Australian Government
National Mental Health Commission

National Disaster
Mental Health and
Wellbeing Framework

Informing the Framework
Supporting Evidence

Supporting Australians' mental health through disaster

Contents

Chapter 1
Evidence base for disaster impacts on mental health

Overview

Disasters have individual, family and community impacts, and all of these are of direct importance to mental health. Psychological outcomes for those impacted by disasters are influenced by a range of factors that can increase risk or enhance resilience. These are often referred to as risk and protective factors. Resilience and/or recovery is expected to be the norm for most, however short term distress responses are common, and a significant minority of those affected by disasters will develop more ongoing and severe mental health problems. Expectable mental health impacts of disasters can vary depending on the characteristics of the hazard event (as outlined in Chapter 2), the community context and the characteristics and circumstances of the individuals impacted (as outlined in Chapter 3).

Disaster exposure increases the risk of developing a mental health disorder

People exposed to disasters experience a wide range of impacts which may affect many parts of their lives concurrently, including death, bereavement, injury, disruption to homes, livelihoods, education and relationships. These impacts often result in a negative effect on the mental health and wellbeing of disaster affected populations.

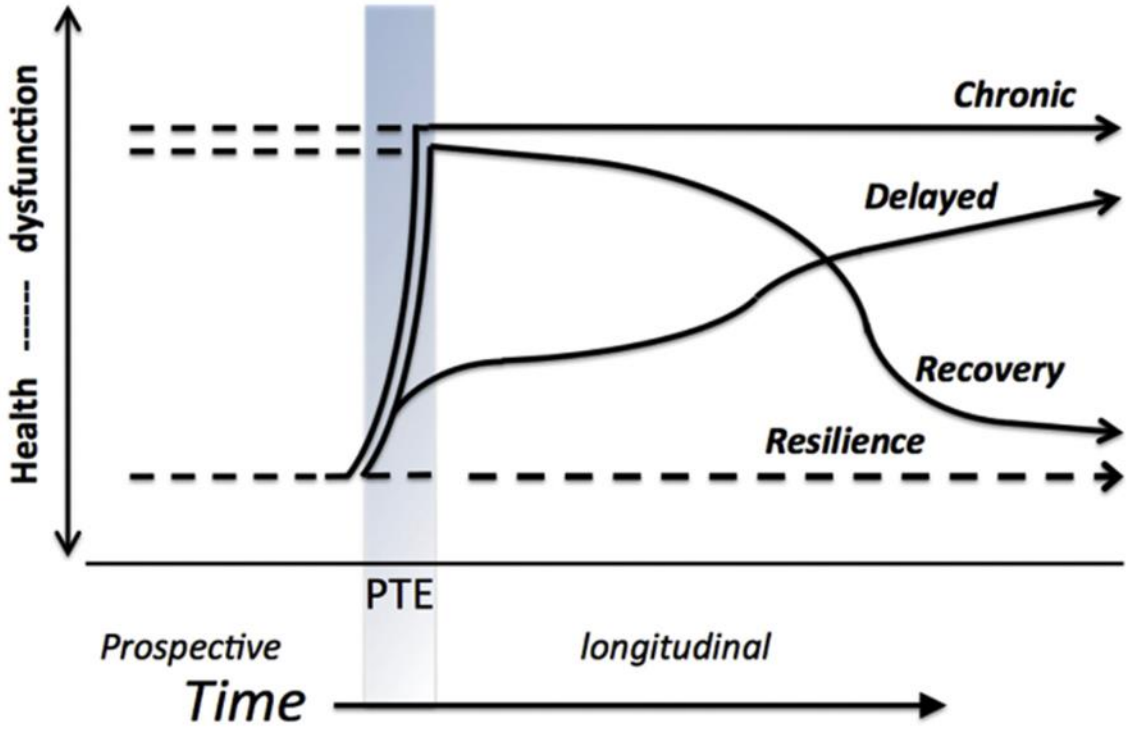
Exploring the mental health impacts of disaster events is a well-established field of research, dating back to the 1940s.[1] The majority of the academic research relating to the psychological impacts of disasters has been undertaken between one month to two years following the hazard event,[2,3] with some notable exceptions such as the *Beyond Bushfires* longitudinal study following the 2009 Victorian Bushfires[4] and a twenty-year longitudinal study of adults who had been exposed to the Ash Wednesday fires in 1983.[5] These longer-term studies have indicated that those affected can experience adverse psychological impacts for a prolonged period after the disaster event.[3,6]

