Psychiatric Disorders in Tsunami-Affected Children in Ranong Province, Thailand

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Key Words

Psychiatric disorders · Disaster · Tsunami · Posttraumatic stress disorder · Children

Abstract

Objective: To study the prevalence of psychiatric disorders in children affected by the Asian tsunami in Ranong province, Southern Thailand 10 months after the disaster. **Subjects and Methods:** The subjects were 47 boys and 47 girls, age 1–18 years, who were affected by the tsunami. They were participants in the Psychosocial Care and Protection System for Tsunami-Affected Children in Ranong Province project. The subjects were interviewed by a psychiatrist and diagnoses were made according to DSM IV criteria. **Results:** Of the 94 children, 47 (50%) had at least one psychiatric diagnosis: posttraumatic stress disorder (PTSD): $n = 31$ (33%); major depression: $n = 9$ (9.6%); adjustment disorder: $n = 9$ (9.6%), and separation anxiety disorder: $n = 3$ (3.2%). The psychiatric diagnoses, specifically PTSD, were significantly associated with the child's age and exposure to the traumatic events. **Conclusion:** Ten months after the tsunami disaster, there is a high prevalence of psychiatric disorders in children, suggesting the importance of early identification, intervention and follow-up.

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Introduction

The Asian tsunami on the morning of December 26, 2004, as a result of an earthquake centered in the Indian Ocean, measuring 9.0–9.3 on the Richter scale [1], devastated coastal areas of Indonesia, Thailand, Burma, Sri Lanka, India and the Maldives. In Thailand, the area along its Andaman Sea coastline of Krabi, Phang Nga, Phuket, Ranong, Satun and Trang provinces were affected: 5,395 people died, 8,457 were injured and 2,817 were missing [2], and 1,215 Thai children became orphans [3]. The tsunami destroyed 4,806 houses, 315 hotels and resorts, 4,365 fishing boats, 5,977 fish traps, and thousands of acres of agricultural land, beach and coral reefs [2–4]. The disaster has had a major impact on the fishing and coastal communities as well as the tourism industry.

Children experienced physical trauma from exposure to the wave and psychological trauma from being in the disaster. In addition they experienced the loss of significant persons, home, familiar community, school, teachers, property and lifestyle. The effect on livelihoods of parents, resulting in economic and occupational disruption, also had an impact on the children. The Mental Health Center for Thai Tsunami Disaster reported regressive symptoms in children, including enuresis, fear of stranger, sleeping and eating problems, school and night phobia, attention seeking, poor concentration, social isolation, poor school performance, depression, separation

anxiety and somatic symptoms in 148 children up to 18 years old who were evaluated a few weeks after the disaster [5].

Exposure to the trauma, age, gender, social support, difficulties at home and loss of significant others are variables that have been reported to be associated with psychiatric disorders or psychiatric symptoms in the children who have experienced natural disasters [6–13].

There are data available about psychiatric disorders in children affected by the tsunami. For example, Neuner et al. [14] studied 264 Sri Lankan children who lived in coastal communities in severely affected areas and found the prevalence rate of tsunami-related posttraumatic stress disorder (PTSD) ranged between 14 and 39%. Five hundred and twenty-three juvenile survivors of the tsunami in Tamil Nadu were studied using instruments validated in Tamil Nadu and found that the prevalence of acute PTSD was as high as 70.7% and that there was delayed-onset PTSD in 10.9% [7]. Thienkrua et al. [15] studied children affected by the tsunami in Phang Nga, Phuket, and Krabi provinces, Thailand, using a modified version of the PsySTART Rapid Triage System, the UCLA PTSD Reaction Index, and the Birlson Depression Self-Rating Scale 2 months after tsunami. They found the prevalence of PTSD symptoms were 13% among children living in camps, 11% among children in affected villages contrasted with 6% among children from unaffected villages. For depressive symptoms, the prevalence rates were 11, 5 and 8%, respectively. There was no epidemiological data available on psychiatric disorders in tsunami-affected children in other areas of Thailand.

Background of the Study

In Ranong province, 156 Thai died, 215 were injured, 9 were missing, and 103 children lost their parents [3]. Three districts, 47 villages, 1,509 households and 5,942 individuals were affected by the tsunami. Two local health centers were severely damaged and one school was totally destroyed [3]. One dyke, 27 piers, 10 bridges and 21 streets were destroyed [4]. The majority of the affected people were Muslim.

