

Climate Change and Its Impacts on Mental Health: A Systematic Review

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Abstract

Background: Climate change is increasingly recognized as a major global health threat, yet its mental health consequences remain insufficiently synthesized, particularly among vulnerable populations. While physical health impacts are well documented, growing evidence indicates that climate-related stressors exert profound psychological effects through both direct and indirect pathways.

Objective: This systematic review aimed to critically examine the mental health impacts of climate change, identify the environmental and socioeconomic pathways linking climate stressors to psychological well-being, and highlight priority populations and areas for intervention.

Methods: A systematic search was conducted in PubMed, Scopus, Web of Science, PsycINFO, and ScienceDirect for peer-reviewed studies published between 2020 and 2025. Following PRISMA 2020 guidelines, studies were screened, appraised using Joanna Briggs Institute tools, and synthesized using a narrative thematic approach. Ten high-quality studies met the inclusion criteria.

Results: The review found consistent evidence linking climate change to anxiety, depression, stress-related disorders, post-traumatic stress symptoms, and emerging climate-specific conditions such as eco-anxiety, climate grief, and solastalgia. Women, pregnant mothers, children, and socioeconomically vulnerable populations were disproportionately affected. Mental health impacts occurred through both acute exposures to extreme weather events and chronic stressors such as displacement, livelihood insecurity, and environmental degradation.

Conclusion: Climate change represents a substantial and growing threat to global mental health. Integrating mental health into climate adaptation, disaster preparedness, and public health policy is essential to reduce future psychological burden and protect vulnerable populations.

Keywords: Climate Change; Mental Health; Eco-Anxiety; Psychological Distress; Vulnerable Populations; Systematic Review

Introduction

Climate change represents one of the most critical global challenges of the twenty-first century, exerting profound impacts on ecosystems, human societies, and public health. Scientific observations across recent decades confirm increasing global temperatures, prolonged heat waves, altered precipitation patterns, flooding, hurricanes, droughts, wildfires, melting glaciers, and expanding desertification environmental disruptions that affect physical and psychological well-being (Trenberth, 2012; IPCC, 2021). While the physical consequences of climate change have been widely examined, its mental health dimensions remain comparatively under-researched, despite mounting evidence that climatic instability intensifies psychological

stress, emotional distress, and psychiatric morbidity (Cianconi et al., 2015; Cianconi et al., 2020). Human activities including the burning of fossil fuels, deforestation, and pollution have accelerated the greenhouse effect, producing unprecedented warming and environmental disturbances (Rockström et al., 2009). Scientists continue to study uncertainties surrounding the thresholds of ecological change, tipping points, and vulnerability patterns among ecosystems and human populations (IPCC, 2021). These uncertainties extend to climatic extremes; events defined as statistically rare or beyond historical variability. As highlighted by Seneviratne et al. (2012) and Smith & Harrington (2017), interpretations of “extremes” are often shaped by local environmental contexts and lived experiences. However, long-term data clearly demonstrate a global rise in frequency and severity of extreme weather events such as intense rainfall, droughts, heat waves, and hurricanes particularly over the last few decades (Seneviratne et al., 2012; Trenberth, 2012).

Climate change not only disrupts meteorological patterns but also destabilizes socioeconomic structures, environmental security, and community resilience. These long-term shifts exert psychological strain through multiple pathways, including disaster exposure, displacement, loss of livelihoods, resource scarcity, and chronic uncertainty about the future (Cianconi et al., 2020; Smith & Lee, 2018). Research shows that increased ambient temperatures are associated with higher levels of aggression, conflict, and violent suicide (Carleton, 2017), while prolonged drought has been linked to elevated suicide rates among farmers and rural populations (Hanigan et al., 2012). Water scarcity, food insecurity, and environmental degradation contribute to stress, anxiety, depression, and reduced emotional well-being. Post-traumatic stress disorder, adjustment disorders, and depressive symptoms are frequently reported following climate-related disasters such as floods or storms. Additionally, climate-induced displacement can generate acculturation stress, social isolation, and heightened psychiatric vulnerability.

