.

Discussion

This review aimed to identify whether natural disasters have a strong connection to mental problems. Climate change will lead to an increase in the frequency of extreme weather events. In this situation, attribution refers to the scientific relationship between greenhouse gas emissions and meteorological change and the link between climate change-related meteorological change and mental health effects [24]. Extreme events such as temperature, humidity, rain, barometric pressure, brightness, rate of airflow, air ionization, thunderstorms and abrupt fluctuations in some of these elements can all cause specific symptom patterns below the dangerous threshold and may hurt people's physical and emotional well-being [1]. Following a tragedy, acute traumatic stress is the most typical normative reaction; symptoms go away as soon as safety and security are restored. However, several stress-related issues, including difficult bereavement, depression, anxiety, somatic disorders and drug and alcohol abuse, will persist in some survivors, along with persistent Post-Traumatic Stress Disorder (PTSD) during crisis children frequently show more signs of distress than adults [25]. One additional approach has been to monitor emergency room visits for people seeking treatment for mental health disorders during heat waves or other extreme weather events [24]. How to promote mental health through therapeutic work with children, parents and society in the context of climate change. Since open-ended questions are more likely to yield richer data (or elicit more narration), most qualitative researchers assume this [26]. Future urban planning also needs to evolve to mitigate and prepare for the effects of climate change on mental health and how governments and communities may react to lessen these impacts and ensure that the shift to net zero doesn't make already-existing disparities in mental health worse. Therefore, more research into these areas would provide a more thorough knowledge [27]. Montoro, et al.,

also reported in the study carried out that the health care given to this group would improve as they would be more equipped to analyze the environment and recognize the climate dangers [28]. Moreover, when individuals are mentally weak, their immune system becomes weak and the gut microbiome can also be altered, which can trigger various human diseases, including autoimmune [29]. Climate change elevates the release of environmental toxicants, nano-sized particles, which are not only responsible for causing neuro-related dysfunctions culminating into mental health issues but also genotoxicity [30]. Human health safety, resilience and adaptation mechanisms need to be emphasized as a primary goal.

Conclusion

Based on the available literature, this research appears to provide considerable evidence that climate change has an influence on biodiversity and ecosystem health. Various species are experiencing shifts in their habitats, leading to altered migration patterns and, in some cases, increased extinction rates affecting mental health. Climate change affects young people's and children's well-being, with consequences for healthcare, policy and academics. This analysis emphasizes that climate change exacerbates several Indigenous peoples-specific vulnerability mechanisms and creates more indirect, mild and frequent clinical depression mental health impacts. Specifically, time spent on the land was found to fulfill important individual criteria of psychological well-being and community cohesion. As these communities grapple with the impacts of climate change, it becomes crucial to support their resilience and safeguard their mental health to promote adaptation strategies, healing and well-being. Throughout the research and in several cases, it extended to entire communities. In addition, raising public awareness, developing policies, promoting social and economic equity and training programmes, as the effects of climate change become more frequent and severe, must strengthen community resilience. To develop integrated disaster risk governance policies, government agencies must take the lead in collaborating with significant parties at the global (due to gap), regional and national levels.

Conflict of Interests

The authors have no conflict of interest to declare related to this article.

Authors' Contributions

SH Devi conceived of this paper and developed the paper outline. JS undertook the literature review, developed the paper and incorporated co-author contributions. SH Devi and JS contributed generally to successive iterations of the paper. All authors read and approved the final manuscript.

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