Research for Action on Climate Change and Health in the Caribbean:
A Public, Private, People's and Planetary Agenda

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Suggested citation: Allen CF, West RM, Gordon-Strachan G, Hassan S, McFarlane S, Polson-Edwards K, Thomas A, Hospedales CJ, Dubrow R. Research for Action on Climate Change and Health in the Caribbean: A Public, Private, People's and Planetary Agenda. Research for Action on Climate Change and Health in the Caribbean Project, 2024.

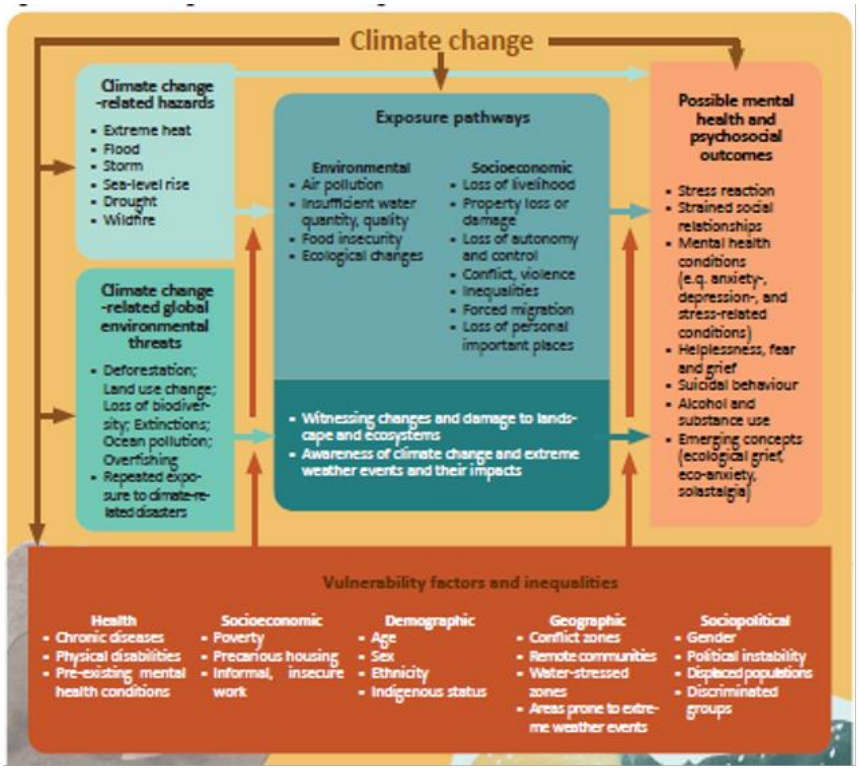
DOMAIN 1: CLIMATE CHANGE HEALTH IMPACTS, EXPOSURES AND VULNERABILITY

7. MENTAL HEALTH

7.1. WHAT IS HAPPENING?

The ways in which climate change-related hazards (referred to hereafter as climatic events, which include extreme heat, floods, storms, sea-level rise, drought and wildfires) can affect mental health and emotional well-being[1] are varied, complex and interconnected with other nonclimatic factors (health, socioeconomic, demographic, geographic, cultural and sociopolitical) that increase vulnerability. Climatic events could affect mental health either directly, such as experiencing a hurricane or heatwave, or indirectly, through exposure pathways such as poverty; loss of employment, crops or housing; or displacement and forced migration (Cissé et al., 2022; Dubrow, 2021; Herrán, 2021; R4ACCHC, 2022a,b,c, 2023a; WHO, 2022) (see Figure 1 and Chapter 8, "Population displacement and migration").

Figure 1: Main interlinkages between climate change and mental health



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Extreme weather events are associated with mental health and psychosocial outcomes such as anxiety, grief, depression, acute traumatic stress, posttraumatic stress disorder (PTSD) and aggression/violence. These can be associated with strained relationships, suicidal ideation, sleep problems, sexual dysfunction and drug or alcohol abuse, with the severity of the conditions ranging from mild to requiring hospitalisation to death by suicide (CARPHA, 2018, 2021; Charlson et al., 2021; Cianconi et al., 2020; Cissé et al., 2022; Comtesse et al., 2021; Dube et al., 2018; Gibson et al., 2020; Gordon et al., 2019; Hassan et al., 2020; Michael et al., 2021; Portier et al., 2010; PAHO, 2012; R4ACCHC, 2022b,c; Ramphal, 2018; Ravaliere and Murphy, 2017; Sharma et al., 2018; WHO, 2022).

