

PTSD Symptoms in Elementary School Children After Typhoon Rusa

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Purpose. A natural disaster negatively affects children's emotional and behavioral adjustment. The purpose of this paper was to examine the prevalence, symptoms, and correlates of PTSD after the occurrence of Typhoon Rusa.

Method. 261 elementary school children living in Kimcheon, which was a devastated rural area in South Korea by Typhoon Rusa, were selected. Data were collected 4 months after the disaster using the PTSD Reaction Index categories recommended by Frederick, severity of PTSD.

Results. 12.3% of the children had either moderate or severe PTSD symptoms; 22.7% reported mild symptoms; and the remaining 65% had sub-clinical symptoms of PTSD. The most frequent symptom was recurrent fear (67.0%). 13% to 17.2% of children exhibited difficulty in concentration, sleep disturbance, and guilt feeling. The regression model of severity of PTSD was composed of the level of exposure to traumatic experiences, grade in school, gender, negative coping style, and social support, and explained 34.3% for PTSD symptoms. Exposure to traumatic experiences was the strongest factor of all predictors.

Conclusion. Emotional support from friends and coping style were correlated with PTSD severity. School-based interventions that emphasizes coping with disaster related problems and problem-solving may prove to be useful, and may aid in building close and supportive ties with teachers, classmates, and friends.

Key Words: Children, PTSD, Natural disaster

INTRODUCTION

Statement of the problem

Typhoon Rusa battered South Korea in September, 2002. It displaced many areas in South Korea with raging floodwaters and landslides for 2 days, leaving 184 people dead or missing. Notably, the rural area of Kimcheon was one of the most affected. The entire city was virtually devastated and the scene reminded us of a war zone. Landslides and gusts destroyed buildings and roads, lamp poles were blown down and trees were up-

rooted. Distraught residents were forced to spend sleepless nights in public facilities after being ordered to evacuate their low-lying homes.

During a disaster, children have been identified as a susceptible group of the population suffering post-traumatic stress disorder (PTSD). The effects of these traumatic experiences are great and survivors are at a high risk for behavioral and emotional readjustment. However, children's problems have often been overlooked in this kind of situation. In spite of increasing recognition of the impact of disaster on children's mental health and psychosocial functioning, a research based

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informing efforts have been limited. Up to date, there have not been any studies in South Korea about post-traumatic stress disorder in children who have experienced such a disaster.

Several investigations have reported the incidence of PTSD symptoms and diagnosis in children. In a large sample of school-age children who experienced a forest fire, over 50% of their parents reported PTSD symptoms at 2 months after the accident, and 33% of them reported PTSD symptoms after 2 years (McFarlane, 1987). However, most studies have not directly focused on the presence or absence of the diagnosis of PTSD and it is still unclear whether children who were exposed to disaster experience all of the PTSD symptoms.

The essential feature of PTSD is developing characteristic symptoms after a traumatic event (Green, 1991). These symptoms involve the following three clusters: (1) persistent re-experiencing of the stressor (e.g., recurrent thoughts or dreams of the disaster), (2) persistent avoidance of reminders of the event and numbing of general responsiveness (e.g., avoidance of disaster-related activities, and feeling of detachment), and (3) persistent symptoms of hyper-arousal (e.g., experience difficulties in sleeping or concentrating). When children are repetitive-

ly exposed to traumatic events, generalized nightmares, psychosomatic symptoms (e.g., headaches, stomach aches), and foreboding omens may occur.

This study was done to identify the PTSD symptoms of children caused by a natural disaster and diverse factors that are related to these symptoms by examining 261 elementary school children in Kimcheon, 4 months after the disaster, Typhoon Rusa.

Conceptual Framework

This study was guided by an integrated conceptual model derived from the relevant background literature. The model includes four factors that influence children's post-disaster reaction (figure 1): Exposure to traumatic events, individual characteristics of children, social supports, and children's coping skills. It assumes that each of the four factors would account uniquely for variance in PTSD symptomatology.