Most of the affected children in Ranong had a disadvantaged background before the disaster. Many were from the lower socioeconomic class, had poor housing or grew up in a dysfunctional family with domestic violence, stepfamilies and single-parent homes with poor child protection. These children were prone to chronic developmental trauma associated with trauma spectrum

disorders and other emotional and behavioral disturbance [16]. Trauma exposure affects what children anticipate and focus on and how they organize the way they appraise and process information. Trauma-induced alterations in threat perception are expressed in how they think, feel, behave, and regulate their biologic systems [17]. And, trauma early in the life cycle has long-term effects on the neurochemical response to stress [18]. Therefore, some of the children may have already been vulnerable to psychological problems, which affected the incidence of psychiatric illnesses, when the natural disaster occurred.

Longitudinal studies on the long-term effect of natural disaster on children found that symptoms decreased with time, but continue to have effects on the children. Shaw et al. [19] evaluated the 21-month follow-up in schoolchildren exposed to Hurricane Andrew. There were a continuing high level of posttraumatic stress symptoms and evidence of increasing emotional and behavioral problems. The result of the study of Karakaya et al. [20] on secondary school students 3.5 years after the Marmara earthquake showed that 22.2% of them had probable PTSD and 30.8% had probable depression diagnoses. Their anxiety levels were also higher than in the normal population. Green et al. [21] did a 17-year follow-up of child survivors of the Buffalo Creek dam collapse. The rate of PTSD at the time of follow-up was 7% compared to a postflood rate of 32%. This suggests that children seem to continue to suffer from psychiatric disorders and psychopathologies for many years after the disaster and therefore, it is important to screen tsunami-affected children for the treatment and follow-up continuously. A screening instrument is also needed to identify the severely affected population as the target group for intervention.

The objective of this research was to study the prevalence of psychiatric disorders in children affected by the tsunami and investigate the association of the psychiatric morbidity and the nature of the traumatic experience in the 10 months following the tsunami.

Subjects and Methods

Two hundred and six children who lived in difficult situations such as poverty, parental death or divorce after the tsunami were enrolled in this project. However, only 94 who were directly affected by the tsunami were assessed; 89 were not directly affected and the parents of the remaining 23 did not allow them to participate in the study. The 94 children were 47 boys and 47 girls, ages 1–18 years. They were participants in the ‘Psychosocial Care

and Protection System for Tsunami-Affected Children in Ranong Province' project funded by Enfant Development, in the areas of Kaper district and Sooksamran subdistrict. The information leading to the inclusion of these children in the program was derived from information provided by the school and local citizens. The study authors received permission from caretakers for the children to participate in the research in October 2005, 10 months after the tsunami.

Demographic data on age, gender, religion, parent's occupations and education, current caretaker data and the nature of the trauma from the tsunami were collected by research assistants at the same time the assessment was being carried out by a psychiatrist doing the semistructured psychiatric interview protocol as part of a broader psychosocial evaluation of the children in the project. With younger children, the accompanied caretakers were also interviewed. If a child had any psychiatric symptoms, additional probes were asked to determine a diagnosis. A checklist for PTSD criteria and diagnoses was used to determine if a child met DSM IV criteria. The data was analyzed using descriptive statistics, univariate analysis and bivariate logistic regression analysis with a SPSS 11.5 program.

Results

There were 24 Buddhists and 70 Muslims. Most of their parents were blue-collar workers and fishermen. At the time of the evaluation, 57 (60.6%) children were living with their parent(s) and the others were living with other relatives. Sixty-five (69.1%) of them lost an important figure in their lives from the tsunami, 52 (55.3%) lost their parent(s), and 31 (33.0%) lost other close relatives. Seventeen (18.1%) children lost the family's property. Sociodemographic data are shown in table 1. Sixty-five (69.1%) children were exposed to the traumatic events caused by the tsunami, 40 (42.6%) of them were directly exposed to the tsunami and 42 (44.7%) were exposed to the traumatic events subsequent to the tsunami such as seeing dead bodies or hearing about a horrible death of their loved ones (table 2).