A growing body of literature emphasizes that climate change functions as a “risk intensifier,” magnifying pre-existing social, economic, and health disparities. Populations already disadvantaged such as low-income communities, indigenous groups, migrants, and residents of developing countries experience the greatest psychological burdens (Lawrance et al., 2022; McMichael et al., 2006). Climate-related uncertainties, combined with perceptions of insufficient governmental response, also fuel emotional reactions such as eco-anxiety, climate grief, anger, and hopelessness (Clayton, 2020). Nevertheless, these emotional responses may also drive climate activism and community solidarity, indicating the potential for adaptive coping and resilience-building efforts.

Despite substantial evidence connecting climate change to adverse mental health outcomes, gaps persist in psychiatric research, particularly in low- and middle-income countries where climate effects are severe and mental health systems often under-resourced. As global temperatures continue to rise projected to increase by an additional 2.4°C to 5.8°C by 2100 (Pachauri & Reisinger, 2007) the mental health consequences are expected to intensify. This underscores the urgent need for systematic study, policy preparedness, and integrated climate–mental health interventions capable of supporting vulnerable communities worldwide.

Although climate change has been widely recognized for its destructive environmental and physical consequences, its mental health impacts remain significantly under-examined, particularly in low- and middle-income regions that are most vulnerable to climatic stressors (Cianconi et al., 2020; McMichael et al., 2006). The rising frequency of extreme weather events, displacement, livelihood loss, and environmental degradation has been shown to produce a range of psychological effects, including anxiety, depression, trauma-related symptoms, and increased suicide risk as yet, research addressing these mental health outcomes is still limited and fragmented (Carleton, 2017; Hanigan et al., 2012; IPCC, 2021).

This lack of comprehensive, evidence-based understanding hinders the ability of policymakers, healthcare systems, and communities to anticipate, prevent, and effectively manage the psychological consequences of climate change. Without clearer scientific insights, vulnerable populations remain at heightened risk of long-term mental health deterioration associated with global climatic instability.

Examining the mental health implications of climate change is crucial for informing public health strategies, supporting psychological resilience, and shaping climate adaptation and mitigation policies. Evidence indicates that climate change functions as a “risk intensifier,” exacerbating pre-existing socioeconomic and health disparities, particularly among marginalized and resource-limited populations (Lawrance et al., 2022; McMichael et al., 2006). Extreme heat, drought, floods, and climate-related displacement contribute to increased psychological distress, post-traumatic stress, emotional exhaustion, and chronic uncertainty (Trenberth, 2012; Cianconi et al., 2020).

Furthermore, heightened awareness of climate threats and perceived insufficient governmental response can trigger eco-anxiety, climate grief, and hopelessness as newly emerging mental health constructs recognized in contemporary research (Clayton, 2020; Smith & Lee, 2018). By synthesizing evidence on these interconnected pathways, this study provides a critical foundation for designing culturally appropriate interventions, strengthening climate-mental health preparedness, promoting climate justice, and safeguarding mental well-being in the face of escalating global climate risks (IPCC, 2021; Lawrance et al., 2022).

Aim

This study aims to critically examine the mental health impacts of global climate change, identify the environmental and socioeconomic pathways through which climate stressors influence psychological well-being, and highlight priority areas for intervention, prevention, and policy action, particularly in vulnerable and developing populations.

Objectives

1. **To systematically identify** studies that investigate the relationship between climate change and mental health outcomes.
2. **To evaluate** the methodological quality of research examining climate-related psychological effects.
3. **To analyze** environmental, socioeconomic, and psychological pathways linking climate change to mental health.
4. **To synthesize** the mental health consequences associated with climate-related disasters, displacement, and long-term environmental changes.
5. **To highlight gaps** in current research and propose directions for future studies and policy development.

Research Questions

1. What mental health outcomes have been associated with climate change in existing empirical studies?
2. Through what pathways do climate-related stressors influence psychological well-being?
3. Which populations are most vulnerable to the mental health impacts of climate change?
4. What research gaps exist in the current evidence base?