Individual characteristics of children

Characteristics of children include demographic variables such as gender, ethnicity, and age. Several studies found that girls report more distress caused by natural disasters than boys (Green et al., 1991; Lonigan et al.,

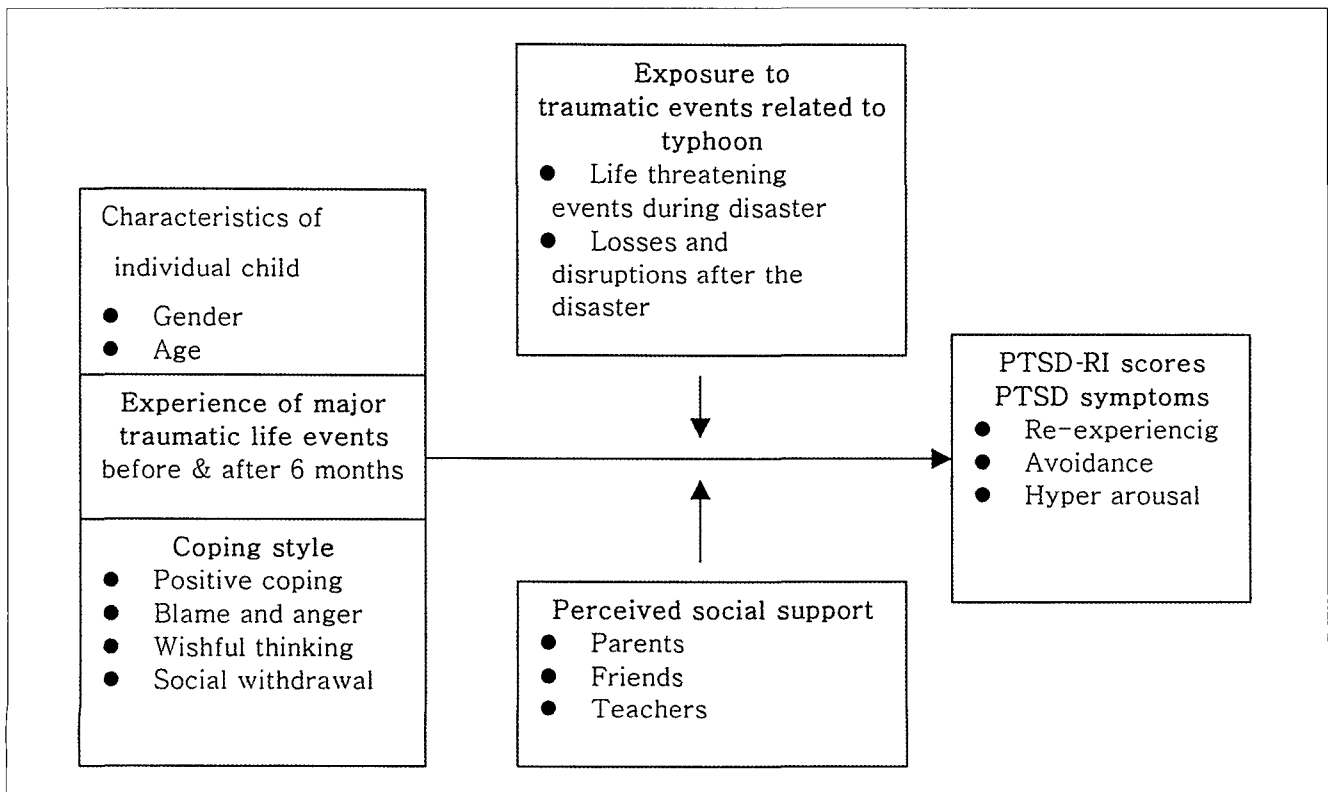


Figure 1. Conceptual Model for predicting children's reaction to natural disasters.

1991; Shannon et al., 1994), and age-related differences in post-traumatic stress symptoms were reported in some studies. In this study, we focused on gender and age only.

Major life events

Major life events that arise during 6 months before and after the disaster likely influence and magnify children's stress reactions, although these events are not directly related to the disaster itself. The 6 items pertaining to major personal loss and life disruption were included to measure PTSD symptoms (e.g., death of a family member or a pet, hospitalization of a family member, birth of a sibling).

Exposure to traumatic event

Exposure to a traumatic event is considered to be the primary and most critical factor for the emergence of post-traumatic stress symptoms. Frightening and life-threatening events during the disaster, and loss-disruption resulting from the disaster are two aspects of exposure that have been linked to psychological distress in children frequently (Burke et al, 1986; Green et al., 1991; Lonigan et al., 1991). In this study, the Hurricane Related Traumatic Experience Questionnaire (HURTE) was modified and used to measure the case (Bahrlick, 1998).