Rates of psychological distress and psychiatric disorder have been consistently shown to be higher in disaster affected communities.[1,2,7] For example, the *Beyond Bushfires* study indicated that ten years after the disaster event, there was a higher rate of probable mental health disorders in communities that had high levels of bushfire impact (22%), compared to low and medium impacted communities (7% - 9%).[8] Widespread distress amongst the affected population is common, with a smaller portion of those impacted likely to experience serious psychological harm.[3,6,7,9,10] The most commonly

reported mental illnesses in disaster research are posttraumatic stress disorder (PTSD), depression, anxiety and substance use disorders.[3,7]

Predicting rates of mental health disorders following a disaster is complex. While there is a wealth of studies exploring the topic, there is a range amongst studies in sampling, hazard type, and disaster exposure as well as limited data about pre-existing rates of psychopathology, and limited longitudinal studies. The most frequently studied disorder after disasters is PTSD. A frequently used estimate for the prevalence of PTSD at one year post disaster for adults is 30-40% of victims, 10-20% of rescue workers and 5-10% of the general population, noting that these ranges are a simplification of findings and that there are studies demonstrating prevalence both higher and lower than these ranges.[11] Prevalence of delayed onset PTSD six months or longer after traumatic events (including disasters) has been estimated at 5.6%, with higher rates in people with professional roles such as military, rescue workers, firefighters, police and utility workers.[12] A meta-analysis of studies in Japan, United States of America, Taiwan, China and Sri Lanka examining suicide death rates following disasters identified an increase for men but not women, noting that this was not consistent across all studies reviewed.[13] The *Beyond Bushfires* longitudinal study identified prevalence of probable mental health disorders (PTSD, depression and/or severe distress) in highly impacted communities as 26% at three years,[14] 22% at five years[3] and 22% at ten years.[15]

When conceptualising how populations exposed to disasters and other potentially traumatic events are affected over time, there has been considerable work undertaken in mental health research to assess the trajectories of these groups. While different models have been developed, commonly used groupings by researchers when looking for the differences in how mental illness presents following disasters is affected include *resistant* (no or mild symptoms), *resilient* (initially moderate or severe symptoms, followed by a sharp decrease of symptoms), *recovery* (initially moderate or severe symptoms, followed by a gradual decrease), *chronic dysfunction* (moderate or severe and stable symptoms) and *delayed dysfunction* (initially no or mild symptoms which increase over time).[16,17]



Commonly observed prospective and longitudinal trajectories of response to potential trauma.[17]

Many people have signs of ongoing distress that don't fit a diagnosis for mental disorder but can make life difficult and can escalate over time. Much existing disaster mental health research has focused on rates and types of psychopathology,[4] often without acknowledging the broader psychosocial and sub-clinical impacts that disaster affected populations experience.[2,5] While most people affected will not develop a diagnosable condition as a result of disaster exposure,[1,3,6,7,9] it is important to recognise that the broader sub-clinical impacts to mental health and wellbeing are nonetheless disruptive and can have far reaching consequences. Commonly reported issues from people affected by disasters who may not meet a threshold of diagnosable mental health conditions include sleep disturbances, difficulty concentrating, low moods, changes to social interactions and physical complaints.[18] Recent research has identified that these issues can escalate and can result in a deterioration of mental health over time.[15]

People may also be conscious of others in their community who are not coping. In the *Beyond Bushfires* study 62.6% of participants in high impacted communities felt 'mostly' or 'fully' recovered ten years after the event, but only 33.5% felt that their community had recovered.[8]

The major life disruptions that tend to happen after a disaster increase the risk of poor mental health outcomes

In addition to potential trauma exposure during a hazard, the disruptions caused by disasters mean that most people affected will also be exposed to secondary stressors. People who experience prolonged secondary stressors are at greater risk of adverse mental health outcomes.[6,7,19–22] Commonly reported secondary stressors after disasters include financial stress, difficult compensation processes, rebuilding and relocating homes, loss of physical and sentimental possessions, impacts to health, disruptions to education, changes to family and social relationships, loss of leisure and recreation time and changes to world view.[7,21,23–25] For example, the *Beyond Bushfires* study demonstrated that people who experienced major life stressors as a result of the disaster were more likely to have poorer mental health.[15] Women in high bushfire affected communities were seven times more likely to experience violence since the disaster than women from communities with low levels of bushfire impact.[26] Those who experienced violence were also more likely to report symptoms of severe posttraumatic stress disorder and depression.

A stepped care approach matches mental health services to the different levels of post disaster needs

Disasters can have adverse mental health and wellbeing impacts at individual, family and community levels. When assessing the needs of communities after disasters, it is important that the range of impacts on mental health and wellbeing are taken into account, and support is offered which meets these needs.

