## Introduction

A "natural disaster," as defined by the World Health Organization (WHO), is an environmental event, not (directly) human made or resulting from technological errors, such as volcanic eruptions, earthquakes, floods, cyclones, tsunami, or more long term epidemics, drought, and famine.[1] Natural disasters take a substantial psychological toll on adults[2-4] and young survivors.[5-9] A growing number of reports have demonstrated that youngsters who experience massive natural disasters (e.g., earthquakes, fires, hurricanes) can develop significant psychological impairment (e.g., post traumatic stress disorder, anxiety, depression) and behavior problems.[5,8-12] In particular, incidence of post traumatic stress disorders in young disaster survivors have been reported as varying widely from at least 5% to about 35%.[6,7,10] Further, it has been noted that children with posttraumatic stress disorders may be at risk for behavioral and emotional problems.[5,7,8] In addition, differences in adjustment and mental health problems of children have been found in relation to gender, age, location at time of disaster, and the extent of damage to life and property.[10]

Main purpose of this ..... is to consider psychological impact of devastating natural disasters on children and adolescents. First, we briefly review research studies on children and adolescents in natural disaster. Second, we depict psychological impact the tsunami on Thai youth based on the literature and our first-hand experience providing mental health relief for Thai survivors in January 2005. Finally, we consider the implication of the literature for enhancing youth resiliency and minimizing maladaptive reactions to psychological difficulties.

## Research studies on youth in natural disasters

This section presents selected research studies on children and adolescents in massive natural disasters and highlights psychological problems that include adjustment problems, post traumatic stress disorders, and depression.

*Adjustment Problems.* A pioneer investigation of the association between adjustment problems and disaster experiences among children and adolescents was conducted by Galante and Foa.[5] The researchers studied the psychological impact of a devastating earthquake on 300 Italian children in the 1st through 4th grades, six months after the earthquake. The psychological disturbances included repeating earthquake stories, fear of reoccurrence, and behavior problems. Results revealed that children with a death in the family showed outward signs of psychological disturbances. However, no evidence was found between the amount of destruction in a village and the children's behavior problems. Another study that supported a positive association between child and adolescent adjustment problems and disaster experiences was presented by Guerin, Junn, and Rushbrook.[13] They examined behavior problems presented in children ages two to five years old who were affected by the Loma Prieta earthquake in the United States (US). Findings showed that approximately 15% of these preschoolers presented at least one behavior problem two to six weeks after the disaster. The most common symptoms reported were somatic complaints (i.e., vomiting, headaches, and stomachaches). Moreover, the study indicated an increase of behavioral problems (i.e., increased clinging,

difficulty separating from parents, difficulty concentrating, and increased aggression and activity) among the children who experienced the most devastation.

*Post traumatic stress disorders (PTSD).* Children and adolescents who are exposed to a devastating disaster are likely to demonstrate PTSD symptoms in three major categories: (a) re-experiencing the event (e.g., recurrent thoughts, nightmares, or flashbacks of the traumatic event), (b) avoidance or numbing symptoms, and (c) hyperarousal (e.g., sleep difficulties, irritability, and difficulty concentrating). For instance, Goenjian et al. examined the rates of PTSD among 218 children and adolescents from three cities at 18 months after the 1988 earthquake in Armenia.[14] The relationship of disaster exposure, gender, loss of family members, and loss of residence to PTSD was also investigated. The study estimated that the rates of the children's PTSD ranged from 14% to 90%, depending on the extent of disaster-related traumatic experiences (e.g., direct life-threat, significant loss of life, and witnessing destruction and death). The children in the most affected areas showed severe PTSD symptoms (e.g., intrusive-psychological reactivity to reminders of the disaster, difficulty concentrating, jumpiness, and nervousness). The study found that girls generally had higher PTSD rates than boys.

In 1994, Shannon and colleagues examined the range and severity of PTSD symptoms exhibited by 5,697 US children with a mean age of 14 years (range 9 to 19 years) at 3 months after exposure to hurricane Hugo.[10] The findings revealed that more than 5% of the sample reported sufficient symptoms to be classified as exhibiting PTSD. In general, females and younger children were more likely to receive this classification. Females reported more symptoms associated with emotional processing and emotional reactivity to the trauma (e.g., emotional isolation, emotional avoidance, guilt, and bad dreams). Males were more likely to report symptoms related to cognitive and behavioral indicators (e. g., memory and attention difficulties). Younger children were more likely to report symptoms, with younger males (less than 13 years) more severely affected than younger females. Furthermore, findings showed that PTSD was associated with decreases in school performance, i .e. the average decrease in school performance of PTSD children was more than three times the average decrease in school performance for children who were not classified with PTSD symptoms. Similarly, Goenjian et al. investigated the severity of PTSD among 158 adolescents after a massive hurricane disaster in Nicaragua.[8] The sample mean age was 13±4 years Results showed that high levels of PTSD were found among adolescents in the two most heavily hurricane affected cities. Children and adolescents who lost a member of their family were likely to present severe PTSD symptoms.