[1] In this document, "mental health" refers to mental health and emotional well-being.

Chronic stress has also been known to aggravate negative health outcomes among people living with noncommunicable diseases (Portier et al., 2010). Well-being is affected by various consequences of climate-related destruction, including the deterioration of one's surroundings, damage to one's property and disruptions to one's normal everyday behavioural patterns (Cissé et al., 2022). New phrases and concepts have been coined to describe some of these common conditions:

- Climate-related psychological distress can arise from observing changes to one's environment over time and experiencing a sense of loss. This loss can be felt especially keenly by individuals and communities with strong identity ties and attachment to their environment, which are important to their mental health. Indigenous populations are examples of such communities (Gibson et al., 2020).
- Climate change anxiety, or eco-anxiety, is related to the perception of the slow-moving impacts of climate change, such as rising sea levels and desertification, and changes such as the increasing frequency of flooding and hurricanes. Feelings of worry, fear, anger, grief, despair, guilt, shame, helplessness, hopelessness and uncertainty can arise, although the contributing factors may not be acknowledged by the individual experiencing these feelings. Sometimes these feelings can lead people to reassess their behaviour and make changes to minimise their contribution to climate change (Cianconi et al., 2020; Comtesse et al., 2021; Hickman et al., 2021; R4ACCHC, 2022d).
- Solastalgia refers to a sense of desolation, detachment and grieving in response to losing an important place. Solastalgia can be triggered by climate change-induced transformations of specific places, regions or territories greater than the home location, meaning a physical ecological loss of landscape, even if it is a gradual slow-moving process (Albrecht et al., 2007; Comtesse et al., 2021; R4ACCHC, 2022c).
- Ecological grief may be regarded as an extension of solastalgia. Solastalgia refers to loss of place, whereas ecological grief can come about due to all types of ecological loss (e.g. of species, ecosystems and ways of life). Ecological grief can be regarded as a response to past or future situations that may trigger loss, for example not being able to teach one's children to swim in the ocean that they, themselves, learned to swim in (Cianconi et al., 2020; Comtesse et al., 2021).

In a global study conducted to understand the feelings, thoughts and impacts associated with climate change among young people (aged 16–25 years), data were collected from over 10 000 young people in Australia, Brazil, Finland, France, India, Nigeria, the Philippines, Portugal, the United Kingdom and the United States of America. More than 50% of young people reported feeling sad, anxious, angry, powerless, helpless or guilty with respect to climate change. Over 45% said that their feelings about climate change have negatively affected their daily lives. In another study, climate anxiety and distress were positively correlated with perceived inadequate government response and associated feelings of betrayal (Hickman et al., 2021). Studies conducted in the Solomon Islands and Tuvalu have demonstrated that climate change is associated with worry about the future, especially regarding rising sea levels, and exerts negative impacts on well-being (Asugeni et al., 2015; Gibson et al., 2020). No similar studies have been identified for the Caribbean, and it is highly recommended that they are carried out (R4ACCHC, 2023b).

However, there have been some observations on the impacts of climate change on mental health in the Caribbean. In Saint Vincent and Dominica, psychologists have reported instances of rain showers triggering posttraumatic stress responses following experiences of floods and hurricanes. The Caribbean Alliance of National Psychological Associations (CANPA) reported that young adults (under the age of 25 years) have been feeling anxious about the future; social media has increased their awareness of the impacts of climate change; and they feel "impotent/desperate/hopeless due to perceived inaction of adults" (R4ACCHC, 2022c). The CANPA reported that young people are discussing their fears, older people are nostalgic for the past and middle-aged people are trying to understand the economic and health impacts of climate change (R4ACCHC, 2022c).