This type of coordinated, multi-level approach to support is often referred to as *mental health and psychosocial support systems*, which is a broad term used to describe support systems that aim to protect or promote psychosocial wellbeing and/or prevent or treat mental disorder.[9]

Evidence informed guidelines for disaster mental health, such as the *IASC guidelines on mental health and psychosocial support in emergency settings* emphasise the importance of a multi-level, stepped care approach to the provision of support which is tailored to the needs of the affected community.[27] Supports should be available at individual, family and community levels, and may range from ameliorating practical issues and reducing secondary stressors such disruptions to housing, education and infrastructure through to acute psychiatric and pharmacological treatments.[9,22,28]

When designing mental health and wellbeing support systems for disaster affected populations it is important to consider ways that impacts to the community can be assessed, the capacity of the existing support services, and the way that support needs will change over time.[9,28,29]

Chapter 2
How the characteristics of disasters vary in their potential to affect mental health and wellbeing

Overview

Disasters are potentially traumatic events that can have a significant impact on the mental health and wellbeing of affected populations. While each disaster event is inevitably unique, disasters also share many common features. This Chapter therefore outlines the contemporary research evidence on the key characteristics of disasters that are likely to have a significant impact on the mental health and wellbeing of affected populations. Traditionally research in this field focused on the varying impacts of different hazard types, in particular human-induced and natural hazards. Recent developments have shifted the focus away from simple distinctions of hazard types towards a more nuanced understanding of key disaster characteristics in context which can influence the nature and scope of anticipated mental health impacts. This shift has been partly underpinned by a growing etiological realisation that natural disasters are rarely solely natural in origin but almost always involve elements of human agency in either the causation or amplification of impacts. It is further reflective of the changing face of disasters in terms of the rise in climate-sensitive and increasingly cumulative and compounding disasters.

Australia's disaster risk profile

Overall, it is important to recognise that Australia's disaster risk profile is heavily tilted towards exposure to natural rather than human-induced hazards,[30] while climate-sensitive natural hazards are also increasing significantly in magnitude, frequency and intensity.[31] This means that Australians are far more likely to be exposed to natural disasters (such as, bushfires, floods or cyclones) rather than human-induced disasters. The existing evidence in disaster mental health research indicates that, on the whole, human-induced or man-made hazards (such as acts of mass violence or terrorism) tend to be associated with worse mental health outcomes than technological or natural hazards.[32–34] This finding has been linked to the relatively greater unpredictability, often rapid onset, and human intentionality underpinning such events.[35–37] Specifically, man-made hazard exposure has been linked to a relatively greater risk of posttraumatic stress disorder.[11,38] By contrast, while depression is also commonly observed in many disaster contexts, its relative risk is particularly elevated following natural hazards.[39] Assessments of the relative impact of disasters on the basis of hazard type, are inevitably based on generalisations across varied study designs, sample types and disaster contexts. In this context, it is therefore important to note that major disaster events which are primarily induced by natural hazards can also have significant and lasting impacts across the broader mental health spectrum.[2]

Disaster characteristics

Key disaster characteristics that can adversely impact mental health outcomes include the greater disaster scope, intensity, rapidity of onset (lesser warning), duration, severity of exposure (at population and individual levels) and severity of stressors experienced.[35,40]

Norris and colleagues posit that disasters possessing two or more of the following four characteristics are likely to generate pervasive mental health problems:

1) large numbers of injuries or deaths
2) widespread destruction and property damage
3) disruption of social support and ongoing economic problems
4) intentional human causation.[7]

Despite evidence of the greater likelihood of detrimental mental health impacts of disasters with such characteristics, slow-onset disasters of significant scope and prolonged duration (such as extended droughts[41] and the global COVID-19 pandemic[42,43] can also adversely impact the mental health of affected populations. Slow-onset disasters can undermine the foundations of good mental health and wellbeing through varied direct and indirect impacts on human livelihoods, threats to health, losses, uncertainties about the future, and restricting vital social and societal connections.

Whether disasters are centripetal in nature and occur in areas where people live (such as with floods, cyclones or bushfires) or centrifugal and affect people who have gathered temporarily and then disperse widely thereafter (such as with transport incidents or terrorist attacks) speaks to the locations of where mental health issues are likely to arise and supports will need to be provided.[40]

While disasters are sometimes thought of as relatively short-lived 'events' that occur in a defined space and time, when it comes to mental health consequences it is important to take a long-term perspective which recognises the varying nature and scope of mental health and psychosocial impacts that are likely to manifest at individual and community levels in the short- mid- and long term.[44] These impacts can range from common initial but often transitory distress responses, and ongoing adjustment issues, to diagnosable mental disorders (see Framework section 3.1).

