

Climate change and mental health: What can we do about the impending pandemic?

DISCUSSION STARTERS

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ABSTRACT

Mental health sequelae of the changing climate arise through various pathways -- direct and indirect, acute and chronic. As the consequences of the climate emergency become more frequent and severe, these pathways may align to impair wellbeing and increase the risk of psychopathology in populations across the globe, especially in vulnerable and underprivileged communities, leading to a mental health epidemic of unprecedented proportions.

The psychiatric community should thus do all it can to prepare for the coming crisis before it arrives. Four ways we can all act within clinical practice to begin mitigate the effects of climate change are proposed: (1) become environmentalists and work with sustainability groups at our Trusts; (2) conduct more research to address the understudied areas of climate-triggered mental disease; (3) be involved in teaching and outreach about global heating and its consequences; (4) address our own cognitive biases that climate change will never impact us.

INTRODUCTION

The 2020s have been a decade of extremes of weather, which are increasing in frequency and severity. In 2023 alone, tropical cyclone Freddy, the longest and most energetic cyclone ever recorded, struck Madagascar, Malawi and Mozambique, killing over 800 and displacing 750,000 people (1); cyclone Gabrielle killed 11 in New Zealand and caused eight billion dollars in damages (2); and at least 56,000 people died across Türkiye and Syria following a magnitude 7.8 earthquake and thousands of aftershocks (3). These extreme weather events emphasise that nowhere is immune to the effects of the changing climate; we are all made vulnerable by the global climate emergency.

The health burden of climate change is well studied. Global heating poses a threat to the global population through various causal pathways, disrupting physical, mental, and social wellbeing. In particular, global heating is known to increase the incidence of psychiatric disease, and negatively impacts a diverse range of mental health outcomes.

This review will briefly outline some of the climate-triggered mechanisms contributing to mental disease, with the intention of highlighting the far-reaching consequences of these effects and the importance of developing and maintaining a healthy relationship with our natural environment. Following this, some small steps are suggested that we can all make within the medical community to help to mitigate the impending climate crisis and its likely consequent mental health pandemic.

CLIMATE EVENTS DIRECTLY AFFECT MENTAL HEALTH

An expanding literature has demonstrated that extreme weather events, which are becoming both more frequent and severe (4), are a source of traumatic experiences that can have significant effects on wellbeing and manifest acute traumatic stress responses (5,6). Earthquakes, wildfires, floods, and hurricanes expose their victims to psychological distress and the precursors of PTSD: danger, injury and death. Accordingly, there is ample evidence that these acute events act as triggers for PTSD, depression, generalised anxiety disorder, grief, substance abuse, and suicide. (7,8)

In the aftermath of Hurricane Katrina, affected communities displayed high rates of PTSD (9) and depression (10), alongside significantly higher rates of suicide attempts and suicide completion (78.6 and 14.7 times the baseline rate of the area, respectively) (10). In 2012, hurricane Sandy killed over 100 people and displaced millions of citizens across 5 Caribbean nations and Puerto Rico, and in the US damaged 200,000 homes, with an estimated 8 million people experiencing power outages (11). Significantly increased symptoms of PTSD, anxiety, and depression were observed following the event (11–14). The increased risk of mental health symptoms and disease can persist for months to years (13,14), indicating that climate events have long-term effects on mental health.

Within the UK, flooding is increasingly likely as climate change continues. Flooding is the most common extreme weather event in the context of climate change, and is associated with an increased

long-term risk of anxiety, PTSD, depression, and suicide (15). Following widespread flooding in 2013–14 (16), a multi-year National Study of Flooding and Health found that those with flooded property had higher odds of developing psychological disease than those disrupted but not flooded (odds ratio PTSD: 7.2, anxiety: 6.5, depression: 5.9). With one in six properties (over 5 million total) considered to be at risk of flooding (17), populations in the UK are at significant risk of future disruption and consequent psychopathology. Raised incidence of mental health conditions amongst these groups could result in a substantially increased burden on the NHS, with hundreds of thousands potentially affected.