Neurological health can also be affected by climate-related factors such as extreme heat; exposure to hazardous chemicals, biotoxins and metals in air, food and water; and changes in pest management. Some harmful algal blooms, fuelled in part by warming waters, contain neurotoxins that affect foetal, postnatal and adult development (Portier et al., 2010). Air pollution can affect the cognitive ability of older people and exacerbate behavioural problems in children (Cissé et al., 2022). Polluted air causes neuroinflammation that is linked to neurodegenerative disorders such as Alzheimer's disease, Parkinson's disease and amyotrophic lateral sclerosis, and also some psychiatric disorders (Van Susteren, 2018). Malnutrition caused by food insecurity (to which climate change can contribute) can affect cognitive function and reduce educational achievement (Cissé et al., 2022). In addition, heat stress affects reaction time and ability to pay attention to tasks (Di Napoli et al., 2021; Mazloumi et al., 2014; Székely et al., 2015; Taylor et al., 2010).

Preexisting mental health conditions, such as anxiety disorders, increase the risk of individuals' physical (as well as mental) health being adversely affected by climatic events. People with conditions such as psychosis, dementia and substance abuse have a two to three times higher risk of death during heatwaves than people without such conditions, for example because of their not having the awareness to move to a cooler location. In addition, the side effects of some medications for mental illness can impair the body's ability to regulate its temperature, thus making people taking these medications especially vulnerable to heat stress, particularly older people (Lawrance et al., 2021; Nurse et al., 2010; PAHO, 2012).

Hotter temperatures have been found to be associated with increased psychiatric hospital visits, with both heat and drought amplifying the risk of suicide, particularly among people living in poverty (Brody, 2021). Furthermore, higher temperatures have been noted to be associated with decreased happiness and well-being, in addition to aggression and increases in the number of violent crimes committed (R4ACCHC, 2022e). A study conducted in the United States of America demonstrated that temperatures between 21 and 27 °C were associated with a reduction in well-being of 1.6% and temperatures above 32 °C with a reduction in well-being of 4.4%, compared to temperatures between 10 and 16 °C. These reductions were probably related to the adverse impacts on health, economic costs, social interactions or quality and quantity of sleep associated with hotter temperatures (Noelke et al., 2016). Excessive heat can restrict outdoor labour and limit one's capacity to fulfil one's potential in society, which can in turn have a devastating effect on one's mental health.

It is important to consider vulnerable populations and the inequalities associated with the mental health-related consequences of climate change (WHO, 2022). In the Caribbean, it is typically the most vulnerable populations (e.g. women, homeless people, indigenous people, older people and children) who are negatively affected by climate change and therefore suffer disproportionate mental health burdens (Dubrow, 2021). Perceived inequality and injustice can have greater negative impacts on mental health and the prevalence of violence than absolute, measurable levels of inequality (UNDP, 2012). Resentment and negative feelings, and the "acting out" of these feelings, may persist unless the health consequences of climate change on vulnerable populations, and on Small Island Developing States in particular, are addressed to the satisfaction of the Caribbean people, especially those who are poor and belong to one or more marginalised groups (Reckien et al., 2016).

Indigenous communities, and other communities, may define well-being in terms of being in harmony with nature and often form strong cultural and social ties with the environment. Extreme weather events and gradual environmental changes leading to long-term social, economic and cultural changes can undermine mental health because they bring about increased competition for resources, disruption of communities, displacement and loss of land or wildlife (Gibson et al., 2020; WHO, 2022). In the indigenous Wayana territory of Suriname there has been substantial deforestation due to gold mining. Deforestation, which contributes to climate change, has resulted in increased numbers of fires and floods, leading to concerns about food security and the availability of clean drinking water. Owing to food insecurity and the illegal redistribution of land for mining, young people in the Wayana territory do not feel secure in their own territory. This has led to experiencing

feelings of hopelessness and uncertainty about their future, which has in turn resulted in high rates of suicide among 15- to 25-year-olds (Itoewaki, 2021; Vreedzaam, 2021).

The psychological effects of disasters often manifest in phases (which vary depending on the scenario and at the levels of the individual and the community), from a predisaster period to a honeymoon period through disillusionment to reconstruction and eventual recovery (Benjamin, 2015). Disillusionment may include feelings of despair, grief and abandonment. The full process can take over one year and be gradual, with possible relapses (CARPHA, 2018; Commonwealth of Dominica, Princess Margaret Hospital, Community Mental Health Team, 2017). However, there is evidence that, among some people, disasters can inspire hope, altruism, compassion and optimism, and instil a sense of purpose and promote personal growth. These positive psychological changes are known as posttraumatic growth and usually occur as people band together to console one another and rebuild their lives among the chaos and devastation (Augustinavicius et al., 2021; Hayes et al., 2018).