Children's coping style

Coping is viewed as a production of the level of trauma, personal characteristics, and situational characteristics. The linkage between PTSD symptoms and style of coping efforts is bi-directional as the presence of post-disaster distress contributes to the use of coping strategies as well as being influenced by them. In this study, the pattern or style of coping strategies is categorized into four types: positive, wishful thinking, avoidance and withdrawal, and blame and anger.

Perceived social support

In general, individuals with strong social support are able to cope with life stressors more effectively than those who lack such resources. Access to social support from a variety of sources should help children to minimize their post-disaster distress. Different people surrounding children's lives (e.g., parents, peers, and teachers) offer different types of social support and these various types of support may fill specific needs after a disaster.

Social supports that children perceived were categorized into 3 domains (information, emotional part, and material part) and examined with 7 items on a 3 point scale (1, 3, and 5). As the value of score increased, the children received better social support. In this research, the value of internal consistency of this tool was 0.57.

Post-traumatic Stress Disorder Reaction Index for Children (PTSD-RI)

The essential feature of PTSD is the development of characteristic symptoms after a traumatic event. The Post-traumatic Stress Disorder Reaction Index for Children (RI) is a self-report measure of PTSD symptoms in children. A modified version with appropriate language for Korean elementary school-age children was used for this study.

METHODS

Sample

Participants for this study were students in elementary schools from first to sixth grade (7 to 12 years old). Participation of young students who had experienced damage by Typhoon Rusa was requested for this research. After explaining the study's purposes and procedures to the principals, school health nurse, and students of 4 elementary schools, we obtained permission for the survey. Participants were 261 students (140 boys, 121 girls).

Measures

The Post-traumatic Stress Disorder Reaction Index for Children (RI) is a 20 itemed (3 point scale from 0 to 2) self-report measure of PTSD symptoms for children. Originally, it was developed as a semi-structured interview on the basis of criteria outlined in the DSM-III-R. Frederick and his colleagues (1992) revised it for use in a questionnaire or structured interview form.

The total number of symptoms that a child reported at the time of the interview was recorded as his/her Reaction Index score. Severity levels of PTSD have established these guidelines: a score range from 7 to 9 indicates a mild level; a range from 10 to 12 suggests a moderate level; and a score over 13 indicates a severe level.

Correlation of Reaction Index scores with a possible diagnosis of clinical PTSD was reported as .91 in the case of the children and the tool of RI (self-report format) has good internal consistency (Cronbach's $\alpha = .83$,

Lonigan et al., 1991). In this study, it was .8149.

The experiences of traumatic life events(6 items) and traumatic events related to the typhoon(5 items) were measured using a self-report instrument with a two point Likert scale. Higher scores indicated more traumatic events. The reliabilities were .82 and .71. The coping style instrument was comprised of 4 items in four-point Likert scale, reliability was .68. Perceived social support had 7 items, which measured emotional, physical and informational support, on a three-point scale 1,3,5. The reliability was .87.

RESULTS

General characteristics of the children

Demographic characteristics

Participants included 261 children (140 boys, 121 girls) from four elementary schools located in Kimcheon. About one third (27.6%) of the children were in grades 1 to 3 (7 to 9 years old) and the remaining 72.4% were in grades 4 to 6 (10 to 12 years old).

Exposure to traumatic experience

In terms of the total number of traumatic events that occurred during the typhoon, 75.1% reported one or more events and the maximum number of events was four. The most frequently reported event during the typhoon was experiencing damage to their houses (49.8%). Although a small group (7.7%) reported physical injuries during the typhoon, 43.3% of the exposed children reported feeling a threat to their lives (table 1).

Table 1. Frequency for Items of the Typhoon-related Traumatic Events (N=261)

Traumatic events	n	%
House was damaged and became displaced	130	49.8
Perceived threatening of life	113	43.3
Lack of food or water	76	29.1
Separation from family members	28	10.7
Physical injuries	20	7.7

Prevalence & symptoms of post-traumatic stress disorder

Using criteria for total scores of symptom severity by RI, 65% of children reported normal symptoms (having 0–6 scores). 22.7% of children had mild symptoms, 10.4% moderate, and 1.9%, severe (table 2). Therefore, the prevalence of PTSD related to the typhoon for children was 35% for this community.