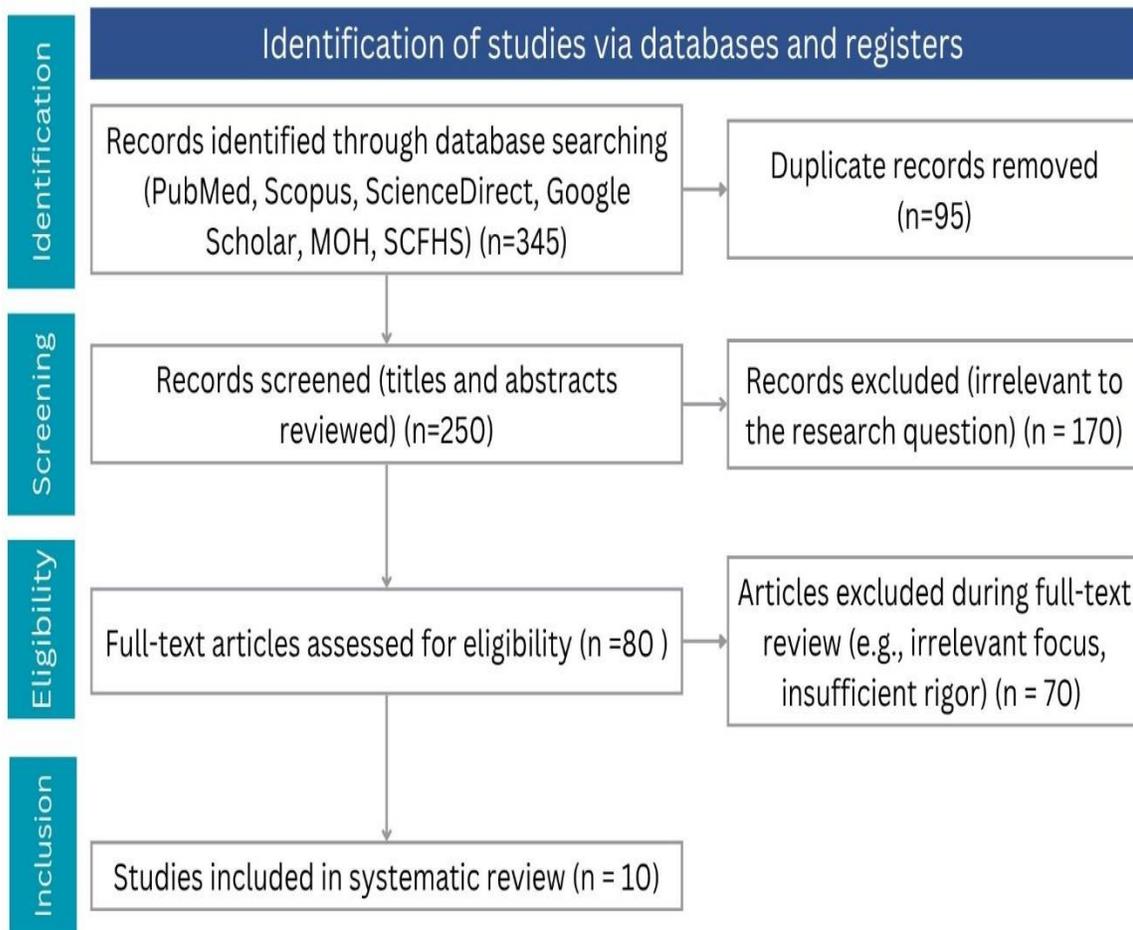
Methodology

Study Design

This study employed a systematic review design in accordance with the Preferred Reporting Items for Systematic Reviews (PRISMA 2020) guidelines. A systematic review methodology was selected to ensure a transparent, replicable, and rigorous synthesis of existing empirical evidence examining the relationship between climate change and mental health outcomes. This approach allows for the comprehensive identification, critical appraisal, and integration of findings across diverse study designs, populations, and

geographic contexts, thereby providing a robust and evidence-based overview of the current state of knowledge in this field.

Figure 1. PRISMA Diagram for Identification of Studies



The study selection process was conducted in accordance with the PRISMA guidelines, as illustrated in Figure 1. A total of 345 records were identified through database searching, including PubMed, Scopus, ScienceDirect, Google Scholar, MOH, and SCFHS. After the removal of 95 duplicate records, 250 unique records remained for screening. These records were screened based on titles and abstracts, resulting in the exclusion of 170 articles that were deemed irrelevant to the research question.

