Psychological Impact of Disasters and Terrorism on Children and Adolescents: Experiences from Australia

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Abstract

Recent acts of terrorism have emphasised the need for research to further establish not only the nature of the impact of disaster and terrorism on the population, but also further define methods of effective intervention. Those affected, and often overlooked, include children and adolescents, yet, our knowledge of the impact upon the younger members of our community is limited. The literature is evolving, and there are a small number of valuable studies that can inform a response to the mental health needs of this younger population.

This article reviews some of the psychological impacts of disaster and terrorism upon children and adolescents, and considers both risk and protective factors. The importance of a developmental approach to children's understanding of disaster, particularly death and the nature of grief and loss are discussed as is the distinction between the phenomenology of bereavement and trauma. Family and community support are highlighted as protective factors, and a number of recent, valuable recommendations for intervention including psychological first aid and cognitive-behavioral therapy are described. Finally, the complex role of the media and the degree that children should be exposed to images of violence and disaster is considered. Disasters, whether they are natural or human-made always will be with us. It is necessary that a public-health approach that not only prepares for such scenarios, but responds by maximising the use of existing systems and agency linkages, is taken.

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Introduction

Recent natural and human-made disasters such as war and terrorist attacks, have placed the issue of protection and care of children onto the international public-health agenda.[1] Drawing upon both national and international literature, this article will discuss the impact of disaster/terrorism upon children and adolescents with an emphasis on key risk and resilience factors. It also reviews recent findings for disaster-related interventions relevant to disaster and terrorism impacts and discusses implications for policy and service provision.

For children and adolescents, response to disaster and terrorism is a complex interplay of pre-existing vulnerability, differing stressors and differing impact, and the nature of support in the aftermath. Variables associated with the development of syndromes may include: (1) severe threat to the life or survival of the child or young person; (2) death of close family or friends; (3) relocation or frequent moves;[2] (4) previous vulnerability or family disorder;[3,4] (5) post-traumatic stress disorder (PTSD) symptoms or continuing stress effects in the parents;[3,5-7] and (6) disruption in social support networks.[8] For children and

adolescents, these variables will be experienced according to the child's developmental level, making them more vulnerable as their identity, personality, and methods of coping still are evolving.

The Australian Experience

The experience of terrorism as disaster, particularly the attack on the World Trade Centre (WTC) in 2001 and the bombing of the island of Bali in 2002, both have had a profound impact upon the Australian population. Australia has a long history of both natural and human-made disasters, e.g., the Darwin cyclone (1974); the Granville rail disaster (1977); the Ash Wednesday bushfires (1983); the Sutherland bushfires (1997); and the Port Arthur massacre (1996). There are a number of valuable studies dealing with some of these events that have provided both clinical and empirical data on the experience of children and adolescents,[6,9–13] and a number of vivid experiences have been described.

Patterns of Response: The Psychological Impact of Trauma

While there are a number of studies describing the effects of disasters generally (e.g., bushfires, floods, and cyclones), there still is limited empirical evidence on the effects of disasters upon children and young people. There are a small number of excellent studies, such as the classic work of Pynoos and colleagues,[17-19] that have added considerably to our knowledge and these will be discussed below. Other research includes the study of victims of the Chowchilla bus kidnapping in California[14] and McFarlane's epidemiological studies of children's behavior and reactions after the South Australian bushfires in 1983[15] and 1985.[6,15] More recently, there has been work dealing with children affected by natural disaster,[16] war and violence,[17-20] and terrorism.[21,22]

Excessive exposure to violent and traumatic events may heighten vulnerabilities in children and adolescents who may experience a range of reactive processes.[23] Trauma exposure affects children's ability to regulate, identify, and express emotions and may have a negative effect on core identity and the ability to relate to others.[24,25] Those who experience personal threat may develop traumatic stress reactions; others who lose someone close may develop grief and depressive reactions; and those who are separated from family either during or after the event may develop anxiety reactions.[26,27] Specific triggers (e.g., fire, wind, or loud noises) may spark fear or terror reactions; there may be nightmares and/or a refusal to engage in activities associated with elements of the disaster.

Psychological response is associated with a child's or adolescent's developmental level. There may be a number of similar reactions across the age spectrum, such as aggression and/or anxiety; however, there may be important developmental differences in how disaster is understood and how symptoms are exhibited.

