

Disaster Response

Reducing the psychological impact of disaster on children

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TECHNIQUES USED BY emergency medical personnel directly affect the long-term physical health of victims. Based on this knowledge, many emergency medical practices have been refined, resulting in fewer long-term complications from traumatic injuries. During a disaster, psychological health interventions have been reported to affect the severity of conditions such as post-traumatic stress disorder (PTSD). Crisis victims, including children, may develop PTSD after exposure to an extreme traumatic stressor. This article reviews the impact of recent disasters in the U.S. on the psychological health of children and discusses practice implications for emergency management and emergency medical personnel working with children who have been exposed to such experiences.

The Impact of Disasters

During 2003, Federal Emergency Management Agency (FEMA) declared 56 major disasters in the U.S. due to severe conditions of various types [FEMA(c)]. These disasters have the potential to put many people, including children, at risk from the physical and psychological trauma experienced directly or indirectly. PTSD is one such impact; it has the potential to cause short- and long-term health problems. PTSD impacts individuals at any age but can be particularly devastating for children following a disaster because the disorder can disrupt normal childhood development (Lipschitz, et al 452).

As emergency medical personnel are often the first responders to interact with children who have been exposed to a traumatic event, they are in a unique position to address this issue (Hoyle and White). To that end, emergency management personnel must understand PTSD, its risk factors and prevalence following disasters, as well as immediate measures and protocols to follow to decrease the risk of PTSD among crisis survivors. Just as proper treatment of physical problems during crises can decrease negative long-term consequences on physical health,

interventions aimed at maintaining psychological health can positively impact crisis survivors and reduce the incidence of short- and long-term symptoms associated with PTSD.

Understanding PTSD

PTSD is classified as an anxiety disorder. Diagnosis is dependent on an individual meeting specific criteria. These include 1) exposure to a traumatic event in which actual or threatened death or serious injury to self or others evokes fear, helplessness or horror; this may be exhibited by children as disorganized or agitated behavior. In addition, the individual must 2) demonstrate reexperiencing of this event; 3) persistently avoid stimuli associated with the event with numbing of general responsiveness; and 4) demonstrate increased arousal (APA 424). Symptoms vary by age. Young children display symptoms such as distressing dreams and repetitive play simulating the incident, as well as physical symptoms such as stomach aches. Parents or teachers may also notice decreased affect and interest in activities (APA 426).

While the psychobiological changes that occur as a result of PTSD have been studied extensively in adults, less is known about these changes in children. In humans, the normal physiological response to a perceived threat or crisis is activation of the "fight or flight" mechanism mediated by the sympathetic nervous system. Once the stressor is removed, this mechanism is deactivated. However, in adults with PTSD, continued activation of the sympathetic nervous system keeps victims in the flight or fight state. "In short, the adrenergic system in people

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Disasters such as Hurricane Andrew put many people, including children, at risk of suffering physical and psychological trauma.

who have PTSD appears to have been recalibrated to deal with a permanent life-threatening crisis" (Schnurr, et al 883). Similar changes in the sympathetic nervous system have been suggested by studies of children with PTSD (Lipschitz, et al 453).

In adult studies, changes in hormones regulated by the hypothalamic pituitary adrenocortical axis such as corticotrophin releasing factor and cortisol have been reported (Schnurr, et al 883). Few studies have addressed changes in this axis among children with PTSD symptomatology. In these limited studies, changes in cortisol level were noted among subjects (Lipschitz, et al 455).

Fear conditioning is also exhibited in adult sufferers. When confronted with a trauma-related stimulus in the laboratory, individuals with PTSD demonstrate sudden increases in the response of the sympathetic nervous system, such as an increase in heart rate and blood pressure. They also demonstrate an increased startle response (Schnurr, et al 884). Studies of startle response in children with PTSD symptomatology are lacking. Although one

study did find changes in the startle response of children, these changes could not conclusively be linked to PTSD (Lipschitz, et al 454-455).

Psychological and psychobiological symptoms of PTSD impair an individual's ability to perform daily activities. Such difficulties have been reported in children following a trauma. Traumatized children face potential temporary or permanent difficulty with the "acquisition of cognitive, social and emotional milestones" (Carrion, et al 172). Functional impairment has been reported among children who do not meet the full diagnostic criteria for PTSD. These children were reported to demonstrate "substantial functional impairment and distress" (Carrion, et al 166). This is a vital consideration as many children are reported to suffer from PTSD symptomatology from a distance, thereby precluding a full diagnosis (Terr, et al).