Mental health impacts of disasters are not solely determined by hazard characteristics but also depend on varied risk and resilience factors in disaster contexts, before, during and after the event. Among these, commonly identified factors include demographics (gender, age, ethnicity, socio-economic status), level of pre-disaster functioning, degree of exposure (loss of life, witnessing of events, threat to life, injury), psychological coping and resources, ongoing stressors (property damage, displacement, financial and resource loss) and social support.[45]

Anticipating disaster mental health risks and consequences

Notwithstanding a strong evidence-base on key disaster characteristics and common disaster mental health impacts, the ability to project the likely mental health consequences of specific disaster events (based on local hazard, impact and community information) is still limited by the complexity of disasters and not presently underpinned by an overly evolved or exact science. One common pragmatic approach involves the application of established prevalence estimates for common mental health problems from the literature to the size of the affected population or relevant subgroups. Another more comprehensive approach to gauging pertinent mental health risks of disaster and informing appropriate responses is the so-called trauma signature analysis.[46] Key elements of this approach include the identification of defining hazard characteristics (hazard profile) and enumeration of the severity of event-specific stressors and risk factors in terms of hazard exposure, loss, and change across disaster phases (stressor matrix). This approach can thus help to identify the unique constellation of major psychological risk factors at play in specific disaster contexts.

Cumulative and compounding disasters

While rapid succession and compounding disasters are receiving increasing attention in Australia and elsewhere and are likely to further deplete resources and impede recovery processes,[47,48] the evidence on the mental health impacts of repeated or cumulative disaster exposure is not conclusive. Some studies have shown that prior disaster exposure can have protective inoculation or habituation effects for individuals (particularly for similar events), while other studies have demonstrated increasingly adverse impacts of repeated disaster exposure.[6,49] In view of the plethora of potential traumatic event constellations and the changing hazard landscape, this area therefore warrants further research in future.

Chapter 3
Disaster mental health and wellbeing for specific populations

Overview

Disasters cause wide-spread disruption and can expose large numbers of people to stressful and traumatic events. While many people recover with time and do not go on to develop a diagnosable psychiatric disorder following a disaster event, research shows that a significant number may develop disorders such as posttraumatic stress disorder (PTSD), depressive disorders, and other psychological symptoms in the months and years following a disaster.[1,2]

Certain characteristics and experiences may make specific groups more vulnerable to poorer mental health and wellbeing outcomes following a disaster. Existing reviews of disaster research have identified that those with more severe exposure to the disaster and other traumatic or stressful events, prior mental health conditions, lower socio-economic status (SES) and ethnic minority group status, those of female gender, and certain age groups (specifically children and young people, and adults of middle age) may be more vulnerable to poorer mental health outcomes.[1,7] This Chapter provides a brief overview of specific groups who may have vulnerabilities to poorer post-disaster mental health and who may require special consideration in disaster mental health responses. Certain population groups, such as those experiencing insecure housing and homelessness, [50] who may be of greater risk are also under-represented within the empirical literature, as such little is known about their specific needs. Notwithstanding indications of increased vulnerability, readers should consider how both group and individual characteristics and experiences may intersect in contributing to potential vulnerability or resilience following a disaster event.[6]

Specific groups

Disaster related and other experiences

Those exposed to certain experiences before, during, and after a disaster may be vulnerable to poorer psychological outcomes. Research indicates that severity of exposure is closely associated with post-disaster mental illness.[1,11] Exposure can entail a range of factors, including:

- physical proximity
- duration
- injury and fear for life
- witnessing the death or injury of others
- bereavement, and property damage.[7,11]

In what has been referred to as a ‘dose-response relationship’, the literature suggests that increasing severity of disaster exposure predicts increased risk for mental health problems.[1] In a recent Australian example following the 2017 Northern Rivers floods in New South Wales (NSW), the increasing height of flood waters within business premises was found to predict an increasing likelihood of probable depression amongst business owners.[51] This relationship has been observed following a range of disaster types, including following the Canterbury Earthquakes in New Zealand, where extent of earthquake exposure was found to be positively associated with increased rates of depression, anxiety, and other disorders.[52] Research suggests that the severity of disaster exposure may have ongoing impacts on mental health in the longer term, with a longitudinal study following the 2009 Victorian Black Saturday Bushfires finding that the extent of fire-related property loss was found to predict both worsening probable PTSD, and the worsening and maintenance of existing depression ten years after the original event.[15]

Experiencing traumatic or stressful events prior to or following a disaster event may increase the risk of adverse mental health outcomes.[1] Ongoing stressful life events in the years following a disaster event can also contribute to poorer mental health outcomes in the longer term.[20] For example, business owners that experienced a *persistent* reduction in income six months after the 2017 floods in NSW were found to be significantly more likely to meet criteria for probable depression than those who experienced an initial reduction in income which resolved within six months.[51] Stressful and traumatic events in the years following a disaster have been found to predict prolonged and delayed onset of mental health conditions such as probable PTSD and depression (as observed in the decade following the 2009 Bushfires in Victoria, Australia).[15]