In the Caribbean, mental health services usually fall under the purview of the ministries responsible for health. There appears to be limited documentation of mental health services in the aftermath of extreme weather events, suggesting that the provision of such services is of low priority (Benjamin, 2015).

Antigua and Barbuda, the Bahamas and Jamaica have a mental health and well-being monitoring system in place to serve as an early warning system to trigger preventive action. The systems do not, however, include meteorological information (WHO and UNFCCC, 2020a, 2021a,b) (Table 1).

Table 1: Integrated mental health and wellbeing risk monitoring and early warning in Caribbean countries

Country	Monitoring systems in place	Monitoring system includes meteorological information	Early warning and prevention strategies in place to reach affected population
Antigua and Barbuda	yes	no	yes
The Bahamas	yes	no	yes
Dominica	no	no	no
The Dominican Republic	no	no	no
Grenada	no	no	no
Guyana	no	no	no
Jamaica	yes	no	no
Saint Lucia	no	no	no

Source: WHO and UNFCCC (2020a,b,c,d,e, 2021a,b,c).

In recent years, there has been increasing recognition globally of the importance of studying the impacts of climate change on mental health, but a limited amount of such research has been conducted in the Caribbean. Such research has focused on impacts post hurricanes/tropical storms (Michael et al., 2021; Ramphal, 2018; Sharma et al., 2018; Shultz et al., 2020). Increased diagnoses of PTSD and depression and incidents of suicide in the aftermath of hurricanes were found to have occurred after Hurricanes Dorian (2019), Irma (2017) and Maria (2017). It was found that 57.5% of adults receiving primary care from one specific health centre in the United States Virgin Islands demonstrated symptoms of PTSD (Michael et al., 2021). A low prevalence of PTSD among medical students in Dominica following Hurricane Maria was attributed to protective factors such as a comprehensive evacuation plan; safe shelter with adequate supplies of water, food and electricity; and the quick resumption of studies (Sharma et al., 2018). The reasons given for anxiety and depression in the aftermath of the hurricanes included possible future disaster events, housing, transportation, food insecurity, unemployment, homelessness and overall loss (Ramphal, 2018; Shultz et al., 2020). Schultz et al. discussed the "psychologically distressing experiences [of the initial medical] providers on the frontline. They were tired, overworked, deprived of sleep due to long hours, and worried about their own families and friends" (Shultz et

al., 2020). Additional studies on the mental health impacts of nonclimatic disasters include studies of the 2010 Haitian earthquake (Dube et al., 2018; Hassan et al., 2020) and 1995 Montserrat volcanic eruptions (Brown et al., 2016). There has also been research conducted on the impacts of climate change-related environmental disruption on the mental health of vulnerable groups such as indigenous people and children (Itoewaki, 2021; Shultz et al., 2020; Vreedzaam, 2021).

After Hurricane Maria, the community of Mayaguez in Puerto Rico was provided psychological first aid (PFA) by four graduate students and six faculty supervisors from the Psychology Department at the Universidad Carlos Albizu, Centro Universitario Mayaguez (UCA-Mayaguez), as part of the initial response. The main services they offered included providing resources for basic needs, offering empathy and support and making referrals into the UCA-Mayaguez mental health clinic. Research was conducted to determine how the UCA-Mayaguez faculty and students supported the mental health of Puerto Rican people immediately following the hurricane. The results indicated that communication was a major issue and students and faculty used radio communication as an important vehicle to relay information about resources and available services. The students and faculty also used the radio as an access point and treated people as they waited in line at the radio station to send messages to family and friends. Once someone was identified as "being in crisis" (e.g. they needed to vent about a particular issue), a radio booth was provided to afford them privacy. Other access points included emergency shelters and UCA-Mayaguez itself, together with community outreach. It was noted that some individuals required more intensive mental health treatment; these individuals were triaged into the UCA-Mayaguez university mental health clinic, which opened three weeks after the hurricane hit (Alto et al., 2021).