Psychiatric Disorders

Half of the children ($n = 47$) had at least one psychiatric diagnosis: PTSD: $n = 31$ (33%); major depressive episodes: $n = 9$ (9.6%); chronic adjustment disorder (unresolved grief): $n = 9$ (9.6%), and separation anxiety disorder: $n = 3$ (3.2%). One young girl had developmental trauma. There were 4 (4.3%) children with mental retardation and 4 (4.3%) with attention deficit hyperactivity disorder, 4 (4.3%) children had developmental disorders unrelated to the tsunami. There were 8 (8.5%) children with more than one diagnosis.

Table 1. Sociodemographic data of the 94 children

Sociodemographic factors	n	%
Gender		
Male	47	50.0
Female	47	50.0
Age, years		
0–5	18	19.1
6–10	36	38.3
11–15	37	39.4
16–18	3	3.2
Religion		
Buddhism	24	25.5
Islam	70	74.5
Educational status		
Underage and kindergarten	26	27.4
Primary school	44	46.8
Secondary school	24	25.5
Parent's occupation		
Fisherman	34	36.2
Agricultural	5	5.3
Blue-collar worker	34	36.2
Merchant	18	19.1
Government service	2	2.1
Unemployed	1	1.1
Living status		
With parent(s)	57	60.6
Other relative	37	39.4
Family background		
Death of parent(s) from other causes	19	20.2
Parental divorce	31	33.0

Younger children had a higher prevalence of psychiatric diagnoses than the older children. The highest prevalence of PTSD and unresolved grief was among those 6–10 years of age. Boys had a higher prevalence of depression but lower unresolved grief than girls. There was a higher prevalence of psychiatric disorder in the children who were exposed to the event and the group that lost a significant figure in their lives. Forty of 65 children (61.5%) who were exposed to the traumatic events caused by the tsunami had some psychiatric diagnosis. The children who were directly exposed to the tsunami had a higher prevalence of PTSD but lower prevalence of depression and unresolved grief than the group that was exposed to the traumatic events subsequent to the tsunami (seeing dead bodies or hearing about the horrible death of their loved ones, table 2).

Factors Associated with Psychiatric Disorders

There was no association between psychiatric disorders and religion, parent's occupation, parental divorce,

Table 2. Trauma, demographic data and psychiatric disorders

	Children		Any diagnosis		PTSD		Depression		SAD		Unresolved grief	
	n	%	n	%	n	%	n	%	n	%	n	%
Gender												
Male	47	50.0	24	51.1	15	31.9	7	14.9	0	0	3	6.4
Female	47	50.0	23	48.9	16	34.0	2	4.3	3	6.4	6	12.8
Age, years												
0–5	18	19.1	10	55.6	3	16.7	3	16.7	1	5.6	2	11.1
6–10	36	38.3	25	69.4	18	50.0	2	5.6	1	2.8	6	16.7
11–18	40	42.6	12	30.0	10	25.0	4	10.0	1	2.5	1	2.5
Trauma												
Any loss	65	69.1	37	56.9	22	33.8	8	12.3	3	4.6	9	13.8
Loss of parent(s)	52	55.3	29	55.8	14	26.9	7	13.5	2	3.8	9	17.3
Loss of close relative(s)	31	33.0	18	56.3	11	34.4	4	12.5	1	3.1	4	12.5
Any exposure	65	69.1	40	61.5	31	47.7	7	10.8	2	3.1	6	9.2
Exposure to tsunami	40	42.6	24	60.0	21	52.5	3	7.5	1	2.5	1	2.5
Exposed to traumatic events related to tsunami	42	44.7	26	61.9	18	42.9	5	11.9	1	2.4	7	16.7

SAD = Separation anxiety disorder.

Table 3. The positive results of binary backward stepwise logistic regression

Diagnosis		p value	Odds ratio	95% confidence interval	
				lower	upper
Any diagnosis	age 6–10 years	0.000	7.631	2.483	23.452
	exposed to tsunami	0.012	3.961	1.361	11.525
	exposed to event related to tsunami	0.031	2.929	1.103	7.781
PTSD	age 6–10 years	0.017	3.894	1.279	11.854
	exposed to tsunami	0.000	7.635	2.514	23.194
	exposed to event related to tsunami	0.019	3.655	1.240	10.770
Grief	age 6–10 years	0.015	24.987	1.879	332.368
	exposed to event related to tsunami	0.042	7.810	1.078	56.577

parental death from other causes, and the current caretaker when analyzed by univariate analysis. The results of binary logistic stepwise backward regression analysis showed that the psychiatric diagnosis and PTSD were significantly associated with the child's age and exposure to the traumatic event caused by the tsunami (direct exposure to the tsunami or traumatic events related to tsunami). Major depressive episodes, separation anxiety disorder and comorbidity were not significantly associated with any variables. Chronic adjustment disorder (unresolved grief reaction) was evidenced in the 6- to 10-year age group who were exposed to the event (table 3).