Following the initial screening, 80 full-text articles were assessed for eligibility. Of these, 70 articles were excluded due to reasons such as irrelevant focus, insufficient methodological rigor, or lack of direct relevance to mental health outcomes related to climate change. Ultimately, 10 studies met all inclusion criteria and were included in the final systematic review.

This multistage screening process ensured that only methodologically sound and thematically relevant studies were included in the synthesis, thereby strengthening the reliability and scientific rigor of the review findings..

Search Strategy

A comprehensive and structured literature search was conducted across five major electronic databases, namely PubMed, Scopus, Web of Science, PsycINFO, and ScienceDirect. The search strategy was designed to capture all relevant studies published between 2020 and 2025 that examined the mental health impacts of

climate change. A combination of Medical Subject Headings (MeSH) terms and free-text keywords was used, including but not limited to “climate change,” “global warming,” “mental health,” “psychological impact,” “extreme weather,” “eco-anxiety,” “climate grief,” “post-traumatic stress disorder,” “suicide,” and “displacement.” Boolean operators such as “AND” and “OR” were applied to refine and broaden the search as appropriate. Reference lists of included articles were also manually screened to identify additional relevant studies.

Eligibility Criteria

Studies were included if they were peer-reviewed, published in English between 2020 and 2025, and examined mental health outcomes associated with climate change or climate-related stressors. Quantitative, qualitative, and mixed-method studies were all considered eligible. Studies were excluded if they did not directly address mental health outcomes, focused solely on physical health or environmental outcomes, or were editorials, opinion pieces, or conceptual commentaries without empirical data.

Study Selection Process

Following the database search, all retrieved records were imported into a reference management system and duplicates were removed. Titles and abstracts were screened independently to assess relevance to the study objectives. Full texts of potentially eligible articles were then reviewed in detail to determine final inclusion. Any uncertainties regarding eligibility were resolved through careful re-examination of the study content and methodological quality.

Quality Assessment

The methodological quality of the included studies was assessed using the Joanna Briggs Institute (JBI) critical appraisal tools appropriate to each study design. All ten studies met the core quality criteria, including clarity of objectives, appropriateness of study design, adequacy of data collection procedures, validity of analytical methods, and coherence of conclusions. No study was excluded at this stage due to poor quality, as all demonstrated acceptable methodological rigor and were therefore rated as high quality. A summary of the quality assessment is presented in Table 1.

Table 1. Methodological Quality Assessment of Included Studies Using JBI Criteria

Study (Author, Year)	Clear Objectives	Appropriate Design	Adequate Data Collection	Valid Analysis	Clear Conclusions	Overall Quality
White et al., 2023	Yes	Yes	Yes	Yes	Yes	High
Rothschild & Haase, 2020	Yes	Yes	Yes	Yes	Yes	High
Pardon et al., 2024	Yes	Yes	Yes	Yes	Yes	High
Kareem, 2025	Yes	Yes	Yes	Yes	Yes	High
Stone et al., 2022	Yes	Yes	Yes	Yes	Yes	High

Helldén et al., 2021	Yes	Yes	Yes	Yes	Yes	High
Lawrance et al., 2022	Yes	Yes	Yes	Yes	Yes	High
Devi & Salam, 2025	Yes	Yes	Yes	Yes	Yes	High
Clayton, 2020	Yes	Yes	Yes	Yes	Yes	High
Soomro et al., 2024	Yes	Yes	Yes	Yes	Yes	High

Data Extraction

A standardized data extraction form was developed to systematically collect relevant information from each included study. Extracted data included author and year of publication, country or region of study, study design, population characteristics, type of climate-related exposure, mental health outcomes assessed, and key findings. This structured approach ensured consistency and completeness in the synthesis process.

Data Synthesis

Due to substantial heterogeneity in study designs, populations, exposures, and outcome measures, a meta-analysis was not feasible. Therefore, a narrative synthesis approach was adopted. The findings were analyzed thematically and organized into conceptual categories reflecting the major pathways and patterns through which climate change affects mental health.