In *pre-school children* there may be symptoms of regression (clinging, bed-wetting, thumb sucking), an onset of aggressive behaviors; fears not directly related to trauma;

generalized anxiety; sleep disorders; and somatic complaints. *School-age children* may develop an obsession with trauma details, become hypervigilant or more aggressive, experience concentration problems and distractibility, nightmares or night terrors, develop a preoccupation with danger and reminders, somatic complaints, and become withdrawn.[24] They may exhibit fluctuations in behavior; repetitive retelling of events or traumatic play; or may feel an inappropriate sense of responsibility; and may have a tendency towards magical thinking.[28]

Adolescents may become aggressive and oppositional, retreat from others, or throw themselves into activities. They may enter impulsively into adult relationships, leave school, or engage in high-risk behaviors such as substance abuse.[20] They may develop eating disturbances, sleep problems or nightmares, difficulties in relationships, and concentration problems.[24,30] These may be evident from an early stage or may persist into the longer term.[31]

A key issue in the psychological response to disaster is the resulting bereavement and loss. There still is limited knowledge of the phenomenology of normal bereavement in children, making the study of child grief following trauma an evolving area. There has been some confusion in the field about the nature of complex traumatic grief and grief after trauma. In this article, we will be dealing with the nature of both trauma and grief as they reflect the complexities of bereavement in children following disaster or terrorism.

Time Course of Morbidity

The onset of morbidity among children exposed to disaster varies. Children may appear unaffected; however, over time a significant number may develop substantial morbidity that can continue well into the second year following the disaster. Children affected by traumatic impacts may initially display reactive phenomena, which continue and lead to disorder if the child is personally vulnerable. These phenomena may continue or even appear after a significant latent period.[6,32–34] Thus, post-traumatic reactive phenomena may be common in school children, but may go unrecognised by teachers or other adults who regularly spend time with them.[6,35]

Phases of Response

During the post-impact period, children (like adults) attempt to master and integrate what has happened. Parental responses and ongoing loss or stressors will affect this experience. Children's responses will vary—they may be highly distressed and fearful, anxious and hyperactive, or withdrawn. Most families share an intense sense of relief when they discover that they are intact following a disaster. For those with missing family members, many may continue to search often at great risk to themselves.

Also like adults, children may share a post-disaster euphoria consisting of elation, excitement, and high arousal. As Raphael notes, adults may find children's games and laughter disturbing and feel guilt at their own joy at survival.[11] As a consequence, parents may attempt to repress this relief and joy in order to prevent it from appearing in their children. However, as time progresses,

parental distress and grief may impact the child. Initial excitement at broken rituals (e.g., no school, irregular meals and bedtimes) may be replaced by a child's need for stability. The routines of school, discipline, regular tasks, and a stable home environment will be key factors in providing reassurance and enhancing recovery. Instability and dislocation can hamper recovery—for example, six months after Hurricane Floyd in America, Russoniello et al found that children whose homes had been flooded and destroyed were three times more likely to report PTSD symptoms than those who homes were not flooded.[34]

While initial disturbance may settle, children and adolescents may display later symptomatology indicative of traumatic bereavement and/or PTSD. The National Study of Americans' Reactions to September 11 (N-SARS) was conducted 1 to 2 months following this event. Of households with children, the mean age of children perceived as most upset was 11 years. Children most commonly had trouble sleeping, were irritable, or easily upset. Many feared separation from their parents.

While observing few effects two months following the "Ash Wednesday" bushfires in Australia, McFarlane et al found that post-traumatic syndromes began to appear after a delay of about eight months.[6] He reported that 43% of children talked spontaneously about the fires and that at least 35% still were upset by reminders. The effects continued at 26 months and were more frequent in children with disorder.[6]

Chronic stressors in the longer-term recovery periods are multiple and frequently "wear down" populations experiencing them. After the devastation of Cyclone Tracy in the Australian city of Darwin, a community leader commented that "the acute stress was bad, but not so disabling as the multiple and chronic stressors of the recovery process".[11]

A year following this cyclone, Milne used a Disaster Impact Scale (DIS) and found that there were no significant differences between boys and girls in their reactions to the cyclone, but younger children tended to suffer more behavioral disturbances than did their older counterparts.[36] Fear of wind and rain was reported by 26% of the children. Fewer children displayed regressive and aggressive phenomena and the developmental stage of the child appeared to have a direct relationship on reaction levels reported. In line with other research, children of non-returned evacuees fared the worst. They reported the highest levels of difficulty (37.2% of the group); whereas returned evacuees (11.7%) and 'stayers' (6.0%) reported fewer problems. Schooling problems were largely seen as a result of the necessity to change schools.

Adolescents and Young People

Adolescents may be more able to articulate distress and consequently receive support and assistance in reprocessing disaster-related cognitions and affect. McDermott and Palmer found that older children reported fewer symptoms of emotional distress six months following the Sutherland (Sydney) Bushfires.[13] This may be because adolescents are more able to adapt to the event and its aftermath by utilizing cognitive responses such as active

coping styles, external attribution, and an internal locus of control.

However, adolescents may suffer significant impairment in social and emotional functioning. Negative coping strategies such as the onset of or increase in substance abuse, have been reported.[29] A recent controlled study found that five months following a fire in a café, adolescents (both victims and classmates) showed increases in total problem scores on the Youth Self-Report (YSR) and in alcohol consumption.[37] The largest increases in incidence were anxiety, depression, cognitive problems, and aggression.[37]

Goenjian et al found a "dose-of-exposure" pattern in Nicaraguan adolescents following Hurricane Mitch.[38] Those most exposed to the hurricane exhibited severe and chronic post-traumatic stress and co-morbid depressive reactions six months after the hurricane. In addition to systematic screening, these results argue the need for public-health approaches that provide specific trauma/grief-focused interventions targeted to groups at risk.