7.2. WHAT SHOULD BE DONE?

Individual and community actions and how to support them

Increase knowledge of mental health and emotional well-being and their management among the general and vulnerable populations pre, during and post extreme weather events

Box 1: Raising awareness and reducing stigma in the Caribbean

In the aftermath of the devastating 2017 hurricanes Irma and Maria, the Caribbean Development Bank and the Pan American Health Organization (PAHO) implemented an 18-month-long mental health project in the Caribbean. The project's capacity-building component included a PFA and Mental Health Gap Action Program Humanitarian Intervention Guide. The project also entailed awareness-raising, monitoring and evaluation, and country-specific development of realistic planning. The awareness campaign "Stronger Together" disseminated information on being able to cope and to raise awareness to reduce stigma around help-seeking.

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A study conducted in the Caribbean concerning public perceptions of climate and health among 3000 participants demonstrated that 75% of the respondents recognised that there was a connection between the effects of climate change and physical health, but only 61% made the same connection with mental health. This demonstrates the need to increase awareness of the relationship between the effects of climate change and mental health (Drewry, 2021). The general public should also be made aware of the signs and symptoms of mental health impacts and how to obtain the necessary help for themselves, friends and families. This awareness can also assist in reducing the stigma surrounding mental health (see Box 1). Healthcare providers in Grenada and Trinidad and Tobago perceived that there were more cases of mental illness due to the impacts of climate change, and expressed concerns that the stigma associated with mental illness was a barrier to seeking treatment (Macpherson and Akpinar-Elci, 2015). It is also important to teach the community how to discuss and practice culturally relevant coping strategies that can assist in providing comfort, building psychological resilience and reducing stigma attached to mental health conditions (R4ACCHC, 2023c).

Engage communities in climate change mitigation and adaptation interventions

Oftentimes people, particularly vulnerable populations such as young people and indigenous people, can become overwhelmed with feelings of anxiety, grief, uncertainty, hopelessness and a sense of impending doom

about their future (Hickman et al., 2021). Including people in climate change adaptation interventions (R4ACCHC, 2023c), such as is being done by the Mulokot Foundation of Suriname, can be good for their mental health. To provide the indigenous Wayana population with agency, the foundation teaches them elements of sustainable farming, such as fish farming in nonpolluted, mercury-free waters (Itoewaki, 2021).

Young people can gain a sense of agency by taking part in advocacy and developing their own organisations and forms of activism, which may contribute to their feelings of accomplishment in the face of climate change challenges. Researchers and policymakers should actively seek community perspectives on climate change challenges and solutions (R4ACCHC, 2022c, 2023c), as was done in the Youth Forum at the 2021 Conference on Climate Change and Health in Small Island Developing States: Focus on the Caribbean.

It is important to identify community members and organisations that can be involved in these interventions (R4ACCHC, 2023c).

Structural/governmental and private sector actions

Strengthen the capacity of national, local and regional mental health services

Mental health services are already overstretched. It is estimated that up to 50% of people with mental illnesses in high-resource settings and 90% in low-resource settings receive no treatment at all (Lawrance et al., 2021). The Caribbean overall, being a middle-income region (though with wide variation), probably falls between these two estimates. National, regional and local mental health services must be strengthened, and they should be integrated into disaster preparedness plans (PAHO, 2012; R4ACCHC, 2023c). The suggested ways to do this include (WHO, 2022):

- Ensuring that mental health services are included in health services at the primary care and local levels;
- Building referral pathways among mental health providers, general healthcare providers, community-based support and other services;
- Ensuring that every health facility has at least one trained person in place to identify and provide care for people with mental health conditions;
- Ensuring that medical pharmaceuticals and other technologies are integrated into the relevant treatment protocols and are on the disaster preparedness list of emergency supplies.

Creating a decentralised, community-based mental health system is one of the better options for immediate and appropriate response to the affected population in the aftermath of a disaster (PAHO, 2012). Creating a regional list of mental health providers is also recommended.

In the Caribbean, a multiplicity of state, nongovernmental and faith-based organisations provide mental health and psychological support services. In addition, other national, regional and international entities provide support and funding. Although decentralisation can facilitate flexible responses to needs, the coordination of services is critical for their efficiency and effectiveness (Weller and Boland, 2018). Central and local government entities should establish registers of providers, processes of referral and protocols for emergency response.

The Caribbean has a long history of collaboration among countries/territories, especially in the aftermath of disasters. After Tropical Storm Erika in 2015, it was recommended that the Government of Dominica accept the offer of psychiatrists and mental health workers from neighbouring countries (Benjamin, 2015). This spirit of cooperation should continue to increase collaboration among countries though agencies such as the CANPA (R4ACCHC, 2022c).