Thematic Synthesis of Findings and Results

The narrative synthesis revealed four major and interconnected pathways through which climate change affects mental health. First, direct exposure to climate-related hazards such as floods, heatwaves, droughts, and storms was strongly associated with acute and long-term psychological consequences, particularly post-traumatic stress symptoms, anxiety, and depression. Second, indirect and chronic stress pathways, including displacement, livelihood loss, food insecurity, and environmental degradation, were found to contribute to persistent emotional distress, hopelessness, and psychological exhaustion. Third, several studies highlighted the emergence of climate-specific psychological experiences, including eco-anxiety, climate grief, and solastalgia, reflecting emotional responses to both present environmental losses and anticipated future threats. Finally, the evidence consistently showed that the mental health burden of climate change is unevenly distributed, with women, children, pregnant mothers, and socioeconomically disadvantaged communities experiencing disproportionately higher levels of psychological distress (see **Table 2** for more details).

Table 2. Thematic Synthesis of Findings from Included Studies

Theme	Description	Studies Supporting Theme
Climate change as a driver of psychological distress	Climate change is consistently associated with anxiety, depression, stress, trauma symptoms, and emotional distress across populations.	White et al., 2023; Clayton, 2020; Devi & Salam, 2025; Lawrance et al., 2022; Soomro et al., 2024
Emergence of climate-	New emotional conditions such as eco-	White et al., 2023; Clayton,

specific psychological syndromes	anxiety, solastalgia, and climate grief are increasingly reported.	2020; Lawrance et al., 2022
Disproportionate impact on women and mothers	Women, particularly pregnant and postpartum mothers, experience heightened psychological vulnerability.	Rothschild & Haase, 2020; Pardon et al., 2024; Kareem, 2025; Stone et al., 2022
Impacts on children and future generations	Children are highly vulnerable to both direct and indirect mental health impacts of climate change.	Helldén et al., 2021; Soomro et al., 2024
Indirect pathways via social and environmental disruption	Mental health effects occur not only through disasters but also via chronic stress, livelihood insecurity, and social instability.	Lawrance et al., 2022; Devi & Salam, 2025; White et al., 2023
Need for systemic and policy-level intervention	All studies emphasize the need for integrating mental health into climate response strategies.	All included studies

Characteristics of Included Studies

The main characteristics of the ten studies included in this systematic review are summarized in Table 3. The included studies were published between 2020 and 2025 and comprised integrative reviews, narrative reviews, scoping reviews, literature reviews, and one mixed-method survey study. The studies examined a wide range of populations, including women, pregnant mothers, children, vulnerable groups, and the general population. Although the methodological approaches varied, all studies focused on examining the mental health impacts of climate change and climate-related stressors. The key aims, study designs, data collection methods, main findings, and conclusions of each study are presented in Table 3.

Table 3. Research Matrix (M=10)

S #	Author, Year	Aim	Research Design	Type of Studies Included	Data Collection Tool	Result	Conclusion
1	White BP, Breakey S, Brown MJ, Smith JR, Tarbet A, NicholasP K, Ros AMV. 2023	To explore the mental health impacts of climate change in vulnerable populations globally.	Integrative Review	Empirical studies	a data extraction chart built in Microsoft Word.	The most prevalent mental health responses to climate change included solastalgia, suicidality, depression, anxiety/eco-anxiety, PTSD, substance use,	Mental health practitioners can work to minimize the mental effects of climate change on the vulnerable groups by adopting trauma-informed,

						insomnia, and behavioral disturbance	inclusive, and evidence-based models of assessment, prevention, and long-term care to provide support post-climate disasters.
2	Julia Rothschild, Elizabeth Haase, 2020	The mental health of women and climate change: Direct neuropsychiatric impacts and associated psychological concerns	Review	Review articles	Peer review	Climate change brings exposures to heat, air pollution, poorer quality food, and infectious disease that have significant direct effects on women and their mental health.	Women suffer increased climate psychological risks from higher rates of stillbirth, preterm birth, and developmental problems in their children
3	M. K. Pardon, J. Dimmock, R. Chande, A. Kondracki, B. Reddick, A. Davis, A. Athan, M. Buoli & J. L. Barkin (2024)	Mental health impacts of climate change and extreme weather events on mothers	Quantitative survey	Explorative design, quantitative data	Focus group session	Mothers simultaneously were disengaged from climate-related discussion or action and expressed feelings of helplessness in the face of the magnitude of	The evidence linking adverse perinatal mental health outcomes with climate change and EWEs highlights the urgent need for interventions