As with children, effects of disaster may be ongoing for adolescents. For example, half the adolescent survivors of the sinking of the "Jupiter" developed PTSD (51.5%) in the 6–8 year period after the event, compared to 3.4% in the control group.[30] Higher rates of other psychological disorders such as anxiety and affective disorders also were apparent.[30]

While some are able to articulate distress, other adolescents may be more likely to deny and withdraw, leading to interpersonal difficulties with well-meaning friends and family members. Australia's most recent experience concurs with this. It has been two years since the Bali bombing, and although not adolescents, the majority of those killed and injured were young and on holiday and were separated from their families. In the aftermath, the survivors are describing post-traumatic reactions, interpersonal and anger-management problems, and symptoms of depression and anxiety. Many have experienced relationship break-up and either are withdrawing from those around them or alternatively, denying their own needs by tirelessly over-committing themselves to fund raising and the support of others. A range of observations have suggested that this pattern also is apparent among some family members and friends of the deceased, helpers and the bystanders at the site, and medical staff who attended.

A number of young males were in Bali with their football teams celebrating the end of the sporting season. Many initially embraced a 'macho' coping style, but are now describing fear, avoidance, and phobic reactions to related triggers (e.g., crowded enclosed spaces such as rock concerts) and are experiencing profound post-traumatic symptomatology (e.g., flashbacks of body parts).

Bereavement and Loss

In addition to PTSD, issues of bereavement and grief will be experienced on many levels. Children may try to understand the meaning in a terrorist attack in an effort to process their loss.

Reactions to Loss

Children's grief may be influenced by their understanding of the concepts of death and finality depending on their developmental stage. While many children will react to personal bereavements and the losses with typical patterns of grief and mourning, often they do not.[39] As important as age and the stage of development are, a child's grief may vary according to the degree to which it has been sanctioned within the family. As discussed, parents often may deny children's responses to the impact and threat,[58,59] and the same has been demonstrated with bereavement.[39] Children may be perceived as unaffected because they may not show the same response patterns as adults, and their behavioral and emotional responses during bereavement may go unrecognized. Parents may be too overwhelmed by their own grief, feel helpless or afraid to tune into a child's distress, thus making them feel unable to respond. Possibly, there is a reawakening of painful separation experiences from their own childhood.

In addition to the loss of significant others, loss of home and possessions are likely to have significant effects. A child may grieve easily and overtly for pets that have died during the disaster, or lost toys because they can be understood and experienced in concrete terms. However, the disruption of daily patterns of love and care will be the most likely to affect children directly.[6,28]

Bereavement Syndromes

Despite the possibility of pathological outcomes, it is important to acknowledge that not all children respond in this way. Childhood bereavement may, but does not necessarily, take on pathological forms. However, when deaths are sudden and unexpected, this may result in a more complicated and pathological reaction from the child.[41] The role of bereavement in disaster-related disorder is increased when a family member (particularly a primary caregiver) is killed;[42,43] a parent experiences significant injury; or the family has lost its home and/or property.[6] When a parent experiences a pathological pattern of grief, this may place the child at risk. The trauma may be compounded further if the child personally experienced the impact or was involved in the circumstances of the death. Symptom patterns may vary between children or may be specific disorders such as anxiety states and depression, as well as conduct disorders.

Assessment: The Distinction Between the Phenomenology of Bereavement and Trauma

Differential Effects of Grief and the Death Encounter

Given that a child's psychological reactions may go unrecognized and only later become evident and pathological, tailored assessment and screening is paramount.[44] Traditionally, researchers have used measures drawing upon a trauma framework, often not addressing the complexities of bereavement and traumatic grief in children and adolescents.

Pynoos and colleagues assessed a group of school children following a sniper attack at a school.[17,45] Using the Grief Reaction Inventory and Traumatic Stress Reaction Index, they found that the severity of exposure to life threat was predictive of high symptom levels on the Traumatic Stress Reaction Index. Closeness to a child who died was most predictive of high scores on the Grief Index. Traumatic stress and bereavement phenomenology operated independently, but, at other times, there was an interplay. Life threat and traumatic stress reactive processes were associated with PTSD, and loss was associated with a depressive episode or adjustment reaction or separation anxiety.

A recent study by Laor and colleagues of 300 children four months following the 1999 earthquakes in Turkey, used the Traumatic Dissociation and Grief scale (TDGS) plus an assessment of risk factors related to the event.[16] Pathological responses took several forms: specific posttraumatic symptoms; grief and depression; or dissociative phenomena. The authors found that different sets of risk factors were associated with different scale factors (e.g., being buried under rubble), and recommended a comprehensive and complementary evaluation of risk factors and symptoms for effective intervention.