A recent study by Kilic et al. examined the PTSD of children and their families six months after an earthquake in Bolu, Turkey.[12] The sample consisted of 23 girls and 26 boys, both groups with mean ages of 10 years. The findings indicated that the severity of PTSD symptoms in the children was mainly affected by the presence of PTSD and the severity of depression in the children's father. The authors explained that when fathers become more irritable and detached because of PTSD, their symptoms affected their children more significantly. Moreover, the results showed that girls had significantly higher PTSD scores than boys.

*Depression and other psychological problems.* Investigations of children and adolescents affected by a massive disaster usually indicated that children exposed to catastrophic disasters were at risk for depression and other psychological distress.[9,14] Goenjian et al. noted that at eighteen months after the disaster, approximately 29% to 81% of children and adolescents in the most disaster affected area of Armenia were depressed.[14] Children reported symptoms such as short temper, seeing bad and unpleasant things ahead, feeling bored, having a loss of faith in the future, and having an inability to enjoy life compared to before the disaster. Results did not show significant differences in depression levels between boys and girls. Other psychological problems among the children included, symptoms of separation anxiety from parents, worrying about something bad happening to parents, feeling sad and not wanting to play or do school work when parents were not around, and feeling afraid to leave home. In another study, McDermott and Palmer investigated the depression and emotional distress of 2,379 children and adolescents in response to a devastating bushfire that afflicted the state of New South Wales, Australia, in 1994.[9] The relationships between disaster-related variables such as disaster exposure, evacuation experience, life threat to self and others, and depression across the age range were examined. Findings showed evidence of depressive and emotional distress symptoms in the youth. Significant independent associations were found between total depression and emotional distress scores. Both symptom groups (i.e. depression and emotional distress) were independently associated with event-related variables and exhibited complex, non-linear relationships with the child's grade in school. Younger children (grades 4-6) were at risk for depressive symptoms in the post-disaster environment; children in grades 8-10 had the lowest depression scores, and depression scores increased in grades 11 and 12. However, data showed that children in the middle school years (grades 7-9) reported the most emotional distress symptoms. McDermott and Palmer concluded that important developmental differences in post-disaster psychological responses exist across a broad spectrum of developmental stages in children. They suggested further study of the effect of disasters on children, including examining more complex constructs such as children's coping and parental emotional responses, disaster exposure, and other personal and school variables.

To summarize, the research reviewed suggests that natural disasters often result in PTSD symptoms, depression, and adjustment problems in youth, especially those most directly affected by the disaster. It was also found that children with PTSD symptoms are at risk for behavioral and emotional problems.[5] In addition, differences in adjustment and mental health problems have been found in relation to youth's gender, location at the time of the disaster, and the extent of disaster damage to life and property.[12,14]

## Psychological impact of the 2004 Tsunami on Thai youth

The devastating tsunami in the south of Thailand has left thousands of people, including young survivors, suffering from psychological distress. For example, Thailand's Ministry of Social Development and Human Security reported that the tsunami left

approximately 872 children as orphans.[15] In a *Rapid Needs Assessment Survey* of children affected by the tsunami, Pairojkul examined 433 households including 830 children in Ranong and Phang Nga provinces at a couple weeks after the tsunami. The findings showed that most of the children's families had lost their homes, fishing tools and boats, and jobs. Moreover, Pairojkul's study showed that after the tsunami about 59% of the children were staying with parents, 20 % with single mother, and 1% without any caregivers.[16] As a result, those children may have to deal with another difficulty, e.g., lack of family supports and possible family financial insecurity.

*Short-Term Impact.* Immediately after the tsunami, many children displayed difficulty sleeping, experienced nightmares, worried about their family and their future, and had difficulty returning to a life of normalcy. According to her study, Pairojkul reported that affected children demonstrated psychological difficulties. For example, the younger children with age 0-5 presented eating problems (8%), clinging to caregiver (6%), and irritability and crying (6%). The children with age 6-12 showed eating problems (12%), sleeping problems (10%), fear (9%), and depression (6%). The older children with age 13-18 had fear (18%), eating problems (11%), sleeping problems (8%), and depression (7%).[16] Moreover, the psychological consequences of the tsunami for children may be intensified due to insufficient support from parents or caregivers who are preoccupied with meeting family and job needs, and, therefore, unable to give the same care and comfort to their children that they provided before the tsunami. For example, adult family members, who are grieving the loss of relatives and friends and coping with the loss of homes and jobs, are often not able to meet the emotional needs of their children. As a consequence, the young survivors may receive less support from their parents and caregivers at a time when they most need it.

