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Strategies for delivering mental health services in response to global climate change

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Abstract

This review examines from a services perspective strategies for preparedness and response to mental health impacts of three types of climate-related events: 1) acute climate-related events such as hurricanes, floods and wildfires, 2) sub-acute or long-term changes in the environment such as drought and heat stress; and 3) the existential threat of long-lasting changes, including higher temperatures, rising sea levels and a permanently altered and potentially uninhabitable physical environment. Strategies for acute events include development and implementation of guidelines and interventions for monitoring and treating adverse mental health outcomes and strengthening individual and community resilience, training of non-mental health professionals for services delivery, and the mapping of available resources and locations of at-risk populations. Additional strategies for sub-acute changes include advocacy for mitigation policies and programs and adaptation of guidelines and interventions to address the secondary impacts of sub-acute events such as economic loss, threats to livelihood, health and well-being, population and family displacement, environmental degradation and collective violence. Strategies for long-lasting changes include implementation of evidence-based risk communication interventions that address the existential threat of climate change, promoting the mental health benefits of environmental conservation, and promoting positive mental health impacts of climate change.

Keywords: mental health services, climate change, disasters, trauma, prevention, treatment

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Introduction

Several empirical studies and systematic reviews have documented the mental health impacts of global climate change [1-11]. These impacts will be widespread, profound, and cumulative [3, 6] and include elevated rates of anxiety and mood disorders, acute stress reactions and post-traumatic stress disorders, sleep disruption, suicide and suicidal ideation, substance use disorders, and a decreased sense of self and identity from loss of place and connection to the environment [1, 2, 6-8, 10-20]. Indeed, numerous studies have linked three specific forms of climate change to mental health impacts: 1) extreme weather events (EWEs) and natural disasters lasting for days, such as hurricanes [8, 12], floods [13, 14], wildfires [15], and short-duration heat waves [16, 17]; 2) sub-acute weather events lasting for months or years such as droughts [1, 2, 18, 19] and long-duration heat waves [1, 2, 20]; and 3) environmental changes lasting to the end of this century and beyond such as higher temperatures, sea level rise, and a permanently altered and potentially uninhabitable physical environment [1, 2, 4, 5, 7, 9, 10]. Each form of climate change can result in varying degrees of economic losses associated with property damage, loss of income and employment opportunities and reduced economic productivity, especially in agriculture and fisheries [1, 2, 19, 21]; threats to health and well-being associated with EWE injuries and deaths, spread of vector-borne and respiratory illnesses, and heat-related stress [1, 2, 11]; population displacement [22]; loss of attachment to the natural environment [1, 2, 3, 7, 19]; and social conflict and inter-group violence [23-25], each of which significantly impact mental health. Moreover, the distinctions between the three forms of climate change and their mental health impacts are beginning blur as acute events like wildfires and hurricanes that appear year after year with increasing intensity in the same regions (e.g., wildfires in Australia and the Western United States, hurricanes in the Gulf of Mexico) take on the characteristics of long-term sub-acute events such as droughts and generate the same forms of anxiety as long-term climate change [26, 27].

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However, most of the research to date has focused on the epidemiology of these impacts. Although policy and practice implications of these impacts are frequently mentioned, they relate primarily to EWE's like hurricanes, floods, wildfires, and heat waves. A comprehensive services response to these impacts should also consider longer-term events such as prolonged droughts, sea level rise and coastal erosion, and constant exposure to high temperatures. In this review, different types of mental health impacts and strategies for preparedness and response to these impacts are presented from a services perspective.

Mental health services to address climate change impacts

All three types of climate change-related events produce consistent adverse mental health outcomes, including symptoms of depression and anxiety, posttraumatic stress, substance abuse, and suicidal behavior, often accompanied by psychosocial impairment. The prevalence, severity and duration of these outcomes may also vary by type and onset of event. For instance, posttraumatic stress disorder may be more prominent during acute events such as hurricanes and wildfires than during a sub-acute event or long-term changes in the environment [2, 8, 12-15]. Suicide has been linked to exposure to sub-acute events like droughts [18, 19], while increased anxiety and mood disorders have been associated with long-term changes in the physical environment, especially among youth and young adults [28, 29], as well as acute and sub-acute events. While these risk factors across events are important, mental health services need to be agile and responsive to the variable mental health effects that disaster victims may experience. As such, service providers would benefit from training and guidance in assessing and assisting people suffering from climate-related mental health problems. Service providers can also play an important role in advocating for climate change mitigation [1], as well as developing and implementing evidence-based or informed practices to support mental health [30].