Methods of Coping

Like adults, children attempt to make meaning of their experience and integrate it via a variety of both (positive and negative) cognitive and/or affective forms: dreams, games, storytelling and play engagement, verbalization, or repression.[46] Many of these coping responses will be age-dependent and associated with the child's understanding of death.[47] Therefore, interventions should be geared toward a child's particular developmental level and should be sensitive to their perception of the disaster.

Terr and colleagues describe a range of consistent responses characterizing children's thinking 14 months following the 1986 Challenger spacecraft explosion.[48,49] These responses included initial defense and denial, fantasy, and then, seeking additional information on their own at home, and at school. Most children talked about the Challenger, but a minority of latency age children avoided related talk and thoughts. Adolescents experienced more philosophical changes and negative attitudes about institutions and the world's future. Having a higher degree of emotional involvement (e.g., watching the event on television) and being an adolescent was linked strongly to fearful and anxious thoughts.[48]

In an attempt to gain control and mastery, younger children may interpret occurrences before the event as omens or warning.[48,49] As discussed, older children and adolescents may have a greater need to verbalize their experience and are better able to express their fears. They also are more likely to seek out information about the event and be aware of the probability or otherwise of its reoccurrence.[28]

Children's emotional release and response may involve re-enactment of their experience through song, play, or drawing. Play techniques (e.g., "Disaster Dinosaurs")[50] may involve metaphors for injury and healing, and provide children with an experience of mastery and control. For example, a number of children were observed to be playing "cyclone" following the Darwin experience.[11] In the aftermath of bushfires, McFarlane found that some children continued fire-related play up to 10 months following the fires.[5] Interestingly, ongoing phenomena including dreams,

games, upsets over reminders, and talk reflected ongoing parent problems, particularly the mother's preoccupation with and disturbance by her own intrusive thoughts of the disaster.[6]

Techniques of defense such as denial and avoidant coping have been discussed; particularly both internalizing and externalizing symptomatology related to the child's developmental level.

Children's Experience of Disaster: A Loss of Innocence

Children's Encounter with Death and Danger

Like adults, children also fear death and destruction and their understanding of the nature of death will vary according to their developmental level. Children may be confused; asking when their parent is coming home. They may fear losing their remaining caregiver. Young children may feel that the parent's absence is their fault and may be confused by concepts of "heaven and hell". They may ask questions about death and dying including the details surrounding the death itself. Children may experience a discontinuity in time, develop a shorter sense of the future, and be unable to project themselves forward in time.[51]

In the chaos and confusion following events such as terrorism, children may be exposed to the reality of violent death, as they inadvertently become part of the acute disaster response. In the chaos following the Bali bombing, local school children were confronted with the gruesome horror of violent death as they searched for survivors who were traumatized and burned or recovered dead bodies and body parts of victims.

In addition to profound psychological effects, an encounter with death or disaster may impact upon a child's sense of safety in the world. Both before and after 11 September 2001, Halpern-Felcher and Millstein assessed adolescents' perceived risk of dying from a general cause, a tornado, or earthquake.[52] They found that adolescents' perception of risk and vulnerability to death dramatically escalated following September 11th, but extended beyond terrorist attacks and generalized to unrelated risks.

Protective and Risk Factors

Developmental Level

As discussed, developmental approaches to child and adolescent post-disaster research still are evolving. However, a number of studies consistently show that important developmental differences in response exist, and that these may interact in complex ways with factors such as degree of exposure, evacuation experience and parental disorders (e.g., younger, highly exposed children may exhibit the most severe psychopathological responses).[53] In a recent Australian study, McDermott and Palmer surveyed 2,379 school-age children (grades 4–12) six months following the Sutherland bushfires.[13] Independent associations were found between symptoms of depressive and emotional distress. Persisting depressive symptoms were associated with higher trait anxiety, earlier school grade (although depressive symptoms increased after 10th grade), evacuation

experience, and emotional distress score. Greater depressive symptoms were reported by younger children (grade 4, age 9–11 years) than were adolescents. When depressive symptoms were stratified by age there was a greater age-dependent effect in females than males. It is worth noting that school grade was a more significant co-variate in the predictive model than was age, and thus, may be a potentially better approximation of an individual's developmental level. Younger children were at specific risk of depressive symptoms in the post-disaster environment, whereas children in the "middle years" (grades 7–9, ages 13–15 years) were at greater risk for post-traumatic stress symptoms.[13]

Family and Family Connectedness

Most children respond sensibly and directly to the disaster's impact, particularly when supported and protected by parents or other trusted adults. The experience of disaster often intensifies the bonds between family members with the family responding as a system. In the immediate post-disaster phase, families often will operate as units and be concerned primarily about the safety of other family members. In the longer-term aspects of recovery, families may turn to each other and their extended family for shelter and support. Alternatively, they may perceive a major impairment to their functioning (e.g., "things will never be the same"),[54] and parents may feel helpless and rejected by a child or adolescent who withdraws from them.