Discussion

In this study, psychiatric morbidity, especially PTSD, was significantly associated with the child's age and exposure to the traumatic event, supportive of previous findings [6, 11, 13, 15–18]. Gender was not significantly associated with PTSD, similar to the finding of McDermott et al. [10], which contrasted with the findings of John et al. [6], Pynoos et al. [7] and Roussos et al. [9].

Our finding of a high prevalence of psychiatric morbidity in this sample fits with the concept of complex trauma in children [22]. Our sample was from the popu-

lation who had a disadvantaged background prior to the disaster, and who might have been exposed to repeated trauma, which has been found to impact on the child's affect regulation, attachment, behavioral regulation, integration of information and experience, cognition, self-concept and regulation of the biologic systems [12]. Furthermore, kindling phenomena might occur when people are repeatedly traumatized, which may lead to lasting neurobiological and behavioral (characterological) changes mediated by alterations in the temporal lobe [11]. Therefore, exposure to the developmental trauma before the disaster might make some children more susceptible to traumatization by the tsunami and the suffering of loss.

Other researchers have studied the psychological impact of children affected by the tsunami and also found a high prevalence of PTSD [6, 14]. On the other hand, research on Thai children who lived in Phang Nga, Phuket, and Krabi provinces showed lower prevalence of PTSD symptoms (6–13%) in tsunami-affected children 2 months after the tsunami [15] compared to 33% of PTSD in our sample. They found the prevalence of depressive symptoms to be 5–11%, which is lower than the prevalence in our study. Furthermore, when we combined major depressive disorder and chronic adjustment disorder (unresolved grief), the prevalence of children with significant depressive symptoms reached 19.2%. The difference might be explained by the screening instruments that were utilized, since the cutoff points in the Thai version [15] had not been validated for sensitivity and specificity in Thai children, and this study utilized a clinical diagnostic interview performed by a native Thai psychiatrist. There may also have been differences in the demographics of the study samples. For example, there are more Muslim children and more children with lower socioeconomic status and difficult backgrounds in the affected communities in our study that could have caused vulnerability as discussed above.

As compared with other types of natural disaster, our researchers found a high prevalence of PTSD and a moderate prevalence of depression in children. Other studies reported PTSD in the range of 4.5–95% and a 7–76% prevalence of depression in children exposed to earthquakes, super-cyclone and wildfire disasters. Separation anxiety disorder and conversion disorder were also reported to be found in these children [20, 23, 24]. The different rates observed in our study as contrasted with other studies may be explained by differences in culture, severity of the trauma, nature of the disaster, method of

assessment or, most significant for this study, the time of assessment after the disaster.

Our study demonstrates that chronic adjustment disorder (unresolved grief) was seen in children aged 6–10 years and was associated with exposure to dead bodies of their loved ones or associated with hearing about horrible deaths of their loved ones. There are no other studies that mention this diagnosis and this association. Major depressive episodes, separation anxiety disorders and comorbidity were not significantly associated with any variables.

We plan to follow up our sample for another 2.5 years to see the long-term effect of tsunami on our children.

Limitation

A limitation of the study was the fact that the subjects were selected from the 'Psychosocial Care and Protection System for Tsunami-Affected Children in Ranong Province'. Children were included who lost their parents in the tsunami or were affected by the tsunami in other ways, who were previously living in difficult situations, such as divorce, death of the parents, or living with relatives. Thus, they may not represent the general population of the children who experienced the disaster.

Conclusion

Ten months after the Asian tsunami, there was a high percentage of psychiatric disorders in tsunami-affected children. The overall psychiatric morbidity and PTSD were significantly associated with the child's age and exposure to the traumatic event. These results suggest the importance of screening, follow-up and intervention for these children.

Acknowledgment

We would like to thank Enfant Development for funding support for the 'Psychosocial Care and Protection System for Tsunami-Affected Children in Ranong Province' project during 2005–2006.

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