Changes in climate other than extreme weather events also have direct mental health consequences. Of note, increasing heat – which can occur in the form of extreme heat events such as droughts, or as an insidious increase in global temperatures – has been linked to an increased rate of hospitalisation for a variety of mental and behavioural disorders (18), increased incidence of suicide attempts and completion (19), and increased aggressive and criminal behaviour (20).

Future work is likely to find further pathways through which the consequences of global heating directly impact mental health and wellbeing. Air pollution, in particular, is beginning to be linked to a number of poor health outcomes, including poorer quality of life, depression, suicide (21–24), schizophrenia (25), and neurodevelopmental disorders (26–29), although these associations may be weak and further study is warranted (27–29).

Further focussed research is also required regarding the long-term mental health sequelae of more recent events. This is particularly true of events occurring in lower- and middle-income countries. Numerous extreme weather events have continued to wreak havoc on communities, with early evidence emerging of the toll these events are likely to take on mental health. In 2022, severe flooding in Pakistan left 1,700 dead and displaced at least 7.9 million people (30). Based on post-disaster analyses from previous flooding and earthquake events in Pakistan, it is anticipated that flooding in 2022 will similarly greatly worsen mental health in the population (31–33), although the full extent of its effects are likely yet to be appreciated. Early reports mention prevalent experiences of post-traumatic stress, depression, and anxiety in the aftermath (34,35), and a rapid needs assessment of affected children suggests that 50% show signs of psychological distress (36). Likewise, in February 2023, a magnitude 7.8 earthquake struck great expanses of Türkiye and Syria, causing over 56,000 deaths (37). While evidence from a previous large-scale earthquake in Türkiye in 1999, and other events worldwide, highlight the significant trauma that can be expected to emerge from these earthquakes (37–40), its burden is yet to be seen – although early work already reports an increase in depressive and anxious emotions following the earthquake, linked to both individual and socioeconomic factors (41,42).

Indeed, socioeconomic factors play an important role in post-disaster mental health and resilience. Low-income households were significantly more likely to worry about access to food sources in

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the immediate aftermath of hurricane Sandy (43), and are more likely to report mental health symptoms following disasters such as flooding (44). Importantly, there is evidence of a greater impairment in mental health experienced by those in lower socioeconomic regions (45,46), indicating that these countries may be more vulnerable to mental health deterioration following changes in the climate and that socioeconomic status constitutes a risk factor at both a national and international level.

Further work is required to assess both the acute- and long-term effects of extreme weather, especially within the political and social contexts of the countries in which they occur. As global heating worsens, extreme weather events are likely to occur more frequently. The psychiatric impact of climate change will only become more apparent, and understanding this impact will become more imperative to managing those who are affected by extreme weather.

CLIMATE CHANGE INDIRECTLY AFFECTS MENTAL HEALTH

Beyond direct impacts of extreme weather events on people's lives, livelihoods, and property, there are thought to be a number of indirect pathways that contribute to psychopathology, both in the wake of acute natural disasters and in the context of slow, chronic changes to the environment.

Community and economic destruction poses a threat of destabilisation of infrastructure and industry, such as agriculture, food supply and healthcare (47,48). The precipitated changes lead to loss of income and livelihood and an increase in poverty, associated ultimately with poorer physical and mental health outcomes. Pressures on healthcare services resulting from climate change impair access to physical and mental health services.

For instance, droughts can accelerate the degradation of property and disrupt agriculture, crops and livestock, all of which can increase cost of living and financial burdens carried by families, induce stress and increase workload, force migration, and alter people's relationship with their environment. Impaired economies and displaced peoples further harm the community, reducing availability of resources, and driving cultural changes, which feeds back directly on the quality of life of individuals (47). Accordingly, periods of drought have been associated with reduced life satisfaction (48).