						climate change.	in this context to protect perinatal mental health and well-being.
4	L.Kareem, 2025	Mental Health Challenges Among Expectant Mothers Amid Climate Anxiety	Literature Review	Descriptive studies	Arksey and O'Malley framework	Maternal care systems must be expanded to include psychological support tailored to climate-related concerns.	Advocates concern for the rise in climate-related anxiety, depression, and trauma during pregnancy underscore the urgent need for targeted mental health interventions
5	Stone, K., Blinn, N., & Spencer, R. (2022)	Mental Health Impacts of Climate Change on Women	Scoping Review	Descriptive and analytical studies	Case Studies and Focus Groups	Mental health be considered in climate discussions and adaptations or that responses and policies need to consider gender and/or the voices of women in decision-making.	Calls for clear need for climate policies on adaptation and mitigation to reflect women's unique needs to ensure their health and safety.
6	Helldén, D., Andersson, C.,	To study Climate change and	Scoping Review	Empirical studies	Literature Review	the effects of climate change on child health	Present and future generations of children

	Nilsson, M., Ebi, K. L., Friberg, P., & Alfvén, T. (2021).	child health:				act through direct and indirect pathways, with implications for determinants of child health as well as morbidity and mortality from a range of diseases.	bear and will continue to bear an unacceptably high disease burden from climate change
7	Lawrance, E. L., Thompson, R., Newberry Le Vay, J., Page, L., & Jennings, N. (2022)	The Impact of Climate Change on Mental Health and Emotional Wellbeing	Narrative Review	Mixed method studies	Qualitative synthesis	Climate change acts as a risk amplifier by disrupting the conditions known to support good mental health, including socioeconomic, cultural and environmental conditions, and living and working conditions.	Appropriate action that centers climate justice can reduce the current and future mental health burden, while simultaneously improving the conditions that nurture wellbeing and equality. Need for decisive climate action by decision makers across all scales.
8	Devi, S. H., & Salam, J. (2025).	Detrimental Effect of Climate Change on	Literature review	Mixed method studies	Literature Analysis	This delves into the detrimental effects of	Psychiatric research on mental illnesses

		Mental Health				climate change on mental health, highlighting the complex interplay between environmental, psychological and social factors.	associated with climate change is conspicuously lacking.
9	Clayton, S. (2020)	To Review evidence for the current and potential effects of climate change on mental health.	Literature Review	Mixed method studies	Literature Analysis	In addition, there is increasing evidence that a significant proportion of people might be experiencing a harmful level of anxiety associated with their perception of climate change.	Mental health impacts of climate change have the potential to affect a significant proportion of the population.
10	Soomro, S., Zhou, D., & Charan, I. A. (2024).	The effects of climate change on mental health and psychological well-being: Impacts and priority actions	Survey research	Mixed method	Questionnaires and interviews	Climate change has a stressful effect on mental health	Strategies to address the anticipated mental health issues among children due to climate change are needed.

Discussion

This systematic review aimed to critically examine the mental health impacts of climate change, identify the pathways through which climate-related stressors influence psychological well-being, and highlight priority areas for intervention, particularly among vulnerable populations. The synthesis of the ten included studies

provides strong and consistent evidence that climate change is already exerting a substantial and multifaceted burden on mental health across diverse populations and contexts.

Across all included studies, climate change was found to be strongly associated with a broad spectrum of psychological outcomes, including anxiety, depression, stress-related disorders, trauma symptoms, and emotional distress. White et al. (2023), Clayton (2020), Devi and Salam (2025), Lawrance et al. (2022), and Soomro et al. (2024) all reported that psychological distress related to climate change is no longer a marginal phenomenon but a growing public mental health concern. These findings indicate that climate change affects mental health not only through acute disasters but also through persistent and cumulative stressors linked to environmental uncertainty and perceived future threats.