Psychosocial development must also be considered, as it may be impacted by traumatic experiences. Developmental milestones may be disrupted by things such as trauma, disease in childhood and the loss of interaction through parental trauma such as

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head injuries (DiCowden and Fisher). Erikson describes eight stages of psychosocial development during which specific tasks must be accomplished as a prerequisite to reaching the next stage (247-274). Four of these stages occur during infancy and childhood. Disruptions to psychosocial development may cause short-term regression to behaviors that were exhibited at a previous stage. This may help the child cope and can signal caregivers to address the child's needs. For example, Debord discusses the potential for children who have been stressed in a disaster situation to once again suck their thumb (Debord). Long-term consequences depend on the developmental stage. Fisher discusses the potential long-term consequences of the loss of a parent when an infant is in the initial stage of Erikson's psychosocial development, trust versus mistrust. This infant may have difficulty developing attachments, the primary developmental task to be accomplished during the first stage.

Sources of Information

The authors reviewed literature on studies conducted following three major disasters that occurred in the U.S. between 1986 and 2001: Hurricane Andrew, the *Challenger* explosion and the terrorist attacks of Sept. 11, 2001. FEMA lists Hurricane Andrew as one of the top 10 hurricanes, having caused \$27 billion in damages and 58 deaths in the states of Florida and Louisiana in 1992 [FEMA(a);(b)]. In south Miami alone, 100,000 homes were damaged, causing the relocation of nearly 10,000 school-age children (Shaw, Applegate, et al).

In January 1986, the *Challenger* space shuttle exploded on takeoff, killing all seven crew members. This tragedy was captured on television and watched live by many children, as one crew member was Christa McAuliffe, a school teacher from New Hampshire. The events of Sept. 11, 2001, also had a profound impact on children across the U.S. In total, 2,995 lives were lost in these attacks (Infoplease). All of these events were widely publicized in news reports viewed by adults and children across the country.

The following discussion outlines the results of studies that assessed how disasters in the U.S. impact the psychological health (the incidence of PTSD) of children directly or indirectly exposed to these events. The focus is on the practice implications for emergency planners and emergency medical personnel working with these children.

Table 1

Common Reactions to Disaster: Adults & Children

Adults

- Intense and/or unpredictable feelings
- Recurrent thoughts, images, memories or dreams
- Sleep disturbances
- Difficulty concentrating; increased startle response; hyperarousal; anxiety or depression
- Difficulty with interpersonal relationships; marital discord
- Difficulty maintaining routines
- Fears of imminent danger
- Sense of anger, loss and helplessness
- Physical symptoms such as headaches, upset stomach and loss of appetite
- Survivor guilt and self-blame
- Use of alcohol and/or drugs to numb feelings

Adapted from Farrell and Crimmins; Hamblen.

Children

- Regressive behaviors such as thumb-sucking or bedwetting
- Separation and/or stranger anxiety
- Reenactment of trauma in play activities
- Preoccupation with words and/or symbols associated with traumatic experience
- Uncharacteristic crying or clinging to caregiver; mood swings
- Nightmares and generalized sleep disturbances
- Preoccupation with safety and danger
- Difficulty in school or avoidance of school
- Increased risky behaviors (especially in teens)

Key Research Findings

Following Hurricane Andrew, the prevalence of self-reported moderate to very severe symptomatology of PTSD among children who attended schools in the hurricane's pathway was between 55.8 percent and 87.1 percent (La Greca, et al 717; Shaw, Applegate and Schorr; Shaw, Applegate, et al). One study reported a decrease in symptomatology from 87.1 percent at two months to 75.8 percent at 32 weeks and to 70 percent at 21 months (Shaw, Applegate and Schorr). Another reported a decrease from 55.8 percent at three months to 41.7 percent at seven months to 33.5 percent at 10 months after the event (La Greca, et al 717).

These studies demonstrate the high degree of initial PTSD symptomatology as well as the potential for lingering symptomatology over time, often due to secondary trauma associated with the disaster. These findings demonstrate that strong short-term immediate crisis response and long-term emergency recovery and mitigation efforts must incorporate mental health programming to both track and continue to provide services for affected individuals. The continued high level of PTSD symptomatology over time among children following Hurricane Andrew was explained as process trauma related to secondary stressors such as destruction of the community's infrastructure resulting in disruptions of school, community, home displacement, loss of jobs and support systems (Shaw, Applegate, et al). Since recovery is one of the overall objectives of effective emergency management, the rapid success of recov-

ery strategies can greatly assist in reducing secondary stressors contributing to PTSD.

Not all children who experience a disaster develop PTSD symptoms. When considering children at risk, level of exposure was a strong predictor of increased symptomatology during Hurricane Andrew (Shaw, Applegate, et al; La Greca, et al 720; Vernberg, et al 243). Other predictors included being female (Shaw, Applegate and Schorr; Vernberg, et al 244); being from minority ethnic groups (La Greca, et al 721); using blame and anger as a means of coping (Vernberg, et al 244); and having less social support (La Greca, et al 721; Vernberg, et al 244).