Unsurprisingly, these impacts are likely to disproportionately affect those in underprivileged circumstances, whose marginalisation renders them more vulnerable to socioeconomic disruption, poorer physical health outcomes and poorer psychosocial wellbeing (8,47).

Gradual changes in habitats also carry potential to directly influence physical and mental wellbeing – for instance, rising sea levels and temperatures may further disrupt agriculture and resources, decimate landscapes and infrastructure and displace communities (8), whilst also contributing to degraded physical health through increased heat stress and disease. Accordingly, prolonged episodes of high temperatures are associated with increases in suicide rates (8,49). However, studies addressing longitudinal global heating are

limited, and causally attributing mental health outcomes to long-term climate changes remains complex and fraught with difficulty, in spite of models that propose these pathways in detail (47,48).

CLIMATE CHANGE DIMINISHES THE POSITIVE EFFECT OF NATURE ON MENTAL HEALTH

Positive psychological effects of nature have been long recognised (50), with exposure to nature theorised to reduce cognitive fatigue and improve mental wellbeing (51). Short exposures of 30–120 minutes to the natural environment were significantly associated with increased self-reported well-being (52), with longer exposures likely inducing greater effects (53). Although understudied, there is reasonable evidence that nature can provide an effective adjunct to traditional interventions in a variety of diseases, including in mental illness, which has been well discussed elsewhere (54).

As such, an important and underappreciated effect of climate change may be to negate the positive effects of natural environments on mental health (55). As biodiversity and the natural environment are lost, the protective factors that nature provides against mental illness are also eroded, leading to a loss of resilience and a further indirect contribution to the development of psychiatric disease.

CLIMATE CHANGE THREATENS OUR RELATION TO THE NATURAL WORLD

It is clear the relationship between a person and their place is important for wellbeing. As global heating changes the environment, it disrupts the delicate symbiosis between humans and their habitat. These derangements can be recognised both by adverse weather events and by slow, insidious change in ecosystems and green spaces.

Observations of the long term change in climate can engender distressing emotional responses and significant worry and concern in many. New terminology has been created recently to encapsulate the complex mental responses to the changing climate. Solastalgia refers to distress and grief experienced following ecological loss (8), akin to a nostalgic mourning felt for a comfort (solace) sought in one's home environment, and has been linked to communities that have suffered significant climate-driven damage and disaster (56). Eco-anxiety describes an anxiety predominantly driven by climate-related concerns of what may be lost in the future (8), which can manifest in its extreme form as eco-paralysis, a state of inaction or inability to act on climate change, either due to a perceived futility or due to psychological defence mechanisms such as denial.

Together, these states emerge as a novel class of “psycho-terratic” syndromes (57). A report on American conceptions of climate change (58) found that two thirds of surveyed Americans are “somewhat” or “extremely” worried by global heating, representing an increase of ten percentage points since 2014.

WHAT CAN WE DO?

It is becoming clearer that we must learn to survive and thrive within a world where climate change is inevitable (59). IPCC reports provide an annual overview of the status of global climate policy and the evolving landscape. Although the Working Group III Sixth Assessment Report notes some progress has been made, urban greenhouse gas emissions remain significant, and total greenhouse gas emissions are predicted to continue to increase until 2050 (60). Recent targets aim not to prevent global heating, but to limit its extent to a maximum of 1.5°C on average (61).

As the environmental consequences of global heating become more apparent, widespread, and frequent, so too will its mental health sequelae. This has the potential to be a burden of unprecedented proportions, as climate change threatens to disrupt entire populations of countries and expose them to risk factors for developing pathology. Accepting this, it is appropriate to consider how to best act to prevent, minimise, or prepare for the looming crisis. Here I propose four ways we all can begin to do this.

