

Single-day Psychoeducational Program for Children after the Great East Japan Earthquake and Tsunami of 2011

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ABSTRACT: Background: When Japan was struck by the Great East Japan Earthquake and Tsunami in 2011, about 20,000 people died and more than 400,000 were left homeless, including almost 100,000 children. While most of these children showed psychological symptoms of trauma, many could not receive appropriate care because of a lack of mental health professionals in rural areas. **Aim:** This study had two aims. The first was to identify whether camps offering brief psychoeducation were effective in relieving the distress of children who experienced the 2011 disaster. The second was to evaluate the effectiveness of brief training for community workers and laypeople in rural areas, delivered by a trained child psychiatrist. **Methods:** We evaluated an intervention consisting of single-day camps, followed by continuous, culturally appropriate psychoeducation, facilitated for children who experienced the disaster. Their adult caregivers participated in a psychoeducational program aimed at providing them with support and guidance related to the care of their children. Camp facilitators were recruited from existing networks in the community, including non-mental health professionals, and were trained by a child psychiatrist to support affected children. **Results:** Our results showed a statistically significant improvement in psychological symptoms among participants. We further found that training of non-professionals might be effective in the recovery of child mental health in areas where there is a lack of mental health resources. **Conclusion:** Our results indicate that a brief psychoeducational intervention after a disaster is effective in improving children's psychological distress. It is possible that community bonding plays a vital role in community-wide mental health recovery, regardless of whether formal mental health resources exist or not.

KEYWORDS: Psychoeducation, Children, Psychological trauma, Natural disasters, Community.

INTRODUCTION

LITERATURE REVIEW: A number of studies have investigated the psychological consequences of major natural disasters, including well-controlled studies on the prospective assessment of mental health (Fergusson, Horwood, Boden & Mulder, 2014;

North & Pfefferbaum, 2013), with findings largely confirming that exposure to massive natural disasters could lead to mental health problems. While this is the case for people of all ages, children are an especially vulnerable group in the event of such adversity. The psychological symptoms of children who experienced trauma and their need for support and treatment are markedly different from those of adults. Some studies have found that children's psychological problems tended to vary according to their situation at the time of the disaster (Norris et al. 2002).

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Earthquakes have a serious impact on child mental health in disaster-affected areas, as demonstrated in studies on the Hanshin-Awaji earthquake in Japan in 1995 (Shioyama et al. 2000; Uemoto et al. 2000); Spitak earthquake, Armenia, 1998 (Goenjian, Khachadourian, Armenian, Demirchyan & Steinberg, 2018; Khachadourian, Armenian, Demirchyan, Melkonian & Hovanesian, 2016); Marmara earthquake, Turkey, 1999 (Celebi Oncu & Wise, 2010; Laor et al. 2002); Indian Ocean earthquake and tsunami, 2004 (Agustini, Asniar & Matsuo, 2011; Thienkrua et al. 2006); Sichuan earthquake, China, 2008 (Jia et al. 2013; Yang et al. 2013); and the earthquake in Nepal in 2015 (Acharya, Bhatta & Assannangkornchai, 2017; Silwal et al., 2018).

After the great earthquake in Turkey, Laor et al. (2002) identified several risk factors for dissociation and grief, including being young, losing two or more loved ones, witnessing death, being injured, lacking sleep, and having experienced two or more traumatic events before the earthquake. After the Indian Ocean earthquake and tsunami in Thailand, (Thienkrua et al. 2006) found that older children tended to develop PTSD and depressive symptoms if they felt their own family members' lives had been in danger. After the massive earthquake in Nepal, post-traumatic and depressive symptoms in adolescents were higher in those living in a severely affected area than those in a less affected area (Silwal et al. 2018).

While the psychological impact of disasters on children has been well documented, there has only been limited development and evaluation of prevention strategies and treatment. (Weiz et al. 2005) highlighted the effectiveness of appropriate preventive strategies and treatments in minimizing poor psychological outcomes and promoting recovery after disasters. However, existing local mental health systems are themselves often affected by disasters, severely limiting resources during the early phases of recovery. In these situations, there is a need for assistance beyond what can be provided by mental health professionals. Given children's reliance on adults, many disaster-related interventions have focused on engagement of parents, teachers, and medical providers. Schools are ideal settings for providing psychological interventions to children and some studies have reported that universal programs conducted by teachers or local professionals were effective in reducing PTSD symptoms (Gloria, et al. 2017). (Klontz et al. 2015) conducted a school-based educational program, which started approximately 12 months after a massive hurricane in Hawaii in 1992, and found improvements in adaptive functioning and across a wide spectrum of behavioral problems.