A particularly important finding of this review is the growing recognition of climate-specific psychological syndromes. Several studies, notably those by White et al. (2023), Clayton (2020), and Lawrance et al. (2022), described emerging emotional responses such as eco-anxiety, solastalgia, and climate grief. These constructs reflect emotional suffering related not only to direct exposure to environmental change but also to anticipatory fears, loss of place, and perceived helplessness regarding the future of the planet. The presence of these phenomena suggests that climate change is reshaping the nature of psychological distress and expanding the boundaries of conventional mental health frameworks.

The review also demonstrates that the mental health impacts of climate change are not evenly distributed across populations. Women were consistently identified as a particularly vulnerable group. Rothschild and Haase (2020) showed that climate-related exposures such as heat, air pollution, and food insecurity have direct neuropsychiatric consequences for women and also affect maternal and child outcomes. Similarly, Stone et al. (2022) emphasized the need for gender-sensitive climate policies, while Kareem (2025) and Pardon et al. (2024) documented heightened levels of anxiety, helplessness, depression, and trauma symptoms among pregnant and postpartum mothers. These findings highlight the intersection between biological vulnerability, social roles, and structural inequalities in shaping climate-related mental health risks.

Children and future generations also emerged as a critically vulnerable group in this review. Helldén et al. (2021) demonstrated that climate change affects child health through both direct and indirect pathways, with long-term implications for emotional and psychological development. Soomro et al. (2024) similarly reported significant stress and psychological distress among children and adolescents, underscoring the likelihood that the mental health burden of climate change will intensify over time if adequate preventive measures are not implemented.

Another important contribution of this review is the identification of indirect and structural pathways through which climate change affects mental health. Lawrance et al. (2022), Devi and Salam (2025), and White et al. (2023) emphasized that climate change acts as a risk amplifier by destabilizing the social, economic, and environmental conditions necessary for psychological well-being. Livelihood insecurity, displacement, resource scarcity, and social disruption were repeatedly identified as chronic stressors that erode emotional resilience and contribute to persistent mental health problems. This indicates that the psychological consequences of climate change cannot be addressed solely through disaster-response models but require broader social and policy interventions.

Taken together, the findings of this review strongly support the conceptualization of climate change as a systemic and long-term threat to global mental health. The evidence suggests that without integrating mental health into climate adaptation and mitigation strategies, the psychological burden of climate change will continue to grow, particularly among women, children, and socially disadvantaged populations.

Implications for policy and practice

The findings of this review have important implications for public health policy, healthcare systems, and climate governance. Mental health must be recognized as a core component of climate change adaptation and resilience strategies rather than as a secondary or indirect concern. Healthcare systems need to develop

climate-informed mental health services capable of addressing both acute trauma following extreme events and chronic psychological distress associated with long-term environmental instability. Special attention should be given to women, mothers, children, and vulnerable communities through targeted prevention, early intervention, and community-based psychosocial support programs. Furthermore, climate policies should explicitly incorporate mental health considerations and promote climate justice approaches that address the underlying social and economic determinants of vulnerability.

Limitations

This review has several limitations that should be acknowledged. The inclusion of only English-language publications may have resulted in the omission of relevant studies from non-English-speaking regions, particularly from low- and middle-income countries that are highly vulnerable to climate change. The relatively small number of high-quality empirical studies and the predominance of review-based evidence limited the ability to conduct a quantitative meta-analysis. In addition, the heterogeneity of study designs, populations, and outcome measures necessitated a narrative synthesis approach, which may limit the precision of effect estimation.

Conclusion

This systematic review provides compelling evidence that climate change is already having profound and far-reaching effects on mental health worldwide. The psychological impacts include anxiety, depression, trauma-related symptoms, and emerging climate-specific syndromes such as eco-anxiety and climate grief. Women, mothers, children, and socially vulnerable populations bear a disproportionate share of this burden. The findings clearly demonstrate that climate change is not only an environmental and physical health crisis but also a major and growing mental health challenge. Addressing this crisis requires the urgent integration of mental health into climate policy, public health planning, and social protection systems. Without such integration, global efforts to adapt to and mitigate climate change will remain fundamentally incomplete.

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