The event was perceived as an extreme stressor for 62.1% of children and between 20.3% and 67.0% of the children had symptoms of re-experiencing phenomena (intrusive thought, getting upset when thinking about the event, fear of recurrence, nightmares, and intrusive imagery or sounds about the flood) and this portion was larger than either avoidance or hyper-arousal. The most frequent symptom was 'fear about recurrence' (67.0%) and 52.9% of children reported 'avoid sense of oppression'. The interesting result is that 29.5% of children who reported 'loss of interest in significant activities' in their daily lives also had 'avoidance symptoms' simultaneously (Table 3).

Table 3. Frequency of PTSD Symptoms (N=261)

Items of PTSD symptoms	n	%
Perceived the event as an extreme stressors	162	62.1
Intrusive thought	101	38.7
Intrusive imagery or sounds	71	27.2
Re-experiences nightmare or bad dreams	53	20.3
Getting upset when thinking about event	85	32.6
Re-experiences fear of recurrence	175	67.0
Loss of interest in significant activities	77	29.5
A sense of alienation	54	20.7
Avoid sense of oppression about the event	138	52.9
Avoid reminder related the event	53	20.3
Startle response or became timid	66	25.3
Distress in recollections	86	33.0
Difficulty concentrating	35	13.4
Learning disturbance	58	22.2
Sleep difficulty	34	13.0
Guilty	45	17.2

Table 2. Severity of PTSD Symptoms by Exposure to Other Traumatic Events

	Sub clinic sx. (RI=0-6)		Mild sx. (RI=7-9)		Moderate sx. (RI=10-12)		Severe sx. (RI=13 & over)		Total	
	n	%	n	%	n	%	N	%	n	%
Not exposed	59	90.8	6	9.2	0	0	0	0	65	100.0
Exposed	110	56.4	53	27.2	27	13.8	5	2.6	195	100.0
Total	169	65.0	59	22.7	27	10.4	5	1.9	260	100.0

Severity of PTSD symptoms according to influencing factors

Severity of PTSD symptoms according to sex and age

Girls reported more overall PTSD symptoms than boys. In terms of PTSD-RI mean score, there were significant differences in statistics ($t=-3.584, p=0.000$) as girls reported $5.7(\pm 3.40)$ and boys $4.2(\pm 3.51)$.

For the current sample, age-related differences in PTSD-RI scores were also consistent. PTSD symptoms in lower grade (1-3) students were more severe than those of higher grade (4-6) students. RI score of all girl students except the second grade was higher than that of boy students. From these findings, we found that girl stu-

dents and younger students had more distress symptoms than boys and older children (Figure 2).

Severity of PTSD symptoms according to Exposure to traumatic events and life events

Traumatic experiences from exposure to typhoon were associated with more PTSD symptoms. The items with the highest RI mean score was 'unwilling separation from family' because the flood had damaged their houses (Table 4). In Table 2, it is shown that 90.8% of children who did not experience traumatic events during the typhoon had no symptom. On the other hand, 43.6% of children who experienced one or more traumatic events

Table 4. Severity of PTSD Symptoms according to Exposure to Traumatic Events

Traumatic events		N(%)	Mean SD	t	p
Separation	No	232 (89.2)	4.65±3.52	-3.270	.001
	Yes	28 (10.8)	6.93±3.07		
Fear to death	No	145 (56.2)	3.59±.24	-7.172	.000
	Yes	113 (43.8)	6.46±3.53		
Lack of food	No	131 (50.2)	3.98±3.13	-3.328	.001
	Yes	130 (49.8)	5.83±3.69		
Damage to houses	No	184 (70.8)	4.43±3.40	-4.373	.000
	Yes	76 (29.2)	6.00±3.63		
Getting hurt	No	240 (92.3)	4.82±0.23	-1.380	.169
	Yes	20 (7.7)	5.95±3.65		