The experiences of children, particularly younger children, are inextricably interwoven with those of their parents and families, and secure attachment relationships can act as a buffer to the effects of disaster. The impact of a parent's reaction upon a child's understanding can be profound and parent/carer response can be a major outcome predictor. A child's foundation, their sense of security and shelter, may be shattered as they are confronted with their parent's fear and helplessness and their inability to stop the disaster and protect the child from danger.[11] Parents may be physically and psychologically "unavailable" in the aftermath. Fear and threat may be experienced both directly and indirectly through identification with and response to parental reactions. For parents who are able to respond there still may be challenges in dealing with issues relevant to the type of disaster—such as terrorism. In a study of children's reactions and parents responses to 11 September, Beauchesne and colleagues reported that some parents found it particularly difficult to respond to their child's anger and their expressed desire for revenge.[35]

It not always is easy for parents to meet their children's needs. Terrifying experiences and danger may bring a return of primitive childhood emotions, and adults may have their own needs to regress and be cared for.[11] Parents may be overwhelmed and underestimate or not recognize the extent of their children's distress. They may project their fears onto the child and misattribute certain behaviours or emotions. Children may identify with their parents reactions and adopt their interpretation of the disaster. At the egocentric stage of development, there is a danger that children may see what has happened as a

consequence of their own unlovableness, aggression, or as rejection, making vital reassurances of ongoing love and care.

A family's recovery may be affected by bereavement, material losses, and extended stresses. Support networks often help to mitigate these stresses as does access to economic and other resources and higher education. Family structure, such as single-parent families may be more vulnerable. During and in the wake of disaster, children who take over caregiver roles within the family also may be vulnerable.

Dislocation: The Loss of Home and Community and the Importance of Social Structures

As discussed, children may experience the devastating and disruptive events of disaster as confusing and threatening. Vulnerability to traumatic symptomatology may increase when family dynamics are disrupted. For example, a lack of extended family to offer accommodation and support may limit parental control and force the family to shelter in unfamiliar environments (e.g., such as the Red Cross temporary shelters, caravans, or tents). Vulnerability may increase when loss and damage extends to schools, playgrounds, and parks. In the immediate post-event period, there often is a tendency to "protect" children by evacuating them, but this may add to the further trauma of separation rather than alleviate distress.[2,24]

Factors such as rapid restoration of family relationships and patterns of living may mediate the ways that fear and security are communicated to the child. Following their escape from the Chowchilla bus kidnapping,[14,55] a reuniting of children with their parents was delayed for 43 hours so that children could be "debriefed". Although no one died or was injured, the children all were subjected to the experience of helplessness and the danger of a prolonged, life-threatening situation. All of the children in the bus hijacking had post-traumatic symptoms four years later.[35,49]

There is much to suggest that the return of or to familiar social structures will be beneficial, and these also may facilitate some of the psychological resolution of trauma and grief. The benefits of keeping family members together or reuniting them is one such social structure, as are their neighborhoods and schools that act as sources of mutual emotional and practical support. Children need to be supported to share grieving rituals and also should be encouraged to become involved in community programs. This is particularly true of adolescents.

At worst, children may have lost a parent or been orphaned. In this case, dislocation or relocation may occur as the child is repeatedly moved or placed in foster care, and these frequent dislocations have been shown to create emotional problems for children. This also may be the case for children of refugees.[56,57]

A recent British study by Fazel and Stein found that more than a quarter of refugee children in their sample had significantly higher levels of psychological disturbance (particularly emotional symptomatology) compared to the two control groups (i.e., an ethnic minority and anglo-saxon children) and three times higher than the national average.[58]

A Swedish study of risk and protective factors of young refugee children found children's social adjustment and self-worth were predicted by the quality of peer relationships (e.g., amount of bullying).[59] Interestingly, this was of equal or greater importance than was previous exposure to organized violence. However, exposure to war and political violence and other individual vulnerabilities before traumatic stress exposure were risk factors for long-lasting, post-traumatic stress symptomatology.

Schools and schooling are key structures, which may play a positive role, both in grounding the child and as community centers for the family. Specific programs using the school environment have helped in facilitating recovery from mass disasters (e.g., bushfires, earthquakes, etc).[60] Both the structures of education and the structures of the institutional setting, bring a degree of normality and potentially developmental progression in the face of trauma. Nevertheless, these institutions themselves, may become chaotic and further disintegrate the social structures that can reassure children of their security, safety, hope, and the potential for a future.