Include pre- and post-disaster management of mental health in national disaster preparedness and recovery plans

Mental health must be included in national disaster preparedness and recovery plans to reduce suffering and facilitate recovery. When mental health is included in such plans, both those affected and those who manage the risks are more likely to be resilient; actively engaged in prevention, preparedness, response and recovery; and working to reestablish normal living (IASC, 2021). Strategies need to address the issues of medication supply, communication before and after the weather event, and access to safe and secure shelter and nutritious food (CARPHA, 2018; Hassan et al., 2020). National and regional disaster and emergency response actors should be involved in coordinating mental health service delivery. This should supplement the work of mental health services, ensuring that basic needs such as food and shelter are met (Weller and Boland, 2018).

Given the association of mental health with a range of social and climate-change related factors, a whole-of-government, whole-of-society approach to developing disaster preparedness and recovery strategies is necessary. In addition, people with mental health conditions should be actively involved in planning and implementation to the extent that their conditions allow.

Develop and implement a comprehensive public communication strategy related to emergency management

Mental health conditions such as anxiety can be alleviated by the provision of information on how risks can be managed. If the public and vulnerable groups are provided with early warning of an impending extreme climatic event, their mental health will be less adversely affected. Communication should be continued, where possible, throughout the event and immediately after it, and, where necessary, into the future for as long as required. Social media, television, radio, mobile loudspeakers and flyers can be used. Information about where one can shelter and access food, water, health services and medicines, especially for vulnerable and sick people, can be communicated through these means (Alto et al., 2021). A media campaign can also be used to rebuild the morale of the population. Following Tropical Storm Erika in 2015, the Dominica Community Mental Health Team allowed the “heroic phase”, immediately after the storm struck, to pass before launching a two-month public media campaign using radio and TV. Members of the media also need training on psychosocial responses to enable them to respond better to disasters (Benjamin, 2015).

Train healthcare professionals and emergency first responders in the special medical and psychological needs associated with mental health related to disasters, including gender-based violence

It is necessary to ensure that there are sufficient numbers of health workers (e.g. psychologists and psychiatrists) and social workers to assist with the psychological recovery of people affected by disaster (PAHO, 2012; R4ACCHC, 2023c,d). Areas for training include survivor-centred support, case management, self-care and PFA (Weller and Boland, 2018).

As time goes on after an extreme weather event, personal, one-on-one care might be needed on a continual basis. One strategy, implemented after Tropical Storm Erika in Dominica, was to establish specialist mental health clinics within the affected communities to reach the victims and survivors (Benjamin, 2015). Another strategy, suggested after the 2017 Hurricane Maria in Dominica by the Dominica Community Mental Health Team, was to provide training to increase the number of people, including laypeople, with PFA and longer-term mental health training (Commonwealth of Dominica, Princess Margaret Hospital, Community Mental Health Team, 2017). The University of the West Indies and PAHO have collaborated to provide disaster-related psychological trauma and mental health training for emergency professionals in the Caribbean (Ocho et al., 2023).

The training of health professionals on mental healthcare responses to disasters should include approaches that destigmatise mental health, promoting concepts such as the following (Weller and Boland, 2018):

- Psychosocial support is about wellness, normal responses to abnormal circumstances and stressors and coping with these stressors, and not just about pathology and disorders.
- Stressors affect everybody and everyone may be vulnerable at one point or another, not just marginalised or "vulnerable" groups.
- Providers need psychosocial support too.
- Multiple factors influence behaviour and so interventions must be strategic, collaborative, coordinated and multidimensional.
- Gender is one of the important social constructs influencing behaviour and must be considered in the design of behaviour change interventions.
- Strongly held cultural attitudes, especially those based on religious beliefs, must be factored into design of interventions to maximise the positive impact of interventions on wellness.
- Barriers to the uptake of services may mean a reevaluation of roles and strategies (e.g. meeting the target group "where they are" rather than expecting them to come to a facility).

After Hurricane Maria, as part of the initial response the community of Mayaguez in Puerto Rico was provided with PFA by four graduate students and six faculty supervisors from the Psychology Department at the UCA-Mayaguez. The main services offered by the students and supervisors included the provision of resources for basic needs, offering empathy and support and making referrals to the UCA-Mayaguez mental health clinic which opened three weeks after the hurricane hit (Alto et al., 2021).