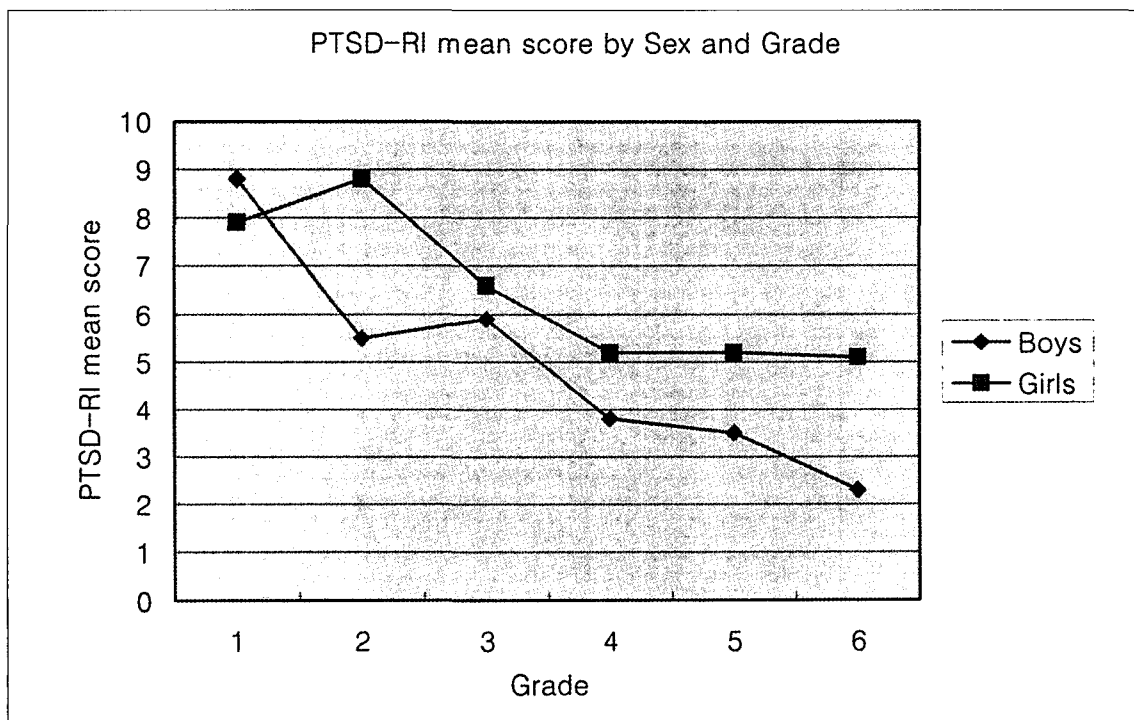


Figure 2. PTSD-RI mean score by sex and grade

reported PTSD symptoms at the level of mild or higher. Similarly, there were significant differences between mean scores of RI in accordance with their exposure level ($F = 17.653, p = 0.00$). In spite of no direct exposure to disaster, 9.2% of students reported mild level PTSD symptoms. This is because they became 'secondary victims' by listening to information about damages caused by the disaster from friends, neighborhood, or media (table 2).

Major life events, which children had experienced during the period of 6 months before and after the typhoon, had an influence on PTSD symptoms. Events such as the 'death of a pet', 'hospitalization of a family member', and 'separation from family' were related to the flood damage caused by the typhoon. Comparatively, the event of 'death of a pet' had the highest RI mean score and in terms of RI mean score, there were significant differences in PTSD mean scores between the group experiencing a life event and the group without such experience (experience group: 5.59 ± 3.60 , no experience group: $2.85 \pm 2.33, t = -5.74, p = 0.000$).

Severity of PTSD symptoms according to coping style

Children who used negative coping strategies in general (RI mean score 7.0 ± 3.46) such as blaming and show-

ing anger reported more PTSD symptoms than those who used positive coping strategies (RI mean score 4.9 ± 3.33), especially the use of 'blame and anger' ($F = 3.83, p = 0.01$) and 'wishful thinking' ($F = 4.18, p = 0.007$) was found to be a strong predictor of PTSD symptoms.