Parental Trauma

Post-traumatic symptomatology (e.g., irritability, heightened arousal, and substance abuse) in a parent(s) is likely to have a negative impact on children. As discussed, survivor parents may develop post-traumatic reactions and not be able to give their children the emotional care they need or raise them within reasonable limits. Milne reported that, in the wake of Cyclone Tracy, 76% of parents reported asymptomatic children.[36] Clinicians also should be aware that parents may be less able to recognize pathology in their children. Morbidity has been correlated to some degree with parents' ongoing preoccupation with their own disaster experience and post-traumatic stress disorder[15] Children may develop symptoms, which may be similar to those of their parents, and this association may increase over time.[61]

Over-protectiveness towards children by traumatized parents may inhibit development or produce cycles of anxiety between parent and child.[15] Recent reports of children followed up after 11 September, showed a similar impact of parental problems and distress on children's responses.[62,63] In a Manhattan sample taken 5–8 weeks after 11 September, the parents' own level of post-traumatic stress predicted whether children received counseling (N-SARS).[64] This has significant implications as parents act as decision-makers for their children in seeking health care. It also is worth noting that more than half (58%) of the counseling was delivered in schools.

Additionally, parents may show no reaction (no crying or distress) to the trauma or bereavement. This may result in confusion for the child and they may repress their own responses/grief.

Prior Trauma or Abuse

The childhood experience of sexual abuse, physical assault or domestic violence may closely resemble the child's response to the death encounter and danger of disaster impact. A study

by Russoniello *et al* of hurricane survivors found that the high rates of PTSD were similar to other studies involving violence in which 94% of the children reported similar symptoms. Thus, children who experienced prior trauma may have a pre-existing vulnerability when exposed to disaster. This also is true of children who witness the murder of a parent.[65]

Vicarious Traumatization

Children may be traumatized vicariously by a transgenerational transmission of disaster, as described by children of the Nazi Holocaust.[66,67] Comparisons have been made between this population and children of refugee parents, as both populations share experiences of persecution, imprisonment, and torture, and loss of family members, social networks, and country of origin. Some studies have found symptoms in these two populations to be similar while others have not.[68]

Indigenous peoples, such as Australia's Aboriginal people, have suffered the trauma and violence of invasion, colonization, violence of dispossession, taking away of children, premature death, and loss. This has been translated across generations. While survival has reflected the strengths of such cultures, the resolution of violence has not occurred for many and the impact has lead to children and young people being exposed to ongoing family and community abuse and violence, which also has had adverse impacts on health and well-being.

Chemical and Biological Disaster/Terrorism

Covert violence may be a strategy of terrorism, because of the uncertainty and unpredictability of the threat.[69] This may be part of nuclear, chemical, or biological attack. It creates fear and panic because it cannot be easily seen and fought. Toxic environments may result and may constitute prolonged and pervasive threats of this kind, for instance chemical effects of Bhopal and nuclear effects of Chernobyl. Biological threats, "invisibility" of agents in air, water, and earth, the real or perceived threats to health, and the impact on social systems and development, all reflect the chronic and disabling impacts that may occur.

In 1995, the [US] Federal Bureau of Investigation (FBI) uncovered a terrorist plan to release a chlorine gas bomb in Disneyland, California. There is an increasing threat of this kind of terrorism for a civilian population, and these acts may be specifically directed at children (Committee on Environmental Health and Committee of Infectious Diseases 2000).

In addition to physiological vulnerabilities, infants, toddlers, or young children may be unable to escape from the site of an incident. They may not have the cognitive ability to decide where to flee. All children are at risk of psychological injury from experiencing or living under the threat of chemical-biological terrorism.[70,71] As in other forms of disaster, children witnessing injuries and deaths in a chemical attack would be vulnerable to both short- and long-term psychological trauma.[70]

A number of schools now are planning for rapid evacuation procedures or the identification of in-school shelters should chemical-biological threats occur. Schools also may be a necessary site for triage and treatment of pediatric casualties, requiring that community planning include this possibility (Committee on Environmental Health and Committee of Infectious Diseases 2000). The inclusion of appropriate parental intervention programs in this instance, is important given that exposure and parental functioning can be significant predictors of child response.[72]

Hope

In addition to secure attachment relationships, a sense of hope has been reported as an important variable in adult resilience.[73] Just as pathological reactions in parents impact upon children so too do positive coping strategies. A sense of hope conveyed via discussion and pro-active response (e.g., rebuilding homes and communities) models a sense of mastery and control, and can include children in methods of recovery.

Systems and Elements of Response
Preparing for Disaster
Strategies for allaying children's fears and providing reassurance should a disaster occur, include clear family plans and disaster kits. Information for children on places of safety, essential contact numbers (parents and family members), and where to go should the family be separated, all are useful. Children also may be reassured by "Home Disaster Kits" that contain food, water, torches, food for their pets, etc. Because children spend the majority of their day in school, community preparation for disaster (including terrorism and chemical-biological threats) should include the local educational system in both planning and implementation of disaster response exercises.

Information Dissemination
During the initial response and also reconstruction phase, it is crucial to be aware of the ways in which grief and psychological morbidity can interfere with people's ability to make decisions and carry out practical tasks. Providing information about methods for safety and about the nature of a child's reactions is helpful for affected families. General advice for parents should emphasise the need to be patient with clinginess; show appropriate and caring responses; to establish clear and gentle but firm limits for acting-out; moderate media exposure; and maintain normal living patterns, if possible.