Mental health services for acute events

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Delivery of effective mental health services in the aftermath of acute events calls for coordinated planning and preparedness before the occurrence of such events and use of evidence-based interventions afterwards. Such services will require development and implementation of effective and sustainable guidelines and interventions for monitoring and treating adverse mental health outcomes and strengthening of individual, family and community resilience, training of non-mental health professionals for services delivery, and the mapping of available resources and locations of at-risk populations. The continuum of care for mental health services developed by the Institute of Medicine [31] serves as a useful framework for outlining the range of services necessary for addressing the mental health impacts of acute climate-related events. The framework outlines seven different types of services divided into three categories: prevention, treatment and maintenance. In this review, we focus on a stepped care strategy that prioritizes universal, selective and indicated services aimed at prevention and standard treatments for known disorders (Table 1).

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Table 1. Level of mental health services delivery by type of climate related event

IOM Service categories and approaches		**Climate-Related Events**		
		Acute	Subacute	Long-lasting
Prevention	Universal	PFA Mapping Tier 1-2 training	Advocacy Adaptation Mapping Tier 1-2 training	Risk communication Ecotherapy Psychosocial resilience Tier 1-2 training
	Selective	SFP CWFS Tier 1-2 training	SFP CWFS Suicide prevention Heat exposure interventions Tier 1-2 training	
	Indicated	PM+ SPR SOLAR Tier 1-3 training	Tier 1-3 training PM+ SPR SOLAR	Tier 1-3 training PM+ SPR SOLAR
Treatment	Standard	CBITS TF-CBT CPT CBT for Anxiety and Depression Tier 3-4 training	CBITS TF-CBT (conflict) CPT (conflict) CBT for Anxiety and Depression Tier 3-4 training	CBITS CBT for Anxiety and Depression Tier 3-4 training

Legend: PFA = Psychological First Aid, SFP = Strengthening Families Program, CWFS = Coping with Work and Family Stress, TF-CBT = Trauma-focused Cognitive Behavioral Therapy, CPT = Cognitive Processing Therapy, CBITS = Cognitive Behavioral Intervention for Trauma in Schools

Development and implementation of effective and sustainable guidelines and interventions

There exist a number of guidelines for providing effective psychosocial care following EWEs and other disasters. The guidelines produced by The European Network for Traumatic Stress (TENTS) [32], for instance, include consideration of planning, preparation and management as well as general and specific response protocols. Another set of guidelines, developed by the World Health Organization [13, 33] includes both clinical interventions and basic, non-clinical psychological support interventions. Clinical interventions delivered by trained professionals are required for only a small proportion of

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disaster-affected populations, while most survivors would benefit from a range of lower intensity interventions that can help reduce distress [14]. Services would then ideally be delivered in a stepped-care approach often used in disaster mental health to support different levels of interventions depending on the timing of the disaster and level of distress [10, 34].

These stepped care approaches comprise universal, selective, indicated, and standard clinical intervention components [35]. Universal strategies target all people exposed to the disaster and are usually implemented immediate use after disaster. Selective and? Indicated approaches target subgroups of those 'at risk' or with emerging symptoms and are used later in the recovery process, with both largely focused on resilience building and psychosocial recovery. These approaches can be stepped up to clinical interventions using evidence-based treatments (EBTs) administered by trained mental health professionals if necessary. Often universal, selective and indicated interventions are delivered by non-specialists as a form of "task-shifting", recommended by the World Health Organization [36] for use particularly in settings, including communities devastated by natural disasters, where a shortage of specialists restricts access to standard treatments. Task-shifting delivery of mental health services to non-specialists like community health workers, teachers, or spiritual leaders, has been demonstrated to be effective in increasing access to and acceptability of services and treating a range of mental health disorders in low resource settings [37-40]. Task shifting can also serve to increase the autonomy and capacity of communities to deliver sustainable interventions.