Mental health history

Those with a history of prior mental health conditions such as depression are more likely to experience poorer mental health and wellbeing outcomes following a disaster.[1,7,11] Amongst young adults surveyed before and after a major bushfire around Canberra in 2003, the presence of depressive and anxiety symptoms prior to the bushfires was found to be associated with later fire-related PTSD symptoms.[53] The relationship between mental health history and post-disaster vulnerability observed in the literature could involve the emergence of a new mental health condition following a disaster event, or a relapse or exacerbation of pre-disaster symptoms.[7] Furthermore, disasters may disrupt usual care for those with an existing mental health condition, with a study finding that 23% of people who received mental health services in the year prior to Hurricane Katrina experienced a reduction or termination of care in the aftermath.[54]

Gender

Female gender has been found to be associated with poorer post-disaster mental health outcomes, such as PTSD, amongst both children and adults.[1,7] Research suggests that the economic impacts of disasters may disproportionately impact upon women, who may recover more slowly from economic losses, experience increased economic insecurity, and changes to employment.[55] Relatedly, gendered roles and norms, and caregiving responsibilities may continue or increase.[55] Recent research also suggests that the implications of the COVID-19 pandemic and associated restrictions such as school and child care closures are linked to a reduction or loss of work amongst women, alongside an increase in caregiving, schooling, and domestic responsibilities.[56]

Emerging research following bushfires in Australia and disasters overseas indicates that violence against women may increase following disasters.[57,58] Research following the 2009 Victorian bushfires found that 7.4% of women surveyed from high bushfire impacted communities reported experiencing assault or violence in the three to four years since the fires (compared to 1% of women from low impacted communities), and that this violence was associated with poorer mental health outcomes.[26]

Socio-economic factors and minority group status

Socio-economic factors and minority ethnic group status may increase vulnerability to poorer mental health outcomes. Research suggests that individuals from minority ethnic groups experience poorer post-disaster mental health outcomes than those from 'majority' groups.[7] Across thirteen studies reviewed by Norris and colleagues, SES indicators such as lower education or income were found to be associated with higher levels of post-disaster psychological distress.[7] Existing research suggests that people from lower SES groups are more vulnerable to cumulative stressful and traumatic events[59] which may impact upon mental health over time.[60] Recent research on the impacts of COVID-19 and associated restrictions has also highlighted the importance of considering potential socio-economic disparities in mental health outcomes.[61]

Age

Certain age groups may be more vulnerable to poorer mental health outcomes or require special considerations in the post-disaster setting. Children and young people can be overlooked during and

after disaster events. However, disasters can adversely affect the mental health, wellbeing, social development, and learning of children for many years.[6,62,63] A significant number of Australian children are exposed to disasters, with the 2020 Advocate for Children and Young People survey reporting that amongst children and young people aged 0 to 25, two out of five had been directly affected by bushfires, three out of ten had been affected by drought, and almost a quarter had been affected by flood.[64] Children's own individual characteristics (including developmental level), their family and home circumstances, and their broader social, school, and community contexts will influence how they respond to and recover from a disaster event.[65] Considerations for infants, children, and young people are explored further in Chapter 4. Adults of middle age may also be at higher risk of adverse psychological outcomes following a disaster event, compared to adults of other age groups.[7] This may be related to certain responsibilities and stressors experienced by this age group, such as the provision of support to others.

First responders

In considering disaster mental health and wellbeing needs for specific populations, it is important to also consider first responders such as emergency services workers and volunteers. While research indicates that rates of PTSD are lower amongst first responders than those directly impacted by a disaster, they remain elevated compared to the general population.[11]In summary estimates derived by Galea and colleagues,[11] the prevalence of PTSD is estimated to be 10-20% amongst rescue workers, compared to estimated rates of 30-40% amongst those directly affected by a disaster, and 5-10% amongst the general population. Certain subgroups of first responders, such as volunteers, appear to be more at risk of adverse mental health outcomes.[66]

Aboriginal and Torres Strait Islander peoples

Aboriginal and Torres Strait Islander people may experience a natural disaster such as the Australian 2019-2020 Black Summer bushfires differently to non-Aboriginal people, due to deep connections between land, culture, history, and identity.[67,68] Some Indigenous communities face multiple and intersecting barriers to accessing services (i.e. remoteness, language, cultural, mobility) that may further compound the impacts of disasters. Research released by The Healing Foundation shows that since the start of the COVID-19 pandemic in early 2020, many Stolen Generations survivors have been experiencing an increased and heightened sense of vulnerability; significant disconnection from family, community and country; and significant impacts on mental health and wellbeing. In particular, the pandemic related restrictions created unprecedented disruption to cultural practices and the normal relational and collective practices of Aboriginal and Torres Strait islander peoples, and retriggered trauma for many Stolen Generations survivors.[69]