Severity of PTSD symptoms according to perceived level of social support

This study assessed children's perceived social support from three sources; parents, classmates, and teachers. Children who had perceived middle level social support (21-27 social support score) reported more symptoms than those who had perceived higher or lower levels: PTSD-RI mean score of the middle level group was 3.98 ± 3.40 , in the high level group, 5.50 ± 3.53 , and 5.09 ± 3.50 in the low level group ($F = 5.84, p = 0.005$) (Table 5). As the perceived level of material support from parents ($F = 5.73, p = 0.04$) and emotional support from friends ($F = 4.39, p = 0.013$) became higher, PTSD-RI mean score also increased significantly. However, 'Emotional and informational support from parents' and 'emotional support from teachers' did not influence the score greatly.

Table 5. PTSD-RI Mean Score according to Degree of Perceived Social Support

Perceived level of social support	N(%)	Mean ± S.D	F	p
Low (below 20)	24 (9.2)	5.09 ± 3.50	5.478	.005
Middle (20-27)	150 (57.5)	3.98 ± 3.40		
High (27 & over)	86 (33.0)	5.50 ± 3.53		
Total	260 (100)			

Table 6. The Correlation of All Study Variables

	Sex	Grade	Typhoon-related traumatic events	Perceived social support	Total number of life event	Positive coping style	Wishful thinking	Withdrawal	Blame-anger
Sex	--								
Grade	.06	--							
Typhoon-related traumatic events	-.01	-.25**	--						
Perceived social support	.10	-.09	.05	--					
Total number of life event	-.06	-.12	.11	.03	--				
Positive coping style	.01	-.10	.16*	.30**	.02	--			
Wishful thinking	-.02	-.23**	.11	.09	-.00	.03	--		
Withdrawal	-.06	-.01	-.01	-.12	.03	-.09	.15*	--	
Blame-anger	-.09	.03	.16**	-.05	.02	-.01	.22**	.41**	--
PTSD-RI	.22**	-.34**	.45**	.18**	.10	.02	.22**	.09	.21**

** $p < 0.01$, * $p < 0.05$

Severity of PTSD symptoms according to somatization

Forty-five children reported somatization symptoms such as headache, stomach ache, nausea, ambiguous inconvenience, lassitude, and so on. There was a significant difference in PTSD-RI mean score between somatization group and non-somatization group in both genders.

Correlation of PTSD-RI score with other influencing factors

There were significant correlations of positive coping style with the sum of social support ($r = .31, p < .001$) and sum of exposure to traumatic events ($r = .16, p < .01$). Scores of PTSD-RI were associated with gender ($r = .22, p < .001$), school grade ($r = -.34, p < .001$), exposure to traumatic events ($r = .45, p < .001$), social support ($r = .18, p < .001$), positive coping style ($r = .22, p < .001$), and negative coping style ($r = .21, p < .001$) (Table 6).

To examine the predictor of PTSD-RI, stepwise multiple regressions analysis was used. The problems of multicollinearity and phenomena of auto-correlation among variables were confirmed through diagnostic test and independency test of residuals. The regression model was composed of exposure to traumatic experiences, grade in school, gender, positive coping style, negative coping style, and social support, and explained 34.3% for PTSD symptoms. Exposure to traumatic experiences was the strongest factor of all predictors (Table 7).

DISCUSSION

Results from previous studies indicate that from 14% to 43% of children experience at least one traumatic event in their lifetime, and from 3% to 15% of girls and from 1% to 6% of boys among these children and adolescents could be diagnosed with PTSD (Green, 1991;

McFarlane, 1987). However, the rate of PTSD of children and adolescents at-risk was reported from 3% to 100% (Garrison et al., 1995). The estimated lifetime prevalence of PTSD in the general population ranges from 1% to 14% (American Psychiatric Association, 1994). In the present study, 75.1% of children experienced one or more traumatic events during the period of the typhoon and prevalence of PTSD related to the typhoon was 35%. This rate is relatively high when compared with that of other communities. Although the prevalence rate of the non-exposure group to traumatic events was 9.2%, the rate of the exposure group was 43.6%. It seems that the rate and severity of PTSD are influenced by the magnitude of the disaster; prior experiences of trauma and the time elapsed after the trauma. This study was performed 3 months after the devastating disaster when community response to the disaster had shifted from honeymoon phase to disillusionment phase.