Psychological First Aid [41] *is* an evidence-informed universal approach in step care delivery that includes provision of information, comfort, emotional support, and instrumental support to those exposed to an event, with assistance provided in a modular and stepwise fashion tailored to the person's needs. *PFA* was developed by the National Child Traumatic Stress Network and the National Center for PTSD and is designed to be used by first responders and other non-mental health specialists for the purpose of reducing the initial distress caused by traumatic events and to foster short- and long-

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term adaptive functioning and coping [42]. PFA may be used as a form of risk assessment and referral to health services during a disaster and to facilitate connections to social support networks [30].

Service providers may also play an active role in fostering community resilience through development and implementation of universal and selective interventions designed to prevent adverse mental health outcomes in at risk populations [3, 43]. Existing interventions such as the *Strengthening Families Program* (SFP) [44], a family skills training program designed to increase resilience and reduce risk factors for behavioral, emotional, academic, and social problems in children 3-16 years old, and *Coping with Work and Family Stress* [45], a workplace preventive intervention designed to teach employees how to deal with stressors at work and at home, may serve as models for the development of interventions that build resilience in families and communities and reduce the likelihood of post-disaster social conflict before or after a disaster strikes.

Non-mental health specialists also play a critical role in the delivery of indicated stepped-care approaches to delivery of mental health services. These indicated interventions are often brief, and low in intensity. One form of indicated stepped care developed as part of the WHO mhGAP Program [38] is Problem Management Plus (PM+), designed for use in communities affected by adversity [46]. PM+ is available as an individual version (Individual PM+) evaluated in Pakistan [47] and Kenya [48] and as a group version (Group PM+) evaluated in Pakistan [49]. Despite evidence of its effectiveness in a number of low-income countries exposed to adversity, it has not been evaluated following natural disaster. Skills for Psychological Recovery (SPR) is another indicated stepped approach designed for treatment of post-disaster mental health problems and is consistent with empirically supported principles following disaster [50]. Although it has been demonstrated to be acceptable to clinicians [34] and cost-effective in simulated agent-based models, its effectiveness has yet to be evaluated using randomized controlled trials.

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The Skills fOr Life Adjustment and Resilience (SOLAR) program is another indicated intervention designed to target poor adjustment and distress following disaster and trauma [51, 52]. Importantly SOLAR targets key mechanisms that are regarded as central to trauma recovery, including emotional processing of the traumatic event. It is deliverable by non-mental health professionals after a short period of training and can be delivered to individuals or groups. This emphasis on task-shifting to up-skill non-mental health professionals located within disaster-affected communities including volunteers, greatly increases the potential reach and cost-effectiveness of the program. Pilot studies have shown it to be safe, acceptable, replicable and able to be culturally adapted and evaluated [51, 52].

Clinical guidelines typically recommend the use of EBTs for mental health disorders arising from EWEs, usually delivered by qualified mental health professionals. For example, for post-traumatic stress disorder, *Trauma-Focused Cognitive-Behavioral Therapy* (TF-CBT) [53], *Cognitive Processing Therapy (CPT)* [54], and *Cognitive-Behavioral Intervention for Trauma in Schools* (CBITS) [55] have been found to be effective in improving PTSD and other symptoms in children and adults experiencing disaster [56, 57]. Likewise, cognitive behavioral based interventions are recommended for depression and anxiety disorders [58, 59].

Unfortunately, the evidence supporting the use of these interventions in both short-term and long-term disaster recovery and addressing the psychosocial impacts of other manifestations of climate change is limited, especially in low resource settings with few trained clinicians and mental health facilities [10]. Research is needed to evaluate the effectiveness of existing EBPs in these contexts [58]. Given robust evidence of socioeconomic and cultural differences in vulnerability to acute climate-related events, their mental health impacts and treatment effectiveness, an important cross-cutting dimension in these efforts will be contributions to adapting interventions to ensure they are responsive to both structured inequities and cultural and ethnic differences [30].