*Long-Term Impact.* The immediate psychological consequences of the tsunami, if not addressed, may linger and result in longer term psychological effects on Thai youth. Symptoms of PTSD may not be manifested until several months after a natural disaster.[17] These PTSD symptoms may include nightmares and fears of a tsunami returning resulting in sleep disturbances that cause fatigue in children, as well as parents. The children may also exhibit a decrease in attention and ability to concentrate which may result in difficulties keeping their focus on appropriate daily activities, including schooling. Behavioral problems may increase which will affect school academic performance and also create problems for parents and the community. Since Thailand has rarely experienced a large-scale natural disaster such as the tsunami, communities, schools, hospitals, and mental health services are not adequately prepared to deal with the impact on children of a large tsunami disaster as was experienced in 2004. As a result the limited availability of disaster mental health services can intensify the adjustment difficulties of young survivors after a disaster.

*Children and Adolescent Resiliency.* Based on our experience visiting the tsunami region in Thailand at three weeks after the disaster, we found that while children and adolescents were at-risk for psychological distress after the tsunami, there were also indicators that many children and their parents were responding

with strength and resiliency to the incidences of death, illness, and destruction that they experienced. In a relatively short period of time, children were attending temporary schools and day-care centers were organized to give structure to the children's days and give parents and caregivers time to attend to their family's needs as well as their own. Temporary shelters made of plywood panels were quickly built at the refugee camps to move families from tents to wooden structures to help them rebuild their lives and gain support from one another. While the tsunami created much emotional and physical distress for youth and their families, we must also recognize the overwhelming strength and resiliency that many people demonstrated despite the horrific tsunami event. The recovery efforts were greatly enhanced by over 100 different service organizations from Thailand and across the globe that provided direct services and support to the survivors immediately after the disaster.

**Psychological implications**

Psychological and supportive interventions following a tsunami disaster can be a preventive intervention that aims at enhancing youth resiliency and minimization of maladaptive reactions to psychological difficulties. As noted by Klingman, the underlying assumption of prevention following a disaster is that, if psychological distress can be kept within manageable or tolerable bounds, there will be a better chance of adaptive responding.[18]

Pataki et al.[21] suggests that unnecessary fact-finding and probing of survivors reactions to a disaster may actually be more harmful than beneficial and can intensify an individual's psychological response. It is best for caregivers and mental health personnel to allow disaster survivors to "tell their story" at their own pace, and perhaps many times over, but to avoid probing and questioning the survivor about their experience, especially shortly after the disaster.[17]

The American Psychological Association Task Force on the *Psychological Response of Children to Natural and Human-Made* Disasters recommended interventions such as individual supportive counseling and classroom and small group activities for children after disasters. Such activities should must have its center the establishment of a safe and encouraging atmosphere in which to help children and adolescents to understand the meaning of their experiences. For instance, a study by Galante and Foa indicated that an intervention that used art and play activities with children to enable them to express their feelings after an earthquake reduced earthquake fears and the number of children at risk for emotional and behavior problems.[5] Thai youth survivors may also benefit from such interventions.

Since the unexpected and uncontrollable disaster may offer children and adolescents few opportunities to control their environment, psychological prevention may rely on efforts to manage the resources of the support systems in order to enhance young survivors' well-being at the individual, family, school, and community levels. For example, offering supportive "listening", with minimal probing, that allows survivors to relate their experience can be facilitative. Prevention efforts must also use the resources of professionals and paraprofessionals in the disaster affected areas or region to offer a coordinated system of care and assistance. Such coordination and collaboration will require that professionals work across

disciplines, and set aside biases and "turf issues" that may have prevented collaborative efforts in the past. Finally, since rural areas will not have the number of mental health professional personnel as is found in urban areas. It is important that mental health professionals be prepared to recruit and train paraprofessionals in the affected areas to deliver services.

## Conclusions

Current accumulated knowledge and research studies have supported the belief that children and adolescents who are exposed to disasters often suffer from PTSD symptoms, including anxiety, depression, and behavioral problems. Collaborations among mental health professionals, spiritual advisers, parents, teachers and other school personnel, as well as community leaders and elders have a great deal to offer in supporting the adjustment of children after natural disasters. A strong partnership among sectors of the community and affected region will help to sustain a child's wellness over the long term. It is better to help children readjust well after a disaster because, if they fail to readjust, children are at risk for developing more serious mental health problems that can interfere with their personal well-being and jeopardize their future.

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