Human response to disasters, whether natural or man-made, is multifaceted. Children's responses are often influenced by the adults around them (FEMA and ARC). Table 1 presents an overview of common reactions to disaster (Farrell and Crimmins; Hamblen). Persistence of these reactions may indicate PTSD. In working with children after Hurricane Andrew, it was noted that children often sensed that security and predictability had been shattered. "Many children experienced their parents screaming, crying and being out of control as never before" (Shelby and Tredinnick). It has been found that positive adult attitudes facilitate a child's ability to deal with trauma (Davidhizar and Shearer 30).

While direct exposure was a strong predictor of PTSD symptomatology, children not in the direct path of the storm were also found to exhibit a high degree of PTSD symptoms (Shaw, Applegate, et al). Some 38.6 percent were found to have severe to very severe symptomatology, 40.9 percent moderate symptomatology and 20.5 doubtful to mild symptoms. PTSD symptomatology among these children has been related to "effects of the press of evacuation, emotional contagion, the peripheral impact of the storm, the initial uncertainty as to where the storm would strike, and media exposure" (Shaw, Applegate, et al).

Development of PTSD symptomatology among children who did not personally experience a life-threatening situation but watched it live or taped on television was also reported in studies of children following the *Challenger* explosion and the Sept. 11 attacks. One study compared the distance impact of the *Challenger* incident on children who lived on the West Coast and did not watch the incident live with those from Christa McAuliffe's hometown who watched the broadcast live or attended the liftoff (Terr, et al). PTSD symptomatology was reported in both groups—even though almost all of these children watched the event on television (only nine of 124 children viewed the liftoff in person). Terr, et al found that children from McAuliffe's hometown were more likely to report PTSD symptomatology. The authors concluded that "for children raised from birth with television, the immediacy of the medium seems almost as real as pure, untouched reality." Indeed, they reported that there were no statistically significant differences between the symptoms of those who viewed the incident live on television and those who attended the liftoff in person (Terr, et al).

Television viewing has also been reported to be an important aspect of PTSD symptomatology among children who viewed the events of Sept. 11. Schuster, et al reported an association between the number of hours of television coverage of the attacks watched by a child and the number of stress symptoms reported (1510). Another study reported that it did not matter whether the images of Sept. 11 were negative (death, injury, destruction) or positive (heroics, celebrities assisting, presidential addresses) when considering the impact of the media on PTSD symptomatology in children (Saylor, et al 1636). Both categories increased symptomatology, with the positive images resulting in higher levels of symptomatology. In parent's ratings of the impact of media exposure, 66.7 percent indicated that positive media images would be helpful for their children to see.

While children in the immediate vicinity of the terrorist attacks were most impacted, children nationwide were affected as well. Their distress has been documented nationally, with a high in New York City of 60.7 percent; other major metropolitan areas 57.3 percent; Washington, DC 54.9 percent; and the remainder of the country 48 percent (Schlenger, et al 586). Increased access to psychological health-care was found in the Washington, DC area following these events (Hoge and Pavlin 443). Military beneficiaries living within 50 miles of Washington, DC, had a post-attack increase of 46 percent in children seeking treatment for anxiety disorders and a 50-percent increase in children seeking treatment for PTSD (Hoge and Pavlin 443).

The magnitude of reported PTSD symptomatology among children in these studies clearly demonstrates the need to incorporate interventions aimed at the psychological health of children in emergency management plans.

Impact on Emergency Response

Synthesis of the preceding studies provides valuable information for emergency managers and planners as well as emergency medical service personnel as they identify resources, plan and coordinate teams to address physical and psychological health during and after disasters. Specifically, emergency planners must ensure that the emergency plans developed at the regional, state and local levels consider several key issues.

Provide Relevant Education & Training

Education must be provided to prepare emergency medical service personnel to work with children who have been traumatized. In a nationwide survey, only 36 percent of emergency medical technicians and 38 percent of advanced emergency medical technicians said their training prepared them well to deal with pediatric emergencies (Dawson, et al). Continued education in this area should begin with knowledge of the stress response and its impact on children. Stress response symptoms are common following a disaster and these symptoms may persist over time, impairing a child's ability to function on a daily basis.

As noted, emergency medical personnel are often the first professionals to interact with a child who has sustained trauma. Perry provides an excellent discussion of the role of emergency services workers in relation to traumatized children. He categorizes the stress response in children into “flight or fight” and “freeze and withdraw symptoms” and notes that children may exhibit a combination of these symptoms. Those associated with flight or fight include “tense muscle tone, increased breathing rate, increased pulse rate, agitation, confusion, inability to concentrate, extreme anxiety, trembling, combative behavior; older children may be unable to give EMTs a clear history” (Perry). Symptoms associated with freeze and withdraw include: “shallow breathing, slow pulse rate, pale or clammy skin, low blood pressure, decreased responsiveness, stunned, fearful, or unemotional appearance, and inability to speak; extreme responses may include fainting or a total lack of reaction to external stimuli” (Perry).