Inappropriate recovery and relief strategies may serve to further exacerbate vulnerabilities and Aboriginal and Torres Strait people's intergenerational experiences of trauma.[67] Instead, Williamson, Markham, and Weir propose that disaster recovery approaches should address those structures that discriminate, and support the priorities and recovery approaches of Aboriginal peoples.[67]

Accessing appropriate support

The likelihood of seeking mental health support may be influenced by certain characteristics and disaster related experiences. A review of related research indicated that those with more severe PTSD symptoms, midlife adults, 'Caucasians', and those who experienced more severe disaster exposure were more likely to access mental health services following a disaster event.[70] Children were more likely to access post-disaster mental health care if they experienced direct exposure to the disaster and if their parents were also experiencing and seeking support for mental health problems.[70] Broader considerations of equity of access to, and delivery of, mental health services may include addressing language and other access barriers (such as stigma), cultural considerations within specific communities (including culturally and linguistically diverse and Aboriginal and Torres Strait Islander peoples), and the role of pre-existing disadvantage (such as poverty and homelessness).[71–73] Mental

health supports should be culturally, developmentally, and individually sensitive and appropriate to the needs of diverse communities.

Chapter 4
Infants, children and young people

Overview

Children are both a vulnerable and a resilient group in the aftermath of disasters, and individual outcomes can be influenced by a range of risk and protective factors.[6] While children are particularly vulnerable to impacts following a disaster, both because of the way trauma can affect development and because of their reliance on adults,[74] they are often simultaneously resilient in the face of disasters and can play an important role in household and community recovery.[63,75,76] Masters describes children as a:

> 'community motivational reservoir' who should be included in preparation and recovery strategies for their ability to encourage and teach others, their energy and creativity, instances where their actions have saved lives, and their capacity to learn good habits in early preparedness from an early age.[76]

This Chapter provides an overview of mental health and wellbeing issues affecting children after disasters. References to 'children' in this document (unless stated otherwise) refer to infants, children and young people 0 to 18 years old.

The evidence base around the impacts of disasters on children and young people is slowly growing, though this age group has been historically under-researched. Children are often not directly included in disaster research. Instead, parental and educator responses are often used as a proxy for children's participation, despite repeated studies demonstrating that this is an unreliable way to collect data about children in post-disaster environments.[63]

Children and young people are increasingly being affected by disasters. A 2020 Advocate for Children and Young People survey found that in NSW:

- two out of five young people aged 0 to 25 years had been directly affected by bushfires
- three in ten young people had been affected by drought
- almost one quarter of children and young people had been personally affected by floods.[64]

Additionally, disasters disproportionately impact some children. For example, more than one tenth of children in NSW and Victorian communities affected by the 2019-2020 bushfires are Aboriginal, despite Aboriginal people only comprising 2.3% of the total population of these states.[67] Royal Far West and UNICEF Australia point out that children and young people in rural and remote Australia are more socially and developmentally vulnerable than their urban peers.[77]

There is evidence within the existing literature that children are concerned about the increasing frequency and impacts of disasters. A recent survey of approximately 1,500 children and young people aged 10 to 24 years found many were concerned about future disasters in Australia, and also about the country's lack of preparedness. A large majority also said that they should be learning more about disasters and how to reduce risks as part of their schooling.[78]

Effects on children's mental health and wellbeing

Distress reactions in children in the early aftermath of disasters are common, and for most these reactions will lessen over time with support from parents, carers and friends.

Common reactions in children who are exposed to disasters include:

- returning to younger behaviours
- forgetting newer skills

- sleep disturbances
- separation difficulties
- challenging behaviours
- emotional changes
- struggling to concentrate.[79]

Research into the long-term impacts of the 2009 Victorian bushfires indicated that children and young people's sense of safety and stability was undermined by the disaster experience in many ways in the months and years that followed.[80]

A significant minority of children who experience trauma will develop a diagnosable mental illness such as posttraumatic stress disorder (PTSD).[81] For example, in a study of 222 children and young people aged 8 to18 years who were screened for PTSD six months following the 2003 Canberra bushfires, 21.1% of children were identified as having probable moderate or severe PTSD. Children and young people who thought that they or a family member might die, were within fifty metres of the flames, saw flames or were home alone at the time were more likely to show signs of PTSD.[82]

Children and young people exposed to traumatic events are likely to exhibit a range of responses depending on their pre-existing vulnerabilities, the buffers and supports available to them and service responses following the event. A national survey undertaken by the Royal Children's Hospital in Victoria in July 2020 found mixed impacts to the wellbeing of children and young people as a result of the pandemic. While 75% of parents surveyed felt that families had become closer since the pandemic, 36% of parents reported that the pandemic negatively affected the mental health of their children, and 31% of parents reported delaying or avoiding healthcare for sick or injured children.[83]

Infants in utero

There is an established evidence base showing that compromised conditions in utero, including high levels of maternal stress, can have longer term impacts on child development.[84] However, research on the impacts of disasters on infants in utero is limited, and the range of methods used in existing research make results difficult to compare.[85] Prior to COVID-19, most existing literature pointed to the association between disasters and:

- higher rates of pre-term labour
- complications in labour
- infants being born with lower birth weights.