Each community/town should have a cohort of first responders who are trained not only in general first aid but also in PFA, to assist both the general public and vulnerable populations. To assist in community climate change adaptation, such training can be targeted to community members and conducted through partnership among community-based and other organisations using a train-the-trainer approach. PAHO values align with the essence of delivering PFA and could be a collaborator in the training of Caribbean PFA providers (PAHO, 2012). Collaborative arrangements between countries can boost the human resources available for post-disaster mental health response (Benjamin, 2015; Commonwealth of Dominica, Princess Margaret Hospital, Community Mental Health Team, 2017; R4ACCHC, 2022c, 2023c).

Other measures to increase the capacity of a mental health workforce include (WHO, 2022):

- Training healthcare managers on the effective integration of mental health into their climate and health plans and strategies;
- Ensuring that staff and volunteers are trained to manage their own mental health, and that they are provided with any necessary support when needed.

Research gaps and how to address them

Explore the relationship between extreme weather events and mental health

There is limited literature on mental health in the face of an extreme weather event in the Caribbean and such research should be prioritised (R4ACCHC, 2022d). Research using prospective and longitudinal research designs is needed to assess the short- and long-term impacts of events such as hurricanes, heat, drought, earthquakes and floods in the Caribbean (R4ACCHC, 2022c, 2023d). One longitudinal study outside the Caribbean examined the impacts of Hurricane Katrina. This study followed a cohort of young women that was established in 2004, one year before the hurricane struck, until 2020; at the end of the study, 30% of the women still showed signs of PTSD (R4ACCHC, 2022c). This study demonstrated the need to examine specific mental health diagnoses, disaggregated by gender, age and race, along with other diagnostic determinants, and their impact on the

general public versus vulnerable populations. CANPA is an ideal organisation with which to collaborate for such research (R4ACCHC, 2022c, 2023d). Research questions could include, but are not limited to, the following:

- Do people with disabilities suffer greater mental health impacts?
- What are the mental health impacts on children, adolescents and young people?
- For how long after an extreme weather event do members of various vulnerable groups need mental health support?
- How do the mental health impacts of extreme weather events differ between people who evacuate and people who shelter in place?
- How do the mental health impacts of extreme weather events differ between people who are internally displaced and people who are externally displaced?
- How is the mental health of the general health workforce and the mental health workforce affected by extreme weather events?
- How do indigenous populations withstand the climate change impacts on their mental health? Even though natural disasters have always existed, what is their capacity to understand, cope with and recover from such extreme events (R4ACCHC, 2022c)?
- What are the psychological impacts of earthquakes (R4ACCHC, 2022c)?

Such research can assist with the development of prevention and treatment options (Dubrow, 2021).

Identify the challenges faced by the healthcare system with respect to mental health during and after extreme weather events

There is likely to be an increased need for mental health services as a consequence of extreme weather events (Brody, 2021; Cissé et al., 2022; Dubrow, 2021; Herrán, 2021; WHO, 2022). The areas in which research should be conducted and improvements could be made in responding to mental health needs include planning and preparedness; expanding the mental health workforce and training of existing staff; access to, and cognisance of, the cold-chain supply for medications for treating mental disorders; and addressing shortages of ambulances and hospital beds.

Conduct research on mental health concerns specifically associated with climate change

Surveys to examine how the general population feel about climate change and its associated risks have been conducted in various countries, but not in the Caribbean. To inform communication campaigns and support mechanisms in the Caribbean, therefore, surveys should be conducted in Caribbean countries.

Feelings of intense grief and hopelessness can be brought on by climate change, particularly among young people. People may experience climate change anxiety or eco-anxiety, solastalgia, ecological grief or climate-related psychological distress, which are new and emerging mental health concepts. Individuals experiencing such despair may be unable to express it, and medical providers are often unaware that their patients are experiencing these feelings (R4ACCHC, 2022c). There needs to be further exploration so that these concepts, the risk factors that cause these reactions, attitudes towards self-care, and the vulnerable populations that may experience these emotions can be understood. This will assist in identifying specific prevention and response actions (R4ACCHC, 2022c; WHO, 2022; R4ACCHC, 2023d).