Development and training of disaster responders

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Plans for responding to EWEs typically include recommendations for training of personnel to address the mental health needs of communities impacted by EWEs and other natural disasters and forms of mass trauma [61]. For instance, the U.S. Substance Abuse and Mental Health Services Administration (SAMHSA) provides a list of 34 online disaster behavioral health training opportunities available to people interested in expanding knowledge and skills pertaining to psychological disaster response [62]. The NATO Joint Medical Committee [35] recommended organizing the curricula and the training required by incident response commanders, managers and professional staffs according to a four-tier model. The levels are:

- Tier 1: General training in core knowledge, attitudes and skills (required by all responders and professionals who work in the context of disasters and major incidents).
- Tier 2: More advanced training for those who deliver psychological first aid, brief low intensity interventions such as PM+, SPR or SOLAR, and assessment of people who may require more specialized mental healthcare.
- Tier 3: Specialist training required by staff who deliver the functions of Levels 3 and 4 in the Model of Care in which a personal approach to particular people's needs is based on assessment of their needs. This includes training to supervise staff whose work includes delivering psychosocial care at Levels 1 and 2 in a stepped care model.
- Tier 4: Advanced specialist training for professionals who are appointed to provide advice to major incident response commanders at strategic, operational and tactical levels. These appointments require not only disaster-related training in psychosocial and mental healthcare but also training in major incident management, consultative skills and selected aspects of strategic leadership and management.

An appropriate and sustainable mental health response after natural disasters will inevitably require the recruitment and training of non-mental health providers who are members of affected

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populations and thus have an appreciation for the social and cultural context of services delivery [3, 13]. These non-specialists include teachers who can be trained to deliver interventions like CBITS [55] and local people who can be trained as community health workers to deliver less-intensive Tier 1 and 2 services like *Psychological First Aid (PFA)* or SOLAR [41, 42, 51, 52].

Mapping of resources and risks

Preparedness for extreme weather events should include protocols and procedures for mapping available resources and identifying at-risk populations in need of selective mental health services in the aftermath of an EWE. The Inter-Agency Standing Committee of the World Health Organization recommended mapping and monitoring psychosocial resources and skills within communities [59]. Use of resources like the Disaster Psychosocial Assessment and Surveillance Toolkit (Disaster-PAST) can improve disaster preparedness and response and enhance community recovery [63]. Mental health impacts of acute weather events may also be addressed by identifying individuals and communities that are most underserved and most susceptible to these impacts [3]. These include women, children and adolescents, poor and less educated individuals, people of color, individuals with a history of mental health problems, remote and indigenous communities, and individuals with little professional or social support [2, 4, 5, 10, 11, 64, 65]. Residents of low and middle-income countries and low resource areas of high-income countries (e.g., rural areas, poor urban neighborhoods) are especially vulnerable to these outcomes due to their increased exposure to EWEs, high levels of poverty or adversity, and lack of access to services [1, 2, 13, 63, 64]. Geographic Information Systems can enable mental health providers to more effectively locate specific locations and groups at risk for elevated mental health impacts and to prioritize resources and personnel to deliver care in the aftermath of an acute EWE [11].

Mental Health Services for Sub-Acute Events

In addition to the indicated prevention and standard treatment services needed to respond to acute climate change-related events described above, selective preventative measures should be