These outcomes have been attributed to interrupted access to antenatal care and higher levels of maternal stress.[75,86]

However, in relation to COVID-19, there have been early reports of a reduction in pre-term labour.[87] For example, a study looking at births in Ireland between January and April 2020 identified an unprecedented reduction in low birth weight infants,[87] and a study comparing pre-term birth rates in Melbourne in 2019 and 2020 noted a significant reduction in pre-term births.[88] Researchers have attributed these changes in developed countries during pandemic lockdowns to a range of social and environmental factors including lower infection rates, increased hygiene measures, less air pollution and lifestyle changes, but note that further research is needed to establish causal relationships.[88]

Factors influencing mental health for children and young people

A range of personal, family and community factors have been found to influence the mental health and wellbeing of children following disasters including:

- the age and gender of the child

- exposure to the disaster event (including separation from family and caregivers)
- change in personal relationships
- coping skills and assistance received
- family factors (including levels of distress in carers, stressors such as abuse, divorce, death or illness in the family, and socio-economic factors)
- level of disruption to the home, school and community environment.[63,75,77,89]

In addition to trauma exposure, the outcomes for children affected by disasters are strongly associated with the way the adults in their lives, such as parents, carers and grandparents, cope with their own impacts. An important variable is the extent to which young people are included in decision-making. A sense of agency can itself be a protective factor, for example the extent to which families actively involve children in preparing for disasters and helping with the response and relief efforts.

Children are affected by decisions made by adults following disaster, such as those regarding housing and relocation.[90] A growing body of evidence identifies that family violence increases following disasters. For example, three to four years following the Victorian 2009 bushfires, women in high bushfire-affected communities reported experiences of violence at seven times the rates of women in low bushfire affected communities.[26] Children and young people can also be directly impacted by family violence,[91] although further research is needed on children's experiences of violence in the post-disaster context specifically.

Academic impacts for young people

Disasters can disrupt children's access to school and education, along with the myriad stressors experienced at the individual, family, and community levels. Factors identified as affecting children's education following disasters include:

- injury and illness
- distress at being separated from family[75]
- multiple relocations[92]
- damage to schools[62]
- changes to friendship networks[93]
- reduced access to study spaces, equipment and internet.[89]

In a local example, recent Australian research explored changes in academic achievement over time following a bushfire event, through analysing largescale National Assessment Program—Literacy and Numeracy (NAPLAN) and School Entrant Health Questionnaire (SEHQ) datasets from the Victorian Department of Education and Training.[62] The study included 24,642 students who had commenced school the year prior to the 2009 Black Saturday bushfires, and explored improvement over time in a range of academic domains from two to four years after the bushfires (when students were in Grade Three and Five, respectively). Findings showed children's degree of improvement between Grade Three and Grade Five in numeracy and reading (as measured by the NAPLAN) was reduced amongst children from areas which were more severely impacted by the 2009 Victorian bushfires. This research suggests that disaster exposure and the associated disruptions may have lasting impacts upon children's academic performance as they progress though school.

International findings on the association between disasters and academic impacts have however been mixed. Following the 2011 terrorist attacks in Norway, a study of high school students found that adolescents exposed to the attacks had poorer academic attainment and higher absenteeism over the following year.[94] Conversely, following the Canterbury Earthquakes in New Zealand, a study of students did not find a relationship between the disaster and longitudinal trends of school disengagement (early school leaving) or academic failure.[95] Similarly, following a fireworks disaster in the Netherlands, a study of 720 primary school students found that children exposed to the disaster

did not differ from their non-impacted peers in academic performance.[96] However, impacted children were more likely to experience socio-emotional difficulties as reported by their parents, teachers, and doctors.[97]

Although internationally the evidence for the academic impacts of disasters appears mixed and requires further research, there is an apparent need for programs to support children's learning and broader wellbeing following a disaster event. Schools can play an important role in supporting the wellbeing of students following a disaster event,[98] and appropriate school-based interventions have been shown to be efficacious in improving socio-emotional and academic domains[99] and reducing disaster related PTSD symptoms.[97] However, international research suggests that absenteeism amongst students can also increase in the year following a disaster event[98] and this may limit children and young people's access to school-based supports and interventions. The contributing factors to absenteeism can be complex, however a recent meta-analysis identified that behavioural and mental health problems among students, and parental/familial difficulties can be significant contributing factors.[100]