Explore changes in cognition of vulnerable populations due to climate-related events

The cognitive abilities and neurological health of vulnerable populations such as children, people with disabilities and older people are known to be affected by climate hazards. It is important to better understand how adaptation measures (such as the use of air conditioning to reduce ambient temperatures in, for example, child

day care centres, schools and homes for older people) can improve cognition and neurological health. This will assist in the planning and effective distribution of limited resources (R4ACCHC, 2023d).

Determine the effectiveness of actions at the individual, community, structural/governmental and private sector levels

To ensure that any actions are effective, it is necessary to monitor and assess them. Such assessments may take the form of process, impact and/or cost-effectiveness evaluations. Determining the barriers to and facilitators of the implementation of suggested actions would also be helpful in determining the limitations, challenges and recommendations associated with them. Research questions could include, but are not limited to, the following:

- After a health promotion intervention, was there an increase in awareness, especially among vulnerable populations, of the relationship between climate change and mental health? Was there an increase in knowledge of the signs and symptoms of mental illness, and where to get help?
- What have been the barriers to and facilitators of PFA training?
- Have mental health services been successfully incorporated into primary health care?
- Were public communication strategies successful in making the public, especially members of vulnerable populations, aware of where to access food, water, health services and medicines?
- Are there sufficient numbers of healthcare professionals and emergency first responders trained in the needs associated with mental health related to climate disasters?
- Did mental health preparation increase well-being after an extreme weather event?
- How did the media influence mental health after an extreme weather event?

Surveillance gaps and how to address them

Establish surveillance of mental health conditions

The lack of surveillance data on mental health and the distribution of psychological conditions across places, populations and time is a severe hindrance to research and action to address climate-change related mental disorders. Alliances with mental healthcare providers need to be formed to enable reporting and development of centralised national databases along the lines of the NCD registries currently being established. Because mental health conditions tend to be underreported to medical services, the limitations of such registries would need to be taken into account when designing research and interpreting surveillance. Nevertheless, administrative data from mental health services can help monitor reporting patterns and care and support services provided, offering guidance for service management and policy (R4ACCHC, 2023b).

Establish emergency response plans for the needs of people with mental health conditions

People living with NCDs, including mental health conditions, are among those who will be most adversely affected by extreme weather events or other natural disasters (Hassan et al., 2020). Community watch teams can help monitor the health status of people with preexisting conditions, including mental health challenges, and help ensure they have access to care (PAHO, 2018). To protect people with mental health challenges from stigma, local registries need to adhere to strict confidentiality standards.

Establish a surveillance system that integrates mental health outcomes and climate and weather information

Once the surveillance of mental health conditions and service provision is established, analyses of the impacts of climate change on mental health can be conducted, and early warning systems developed. For example, links between increases in ambient air temperature and heatwaves and mental health outcomes can be further established and early warning systems implemented accordingly (Cissé et al., 2022; Dubrow, 2021; WHO, 2022).

Monitoring increases in ambient air temperature could enable medical services to be alerted when there is likely to be increased use of health care due to mental health challenges caused by extreme weather events (WHO, 2022).

Establish surveillance systems to monitor long-term impacts of mental health post extreme weather events

Immediately following an extreme weather event, medical and psychological care may be made available, but specialised mental health care is frequently discontinued as things get back to normal. Oftentimes mental health disorders, such as PTSD, and their potential outcomes, such as suicide and attempted suicide, do not manifest until months after the event. It is therefore recommended that systems be created for the active and intense monitoring and surveillance of mental health disorders and their potential outcomes, in addition to proxy indicators such as gender-based violence, for at least 12 months after an extreme weather event.

Research and surveillance capacity-strengthening needed

Technical assistance may be necessary to build surveillance expertise and systems on mental health. Without this, research and action on links between climate change and mental health in the region will be hampered. National ministries responsible for health, along with regional agencies, such as the Caribbean Public Health Agency (CARPHA), need to strengthen mental health surveillance to capture and monitor cases of mental disorders, including psychosis, PTSD, depression, anxiety and dementia. Collaboration between mental health surveillance systems and national and regional meteorological and environmental agencies and ministries will facilitate examination of the effect of sudden-impact, extreme weather events (e.g. hurricanes) and slow-moving environmental changes, such as deforestation and sea level rise, on mental health (R4ACCHC, 2023d).

7.3. REFERENCES

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