Consensus on Intervention
Initial studies have focused on documenting reactions to disasters and identifying factors that correlate with or predict severe disaster reactions. Although research has begun to examine interventions for those affected, we still are in the process of developing empirically supported interventions for children and youth following disasters.[74] The US Consensus Workshop on Mass Violence and Early Intervention provides the most recent and comprehensive review of the available clinical and scientific evidence into current practice, timing, and screening for both adults and children following disaster.[75] It nominates: involvement of parents/caregivers, school supports, and normalizing the

child's response to disaster through psychosocial approaches as core components of intervention.

It also highlights the importance of a child's developmental level in planning appropriate responses for coping with disaster, and advocates for common principles in the acute aftermath such as the provision of psychological first aid provided by experienced therapists on hand for children as well as for adults.[19]

Key researchers have highlighted important intervention components for children and young people from the acute through to the longer-term in five stages.[5] These include: (1) psychological first aid; (2) specialized initial interview/assessment; (3) brief psychotherapy; (4) intermittent intervention linked to need; and (5) long-term therapy.[75] Pynoos and colleagues emphasize the importance of: (1) normalization, including maintaining family, school, and other systems as far as possible; (2) assisting children working through the meaning and experience of the disaster; (3) increasing their capacity to adapt to cues that remind them of the traumatic experience; (4) lessening stress reactions; (5) facilitating grief work; (6) fostering continued adaptation and resilience; (7) preventing adverse developmental impact and rapidly responding to signs of failure of coping; and (8) enhancing social networks and support.[75]

There is increasing evidence for the effectiveness of interventions for children and parents based on cognitive-behavioral principles,[8,74,76,77] such as psycho-education, stress inoculation, relaxation training, desensitization to painful memories and reminders, cognitive restructuring, and parental intervention.[24] Of interest in terms of controlled studies, is Chemtob's work with children after a hurricane in Hanoi.[78,79] These elementary school children were screened two years after the cyclone and those with the highest symptoms of psychological traumatization benefited from cognitive and play therapy interventions which prompted them to review their experiences.[79] Individual or group programs were helpful, and the decrease in trauma symptoms compared to the wait list controlled group was sustained at a one-year follow-up. Another study of children who were exposed to this cyclone, showed substantial reductions in PTSD symptoms in those provided with three weekly sessions of eye movement desensitization and reprocessing (EMDR) therapy. This was provided three and a half years after the cyclone.

As discussed, schools play important preventive and protective roles, and work on school-based programs may be used to identify at-risk children and promote recovery and resolution.[19,77] Schools also provide opportunities to assess and treat larger populations of exposed children and adolescents. For example, in Australia, primary schools were used as a method of screening children for persistent problems six months after the 1994 Sutherland bushfires.[60] These researchers used manuals and workbooks for children as a component of their intervention and found improved outcomes. Given the evidence of disaster impact on parents, companion programs including issues of parenting and personal difficulty also should be implemented.

Few treatment outcome studies are available to guide treatment selection for individual children with PTSD. Recently, Stein et al conducted a randomized, controlled trial for school children (with PTSD symptomatology) who had witnessed or been exposed to violence.[76] The intervention was conducted on school premises by trained school-based, mental-health clinicians. A 10-session, standardized, cognitive-behavioral, early intervention was found to be effective in reducing the symptoms of PTSD and depression compared to a wait-list delayed intervention comparison group. At six months, when both groups had had the intervention, there were no significant differences. The authors advocate for the importance of program delivery in a school environment and also for the use of both child and teacher report outcome measures.

Goenjian et al examined the effectiveness of school-based grief/trauma focussed psychotherapy in reducing PTSD and depressive symptoms in adolescents following an earthquake in Armenia.[80] These authors argued that exploration, relaxation, and desensitization procedures and group support may be important therapeutic factors. Students in school were provided with "traumatic-grief" brief individual and group therapy and compared to other similar schools, where students did not receive this intervention. These interventions were two, one-hour individual sessions and four, one-half hour, group sessions over a three-week period. This took place more than six months after the quake. A follow-up study conducted three years after the quake showed lower PTSD symptoms and better outcomes in terms of depression for the intervention group.

Additional specialized interventions may be necessary for more complex problematic responses. There is a lack of empirical support for the use of any particular psychotropic medications in children with PTSD,[8,81] but, recent studies in other groups of children exhibiting symptoms of anxiety and depression suggest the utility of selective serotonin reuptake inhibitors.[8]

A useful model for a large-scale intervention for recovery after trauma and bereavement is a community-based program of intervention (Trauma Recovery Program) devised for child survivors following the Rwandan genocide.[20,82] Although not a randomized, controlled trial, this important work examines the viability of training community workers to deliver interventions to larger populations with high levels of need. The program is a model that might be adapted for children in other circumstance of mass violence or mass disaster.