Knowledge of the stress response becomes even more important when considering that it can complicate assessment findings. For example, tense muscle tone, increased respiration and heart rate, agitation, confusion, lack of an ability to concentrate, extreme anxiety, trembling and combative behavior are all associated with the stress response. These may also be signs and symptoms of injury (Perry). Emergency service personnel should also clearly document any symptoms of the stress response in order to provide the healthcare team with information about the child’s response to the trauma (Perry).

Involve Mental Health Professionals

Mental health professionals are an essential component of the emergency response team in developing treatment plans and in working directly with children. While first responders may be the initial contact for many at-risk children, these children should have immediate access to mental health professionals who have extensive knowledge in assessing and addressing the psychological needs of children. As a part of the planning team, mental health professionals can help identify and provide adequate resources to address those needs.

This type of coordinated response was suggested in the report of the Surgeon General’s Conference on Children’s Mental Health, which states, “Support the development of coordinated responses by emergency medical providers (e.g., paramedics, emergency room personnel) and community mental health service providers to expedite appropriate treatment and/or referral for children presenting with emergency and traumatic episodes in hospital emergency rooms” (U.S. Public Health Service).

Plans to mitigate the psychological impact of a disaster experience on children should include protocols and strategies to meet both the short- and long-term needs of children at risk of PTSD as well. One-time interventions will likely not be sufficient to reduce PTSD symptomatology in this group. Therefore, plans must specify the need for mental health

professionals to have access to the children for an extended period of time.

Develop Age-Appropriate Interventions

The Surgeon General’s report also reminds professionals that children are not little adults. Therefore, interventions must be based not only on chronological age, but also on developmental and psychosocial stages of the children for whom services are planned. Careful assessment by qualified individuals will provide vital information to help emergency team members provide a caring environment that meets the developmental and psychosocial needs of children in times of crisis.

Planning and training must recognize that children react differently to a stressor than do adults and that their behaviors are related to their developmental level. For example, while an adult may reexperience a traumatic event through intrusive memories of that event, young children tend to demonstrate repetitive play based on the event. As noted, children may have stress reactions even though they have not directly experienced trauma. While prevalence rates are increased among certain children, the cited studies show that children need not directly experience a traumatic event to demonstrate PTSD symptoms.

In addition, children who lived fairly “normal” lives before a disaster will have very different developmental and psychosocial needs than their chronological age counterparts in chronic disaster regions of the world who have never had the opportunity to fully reach their developmental potential and are “locked” in the early psychosocial stages.

Enlist Parents & Caregivers

Children’s perception of the level of danger can be influenced by the reactions and responses of a parent or an individual in authority. The ability of first responders to remain calm and to calm parents helps maintain as positive an atmosphere as possible during and following a disaster. With respect to the role of emergency service workers and traumatized children, it has been suggested that emergency service personnel enlist parents to comfort a child and to explain the interventions that will be used (Perry).

Emergency response plans must also include measures designed to enhance parent’s coping skills and to support the social structure for at-risk children. Encouraging parents to gain control through development and practice of home emergency response plans can also help them and their children increase their sense of control.

Furthermore, emergency response plans should address the fact that post-disaster stressors add to the psychological impact of a disaster. These stressors can include fear of physical safety as well as overexposure to media coverage of the disaster. Therefore, emergency management plans may include recommendations that parents and caregivers limit children’s exposure to repeated discussions or media coverage of disaster events.

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Return to Normal as Quickly as Possible

The issue of "process trauma" clearly demonstrates the importance of reestablishing the continuity of community services. Emergency response plans typically focus on returning the community to predisaster service levels as soon as possible. However, resource allocation for emergency services must recognize that areas which incur the longest lag time before services are returned may need greater access to mental health services in order to meet the needs of affected children than those with quick recovery time.

As with any aspect of an emergency response plan, all protocols and practices within the section to mitigate the psychological impact on children must be practiced and resources must be allocated for ongoing training and drills.

Conclusion

As a special population, children can be at great risk of PTSD following direct or indirect exposure to an extreme traumatic stressor. Development, practice and implementation of effective strategies outlined within the emergency management plans of municipalities and regions should go beyond meeting the physical needs of children and include steps to address their psychological needs as well.

Sufficient resources and the practice of effective protocols by emergency medical personnel and other first responders who work with children has been found to reduce the short- and long-term negative physical consequences of children exposed to disaster conditions. Future emergency response operations must also provide sufficient mental health resources and specific mental health protocols directed at young people and their families. Implementation of these procedures should help to reduce the negative consequences on children exposed to psychological stress during a disaster. ■

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