At this time, though PTSD score usually starts to decrease, survivors with fatigue begin to complain about betrayal from the government, abandonment, lack of justice, and their incompetence (<http://www.ncptsd.org/fact/disasters>, Feb, 2003). However, as Kimcheon had not suffered a flood for decades, it had relatively high rates of PTSD.

As might be expected, this study suggests that the severity of PTSD symptoms was strongly related to the extent of exposure to traumatic events. Children who had experienced 'separation from family members' had more symptoms than other factors such as 'houses were damaged' and 'became displaced'. In addition, 'getting a physical injury' had a relatively lower PTSD-RI score.

For even adults, a disaster is a difficult experience to understand and accept as it makes them feel unsafe in their daily lives and in the world around them. Children are more deeply affected by a disaster. The onset of PTSD in childhood and adolescence has a particular damaging impact since it may impair the acquisition of life skills needed for independence and self-sufficiency. If these skills are not achieved before the onset of adulthood, the impairment can remain lifelong (Kinzie et al., 1986, 1989; Malmquist, 1986; McFarlane, 1987; Pynoos, 1987; Green, 1991).

Unlike other psychiatric disorders which are usually linked to psychosocial and biological causes, PTSD can occur even to a normal person in psychological terms as a result of traumatic experience. The current diagnostic criteria for PTSD can be found in the Diagnostic and

Table 7. Predictors of PTSD-RI

Variables	Beta	t value	p
Typhoon-related traumatic events	.34	6.35	.00
Grade in school	-.27	-5.11	.00
Gender	.24	4.7	.00
Style of coping: blame-anger	.18	3.48	.00
Perceived social support	.13	2.45	.02
F value	6.0		.02
R ²	.36		
Adjusted R ²	.34		

Statistical Manual of Mental Disorders IV. They include; (1) persistent re-experience of traumatic event (such as flashback and nightmares), (2) continuing avoidance from stimuli that triggers reaction to the experience, and (3) persistent symptoms of increased arousal. In children, repetitive exposure to a traumatic event can lead to generalized nightmares, psychosomatic symptoms, and foreboding omens.

Symptoms vary widely and may include signs associated with depression, anxiety, sleep disorders (such as persistent distressing dreams, difficulty in falling asleep, or staying asleep), and even psychosis. For children, the sign of diminishing interests or being daunted in their activities was not reported. Thus, people in close contact with them must carefully observe and report these signs. Pertinently, children at the age of five or younger may have persistent anxiety about separation from their families evidenced by excessive clinging to parents and caretakers; may have difficulty in sleeping or have nightmares; may whimper and cry more; and may exhibit regressive behavior such as bedwetting, thumb sucking, or refusing to sleep in the dark. Children at ages 6 to 11 may exhibit these and additional reactions. They may withdraw from their usual activities; have difficulty in concentrating on and finishing a task; experience irrational fears; be unusually irritable, have angry outbursts; become depressed; have feeling of guiltiness; become either emotionally numb or anxious; or show decreasing academic achievement (Pynoos, 1987).

In this study, more than 60% of children had mild anxieties and worries, and the range of 20.3% to 52.9% of the children had moderate intrusive and avoidance symptoms from the PTSD symptom clusters. Furthermore, 13% to 17.2% of the children exhibited difficulty in concentration as a cognitive reaction, sleep disturbance as a physical reaction, and guilty feeling as an emotional reaction. These findings support that people in close contact with children exposed to a traumatic event (e.g., parents, teacher) must carefully observe and encourage them to express their ambiguous fear and anxiety. Moreover, children who display sleep disturbance, concentration difficulty, and guilty feeling need close observation and interventions as these symptoms may cause developmental impairment and emotional disorder such as depression, regardless of severity of PTSD symptoms, although the frequency is relatively low.

Consistent with previous research (Green et al., 1991;

Lonigan et al., 1994; Pynoos, 1986), the level of exposure to traumatic events is found to be a strong predictor for the severity of PTSD symptoms. Reports about frightening and life-threatening events that occur during natural disasters, and the loss and disruption that follow such disasters are two aspects of exposure that are most frequently associated with children's post-disaster reactions (Vernberg & Vogel, 1993). However, McFarlane (1987) found that separation from parents immediately after a natural disaster and altered family functioning after a natural disaster were direct causes of symptom development in children, more so their exposure to the disaster or loss from it. In the current study, we observed that many children had been troubled with threat of death, especially in the group of physically injured people.