1 – We must learn more. Although the literature on the psychological impact of climate change is substantial and expanding, more data are needed. Opportunistic analyses of emerging climate-related psychiatry -- such as longitudinal follow-up of those affected by extreme weather events -- must be undertaken if we can hope to address the problem. These could be particularly valuable where evidence so far is lacking -- such as in the elaboration of psychoterratic syndromes (57) and of the multi-causal pathways mediating psychopathology through indirect effects (47), and research regarding low- and middle-income countries – areas where the effects of a changing climate may be disproportionately felt and where populations are most vulnerable. A recent review noted that over two-thirds (87/120) of assessed papers focussed on mental health effects of climate change in high-income countries (62), reflecting a disparity in research that needs addressing, given the global nature of the climate emergency. Monitoring the changing burden of mental disease in both higher- and lower-income countries may be particularly valuable, allowing us to identify the most vulnerable groups and design interventions that are optimally efficacious for climate-triggered psychopathology.

2 – We must teach more. Achieving change on a national or international scale requires good awareness of the climate emergency and its health impacts. Although the General Medical Council's Outcomes for Graduates guidance stipulates that some teaching should be offered by medical schools on sustainability and environmental health (63), this is often not implemented (64). Similarly, no in-depth and compulsory curricula exist in the majority of specialty training pathways. As a result, there is a dearth of teaching on the climate emergency at every stage throughout training. Reaching out to our medical schools, Foundation Schools, or Trusts and impressing upon them the importance of adequate climate change education will improve awareness and provide the foundations to initiate collaborative and collective measures to tackle the climate emergency. Alternatively, organising or participating in additional teaching activities on the climate may help to kindle a culture of

change within our workplaces.

3 – We must address our cognitive biases. None of us are immune to the effects of climate change. In spite of this, it is easy to assume that negative impacts of climate change are more likely to happen to others than to ourselves: the optimism bias. In support of this, 50% of Americans believed climate change would harm “the world’s poor”, whereas only 18% believed it would harm them personally (58). However, as discussed above, extreme weather events such as floods are not isolated to underprivileged regions of the world. I suggest these biases can apply also to mental health, and may contribute to an underplaying of the severity and scale of the threat that climate change poses to our collective mental wellbeing. Adapting disaster response models to develop institutional/clinical education and preparedness programs (65) may help to alleviate these biases and minimise the healthcare burden of unprecedented mental health crises.

4 – Prevention is the best cure: we must all become environmentalists and climate activists. The most effective intervention that can mitigate the approaching crisis is to prevent it from taking hold. In the climate context, this means to minimise ongoing environmental damage, so as to minimise the causative factors that may contribute to the development of mental illness (47). As such, active involvement in sustainability and policy at the organisational, institutional and geopolitical level is necessitated from a public health standpoint: environmental interventions have enormous potential to promote mental health of entire populations. This can start with something as simple as an email. Your Trust may have a sustainability strategy in place, or your hospital may have a sustainability team. These teams can give Trust-specific advice for implementing environmentalist policy and getting involved in practical changes within the NHS.

Progress is being made on improving sustainability within the NHS, with an ultimate aim to achieve carbon net zero by 2045 (66,67). Numerous initiatives are underway or planned, including the use of reusable clinical waste bins, reductions in food waste and footprint, and the restoration of used medical electrophysiology devices to “as new” (see <https://www.supplychain.nhs.uk/sustainability/sustainable-initiatives/> for information about ongoing initiatives and how to get involved). These initiatives are already leading to improvements in metrics on carbon footprint and waste in the NHS, with NHS emissions in 2021 dropping by the equivalent of over one million homes compared with the previous year (68); but much more remains to be done.

CONCLUSION

Mental health sequelae of the changing climate arise through multiple, varied and systemic pathways -- direct and indirect, acute and chronic. As we are entering an epoch defined by the climate emergency (the so-called anthropocene), and it becomes increasingly evident we are unable to prevent the consequences of global heating, almost all of these pathways will align to impair wellbeing and increase the risk of psychopathology in populations across the globe. This will especially be true in vulnerable and underprivi-

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leged communities, and will likely lead to a mental health epidemic of unprecedented proportions. The psychiatric and wider medical community should thus do all it can to prepare for the coming crisis before it arrives.

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