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developed for individuals with pre-existing psychiatric conditions who are at risk for serious illness and hospitalization during heat waves [17] or for farmers at risk for suicide in drought-affected regions [66, 67]. Responding to the mental health consequences of sub-acute events will also require strategies rooted in both mitigation and adaptation [10]. Mental health professionals are well-positioned to advocate for policies and programs that mitigate the likelihood and the magnitude of sub-acute and long-lasting climate-related events [3-6, 10], including the guidelines and interventions described above in dealing with acute events. Many of these guidelines and interventions will undoubtedly require forms of adaptation to address the secondary impacts of sub-acute events such as economic loss, threats to livelihood, health and well-being, population and family displacement, environmental degradation and collective violence, as well as the populations most vulnerable to such impacts. For instance, coastal erosion resulting from sea-level rise and more frequent extreme weather events will necessitate re-locating entire communities to geographic areas where sea-level rise and frequent extreme weather events are less likely to occur [10]. Such relocation will result in an increased need for mental health services arising from migration while reducing the risk of mental health impacts due to the stress of living in degraded environments. Mental health service providers will increasingly rely on public health education to address the stress associated with the increasing threats of vector-borne illnesses due to climate change [10]. There will be a greater need for service providers to advocate for addressing underlying risk factors for collective violence, such as poverty and socioeconomic disparities, in response to the mental health consequences associated with such violence [25].

Mental health services for long-lasting events

In addition to the strategies for delivering services for acute and sub-acute events, strategies for delivering universal services to address mental health impacts of long-lasting climate-related events are required. Young people are especially vulnerable to these impacts. A survey of youth living in the United States commissioned by the Washington Post and Kaiser Family Foundation found that more than 70%

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believe climate change will cause a moderate or great deal of harm to people in their generation. About 57% of teens and 68% of young adults interviewed reported that climate change makes them feel afraid [66].

One potential strategy for addressing these impacts is the implementation of universal evidence-based risk communication interventions that address the existential threat of climate change. Understanding risk perceptions can support targeting of communication and education initiatives to where climate adaptation efforts are most needed [69]. There are several evidence-based strategies for communicating risks that can be employed in educating the public regarding the long-lasting risks associated with climate change and motivating behavior to mitigate those risks [70-72]. However, the challenge lies in not merely increasing awareness of the risks associated with climate change, but in also managing feelings of stress and anxiety. Mah and colleagues [72] call for attending to the impact of variability in the nature of different kinds of stress caused by climate change and individual differences in stress response, as well as addressing individual coping in the context of community and ecosystem resilience, when implementing these evidence-based communication strategies.

Another universal strategy is to promote the mental health benefits of environmental conservation. Consistent with the principles and practice of ecotherapy [73], assuming responsibility for protecting the environment through deliberate action has been linked to addressing the "psychoterratic" syndromes of ecoanxiety, ecoparalysis and solastalgia [2, 5, 10, 28]. The biodiversity in natural environments that is preserved through conservation efforts, and engagement in climate change mitigation efforts both have been demonstrated to result in positive effects on mood, attention and cognition [10, 74-76].

A third universal strategy is to promote elements of positive mental health impacts of climate change. The belief that awareness of climate change as a threat to well-being and survival may also inspire and support psychosocial resilience, is based on evidence of individual and community responses

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to extreme weather events with compassion, altruism, and post-traumatic growth [10, 77]. However, research is required to determine whether the positive responses to acute events can be effectively translated into evidence-based practices that enable individuals and communities to effectively adapt to long-lasting changes in the environment, given the greater difficulty in mobilizing responses to existential threats that are experienced slowly and indirectly, compared to threats that are experienced immediately and personally [78].

Conclusion

Mental health services providers are increasingly called upon to address both direct (i.e., heat stress, exposure to extreme weather events) and indirect (i.e., economic loss, threats to health and well-being, displacement and forced migration, collective violence and civil conflict, and alienation from a degraded and potentially uninhabitable environment) consequences of acute, sub-acute, and long lasting climate change-related events. Some of the mental health impacts and services employed in response to these impacts will crosscut all three event types and some will be specific to each type of event. The services that are currently utilized or likely to be developed in response to acute and extreme weather events, how they are implemented, and by whom will have important implications for addressing longer duration events. Sub-acute and long-lasting climate-related events will also require development and implementation of new types of mental health services to supplement stepped approaches, like planned relocation of communities, public health education, violence prevention, risk communication, personal engagement in environmental conservation, and promotion of positive psychological outcomes associated with climate change.

Author contributions

LAP was responsible for the development of the conceptual framework, conducting the literature review, and writing of the manuscript. MOD and WL assisted in the development of the conceptual

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