Major life events that arise after a disaster (e.g., death of a family member, parental divorce, and so on) likely influence and magnify children's stress reactions, although these events are not necessarily related to the disaster itself. Children experiencing the 'death of a pet' had the highest RI mean score and thus, we need to understand children's attachment to their pets and to significant others.

The extent of the children's defensive style and coping, the availability and use of social support, and expectation of response and recovery show differences according to gender. Gender differences in studies with large samples have generally found that girls have more symptoms than boys (Green et al., 1991; Lonigan et al., 1991; Shannon et al., 1994). Some studies found boys have more symptoms than girls and some found qualitative gender differences in symptoms and recovery. A number of age-related differences in post-traumatic stress symptomatology caused by disasters have been proposed on the basis of developmental differences. These differences include children's abilities to comprehend the nature of traumatic events, developmental change in coping skills, and differences in their access to social support (Vernberg & Vogel, 1993). Age and gender related differences in post-traumatic stress symptoms have shown to be significant in youngsters.

Although social support has not been evaluated in the context of children's disaster reactions, individuals with strong social support had greater ability to cope with life stressors than those who lacked such resources. Social support from a variety of sources should help children to minimize their post-disaster distress. Natural disasters af-

fect entire communities so there is a high likelihood that support providers (e.g., families, teachers, friends) are also victims. Furthermore, disasters typically precipitate an initial rush of spontaneous help but there is often depletion of supportive resources as time goes on. These trends coupled with the present findings suggest that efforts to provide support to young disaster survivors should extend beyond the acute phase of disaster recovery.

Coping is considered as the product of the level of trauma suffered, personal characteristics (demographic characteristics), and situational characteristics. The relationship between PTSD symptoms and coping efforts was viewed as being bi-directional as the presence of symptoms contributes to the use of coping strategies as well as being influenced by the use of these strategies. The finding that all four coping variables (positive coping, blame-anger, wishful thinking, and social withdrawal) were positively correlated with all PTSD symptoms suggest that a high level of distress caused by an intense, ongoing stressor may initially elicit a variety of coping strategies, in both positive and negative ways.

The frequent use of blame and anger as a way of coping may potentially have the most negative ramifications to children's level of distress following a disaster. Indeed, 'blame-anger' was linked with the highest level of PTSD symptoms. Although these findings are interesting and provocative, it is conceivable that clearer differences in psychological outcomes for these different types of coping emerge later in the course of adapting to traumatic experiences. Further investigation of children's coping actions caused by major disasters is needed to clarify the most important distinctions among various forms of coping and to research possible connections between various coping strategies and PTSD symptoms.

CONCLUSION

The important contribution of this study is investigation of community prevalence of PTSD and characteristics of PTSD symptoms in school-age children following a natural disaster. Beside adults, children's PTSD symptoms are associated with degree of traumatic events. More than 60% of children who were exposed to traumatic events reported mild anxiety and worry, and the prevalence of PTSD related to the typhoon was 35% for the community. Some children (13-17.2%) who developed somatization, decreasing concentration, and guilt

feelings need to go through a close examination and intervention program.

Exposure to traumatic events related with the typhoon such as fear, separation from parents, and the lack of water or food was the strongest predictor and made PTSD symptoms worse. Unlike the result of previous studies, emotional support from friends was correlated with lower level of PTSD symptoms, though emotional support from parents was not. Also, type of coping was a strong predictor for severity of PTSD symptoms.

Finally, the current findings may serve as a springboard for developing a community-based program. Our results suggest that interventions extending beyond the acute phase of recovery are needed. It may be useful to focus on enhancing children's skills in dealing with ongoing stressors. School-based interventions may prove to be useful in this regard. Teacher or counselor led activities that emphasize coping with disaster related problems can provide children with models of effective coping and problem-solving, and may build close, supportive ties with their teachers, classmates, and friends.

The limitation of the present study were the study group was selected a convenience sampling method, and data collection was done by having the children answer the questions based on their recollections of past experiences. Thus, the results of study should be interpreted with caution, and future studies that confirm the findings related to the level of PTSD prevalence for children, and transition pattern of PTSD symptoms through longitudinal study design are recommended.

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