The Trauma Recovery Program provided information, training and psychotherapeutic services to traumatized and bereaved individuals, families and communities. It was developed on the basis of research through a National Baseline Trauma Survey (1996) and Follow-up Survey.[83] This information was used to develop a program which was a partnership between United Nations Children's Fund (UNICEF) and the Rwandan Government (Department of Health). The nationwide program targeted bereaved and traumatized children and their caretakers, by strengthening community capacity among local people and paraprofessionals. It was implemented locally by 10 trauma advisors who were specifically trained and who, in turn, helped

other social agents, such as teachers, nurses, and social workers, to understand and respond. The Program also used a mass-media campaign and booklets. It was backed by a professional team through the Central Mental Health Administration. The baseline survey and follow-up showed that 95% of children and adolescents had witnessed some kind of violence with 69% actually seeing someone injured or killed. Seventy-nine percent had experienced a death in their immediate family; a parent or sibling; more than one-third of these children had witnessed it, and 15% had to hide under dead bodies.[82] At the time of this report, it had reached an estimated 28,000 local agents and 200,000 children.[20] A follow-up outcome study is in process.

Follow-Up and Outreach

The experience of the Bali bombing has reinforced earlier research into models of response that advocate for the importance of outreach, support, and rehabilitation, and intervention for those at heightened risk for developing psychosocial problems. Many of the bereaved, the survivors, their families and friends have not been ready to discuss their experience. It is only recently (two years following the event) and after pro-active follow-up that this has occurred.

Additionally, researchers and public-health officials advocate for the importance of follow-up of children and parents via school environments where teachers can monitor all students, particularly those children who are at high risk for developing problems.[84]

Role of the Media

The images of bodies falling to their deaths from the WTC horrified viewers around the world. As yet, there are no research studies known to the authors, that examine the impact of these particular images upon children; however, a growing number of reports have demonstrated that children exposed to media coverage of traumatic events can develop significant PTSD symptoms.[21,85–87] A study of the Oklahoma City bombing concluded that bomb-related television exposure was a primary predictor of PTSD scores and also played a role in sustaining these symptoms.[21] Also highlighted by this report, was that a child who did not experience a direct loss related to the event may display PTSD symptoms,[88] and that a strong initial reaction to a disaster should be followed over time.[87]

Additionally, clinical case studies report that classroom exercises involving writing or speaking about traumatic events without addressing the associated anxiety may only sensitize children rather than habituate them.[89] These findings indicate that access to the media should be monitored carefully. Parents should co-view media coverage, be reassuring, and be willing to explain or discuss their children's fears following television coverage or general media exposure. Teachers may need to be more aware of children and adolescents who show signs of social withdrawal and regression.

Systems of Response and Agency Linkages

Following Cyclone Tracy in Australia (1974), mental-health response systems developed in the wake of the disasters varied in their level of sophistication and degree of acceptance, but they generally became better orchestrated with each subsequent major event. Lessons learned from research and review following one disaster often have been applied in responding to the next. Intersectoral links and liaison between agencies has increased. This includes the delivery of services via schools and work with teachers in monitoring and addressing difficulties that children and adolescents may have.

Research and review have been crucial in uncovering the presence of significant morbidity among children and adolescents and highlighting the need for coordination of mental health services with other relief efforts. A number of jurisdictions in Australia have highlighted issues and service needs for children and adolescents in their general disaster response plans and are tailoring these plans to include mental health issues and service needs for young people.[90]

Conclusion

Children and adolescents may experience a range of responses during and following a catastrophic event ranging from PTSD, traumatic grief, depression, and anxiety to somatization. Symptom complexities arise because of the child's developmental level, the type and degree of exposure to the trauma, the nature of the aftermath including the horror, bereavement, and ongoing loss of stability and security. Resilience may be enhanced by facilitating a return to stability via social structures and providing opportunities for mastery. Support for families (especially parents) and finding meaning in what has happened also are key considerations.

Findings strongly indicate the need to incorporate children and adolescents in public, mental health approaches in disaster settings. This includes systematic screening and trauma/grief-focused interventions, within a comprehensive disaster recovery program.[91] The horror of disaster, be it human-made or natural, may entail a "loss of innocence" for children and young people, which also is experienced by the wider community. For this reason, implementation of mental health interventions with children, adolescents, and their families must be integrated with other resource, support, and assistance programs through a range of agencies and non-government organizations (NGOs). A pro-active approach via schools, community clinics, government agencies, and disaster and recovery response organizations has been advocated. This necessitates forward community planning and better outcome measurement.

An empirical evidence base is evolving; however, implementation of good practice interventions with children and adolescents can be informed by a number of established guidelines including: (1) systematic assessment and documentation of problems; (2) psychological first aid; (3) targeted interventions; (4) pro-active follow-up; and (5) systematic evaluation.[75]

Most importantly, the response should be informed by an expectation of positive outcomes and compassionate support for the particular needs of children, adolescents, and their families who have been affected by catastrophe. For, while children may lose their innocence, they need not lose their belief and hope for a positive future.

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