Strategies to support recovery in children and young people

Strategies to support children and young people can take place before and after a disaster event. For children and young people living in areas vulnerable to disaster events, approaches to support disaster preparedness may reduce risk and promote resilience in the event of a disaster.[101] Disaster risk reduction (DRR) approaches may include education and skills building with a focus on reducing both physical and psychosocial risks, such as disaster plans and drills to reduce the risks of physical injury and promote preparedness, and learning strategies to manage stressful events.[101] A critical review of current research by Ronan et al.[101] reported that while disaster preparedness approaches show initial promise, further research is required that follows children and young people through into the disaster response and recovery stages of an event. A small study conducted before and after bushfires along the Victorian surf coast in 2015 provided insights into how children can apply the learnings and benefit from their disaster risk reduction training through increased understanding of appropriate fire safety behaviours in different contexts, and calming strategies to manage emotional responses.[102]

A number of resources exist to guide parents and carers in supporting children and young people to both prepare for and recover from an emergency. They have been produced by a range of agencies including Australian Red Cross, Emerging Minds, Phoenix Australia and Queensland Centre for Perinatal and Infant Mental Health. Australian Red Cross co-developed with the University of Melbourne[103] a useful guide to these recovery resources for parents, carers, and young people to help users to navigate through what is available and find the resources to match their need. It includes advice on how to appropriately include children in disaster preparedness, along with a range of resources for different age groups and user groups to support post-disaster recovery in the short and longer term.

Following a disaster event, children and young people may experience psychological distress and other symptoms,[63,79] and a minority may go on to develop specific disorders such as PTSD. [81] A stepped care approach is recommended to support best recovery outcomes,[104] recognising that there will be different levels of support needs. Level 1 is universal and is generally based on the five essential elements of mass trauma intervention—promoting of a sense of calm, safety, self and community efficacy, connectedness and hope.[105] Psychological First Aid is an example of a Level 1 intervention. Level 2 is recommended for those showing signs of ongoing distress and includes programs to support coping strategies and build resilience, such as Skills for Psychological Recovery (SPR)[106] and Disaster Recovery Triple P (DRTP; 2-hr parenting seminar).[107,108] Level 3 in the stepped

care approach refers to psychological therapies delivered by trained mental health professionals for those showing signs of mental health disorders. Examples of Level 3 interventions that are supported by the evidence include Cognitive Behavioural Therapy (CBT) and Eye Movement Desensitization and Reprocessing (EMDR).[109,110] Further evidence is needed for all levels of the stepped care approach but particularly for Level 2 programs and programs supporting preschool children.

A number of factors may impact on intervention outcomes, such as the timing of delivery, intervention provider, and format (e.g., group or individual, length of treatment).[111] Schools can play an important role in supporting students' recovery through the delivery of school-based interventions.[112] Programs have also adapted to online delivery through the COVID-19 pandemic.[113–116] However, selecting appropriate programs may be challenging because post disaster interventions and evaluations vary in study design, quality and outcome measures, and intervention modality, delivery, and timing,[111,117] and further research may be required into the efficacy of specific interventions and the role of such factors. To assist school leaders in identifying suitable psychosocial recovery programs for their school community, the *Appraise: Tools to guide selection of school based post-disaster psychosocial programs*[118] is available to match school needs (identified via checklist for the school leader) with what is being offered by school-based programs (identified via checklist for the program provider).

Screening is commonly recommended as a relatively simple and low-cost universal strategy to identify those children and young people who may be at heightened risk of developing mental health problems following disaster and who may subsequently benefit from a more comprehensive clinical assessment and/or treatment, i.e. Level 3 support.[119] Screening of children and young people in school or community settings has therefore formed a key component of mental health responses to several Australian bushfire, cyclone and flood disasters.[120] School-based screening following Queensland flood disasters, for example, has been conducted with parental consent involving child self-report measures for depression, anxiety and PTSD. It demonstrated high levels of acceptability and satisfaction among teachers and parents and the ability to facilitate parental engagement in conversations about their child's wellbeing as well as broader treatment access.[121] For those children showing more severe symptoms or presenting with a mental health condition, Level 3 clinical evaluation, referral and specialist treatment are generally indicated.[119]

Conclusion

Children and young people are an important group within disaster-affected populations with specific needs and who need different approaches to treatment and care.

The mental health and wellbeing impacts of disasters can have long term implications physically, emotionally, socially and academically on children, and children and young people are likely to be more dependent on others around them for their recovery.

Recovery plans need to be developed with representative voice and with specialist evidence-based knowledge of the needs of infants, children and young people and targeted and specialist funding provided to mitigate the academic, developmental, and psychological consequences of disaster related adversity.

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