Other community resources, including lay people from a range of backgrounds, are often called upon to assist in complementing the mental health system during the initial period of turmoil and upheaval. In Goa, India, for example, lay counselors were trained to educate residents about their symptoms, as well as simple relaxation methods and breathing exercises for anxiety, contributing to relief of residents' psychological symptoms (Patel et al. 2010). The training and support of community members to assist their communities can play a vital role in the facilitation of community-wide recovery.

It is not surprising that there are very few well-designed intervention studies utilizing control groups, as these are almost impossible to

conduct shortly after a disaster, when there is an enormous need for services and resources are severely stretched, both in terms of limitations on pre-existing and established services and disrupted community infrastructure.

This paper describes an intervention providing psychoeducation for children and their caregivers, utilizing trained community members. According to our knowledge, there are no existing reports on child-focused post-disaster interventions that include the training of lay workers and a concurrent intervention for caregivers.

BACKGROUND: On March 11, 2011, an earthquake with a magnitude of 9.0 on the Richter scale, referred to as the Great East Japan earthquake (GEJE), hit the Pacific coast of northeast Japan. Because of the damage from the earthquake, about 400,000 people, including children, evacuated to shelters and suffered long-term distress caused by the inconvenience and confusion of the situation. In the wake of the disaster, the Japanese government officially reported 19,630 deaths, 2,569 missing persons, and 6,230 injured persons. The Tohoku coastline of northeast Japan, spanning the Iwate, Miyagi, and Fukushima prefectures, was the most severely affected, with more than 90% of all casualties coming from this region (Fire and Disaster Management Agency, 2018). Furthermore, 1,778 children lost a parent in the disaster (Japan Child and Family Research Institute, 2018).

Miyagi Prefecture is a rural area in Japan and experienced a shortage of mental health professionals even before the occurrence of the disaster. After the GEJE, the Japanese government sent teams of mental health professionals to provide assistance in the affected areas. Child psychiatrists and other mental health workers visited evacuation sites and schools to monitor children's conditions and collaborate with local community workers, including public health nurses and teachers. However, the number of children in need of help outweighed the capacity of the mental health workers, and a number of issues needed to be addressed: there were no safe places for children to play, lay workers did not have sufficient abilities to identify children's psychological symptoms, and they did not know how to appropriately assist children who were in obvious distress.

In light of these challenges, we developed psychoeducational programs for children and caregivers using the limited resources available. The current study reports on the trial of one such program and evaluated its effectiveness. We aimed to determine if a single-day intervention led by lay community workers with limited mental health training was effective in reducing the psychological distress of children and their caregivers. The intervention included brief psychoeducation for children, using familiar cultural activities, and concurrently providing information and teaching relaxation techniques to their caregivers.

METHODS

PROGRAM DESCRIPTION: Child and adult participants were recruited from seven elementary schools in three cities in the disaster-affected area (A city has three schools with an average number of students of 80.9/year, B city has two schools with an average number of students of 288/year, and C city has two schools with an average number of students of 202/year) and who attended the program in groups of about 20 per camp. We asked schools

to distribute a pamphlet advertising the camp and caregivers' program among all students; children and caregivers who wanted to participate could enroll *via* phone or email. Caregivers who wanted to attend the program received their intervention at a facility in their town on the same day as their children's camp in the countryside. During our visits to the communities before the first camp, caregivers discussed their difficulties, and it became clear that there was anxiety around letting their children too far out of their sight; we, therefore, did not conduct an overnight camp. Six camps were conducted in total, with 65 caregiver interventions.

There were two different programs for children and caregivers, run concurrently. The children's program consisted of a group discussion, cooking, eating, playing, psychoeducation, and relaxation, while the caregivers' program comprised lectures on mental health problems and relaxation, as well as individual consultations. We adopted two modes of psychoeducation for child participants: picture stories with drawings, and blowing pipe with abdominal breathing. Picture stories and blowing pipes were selected as these are traditional Japanese toys; expressing their feelings in a safe, relaxing, and having fun were considered important for the improvement of the children's mental health. First, we delivered a lecture on the formation of emotions and the need to be aware of one's feelings, and we asked participants to draw a picture. We also provided instructions on the pictures they should draw throughout the session. Second, we delivered a lecture on the use of breathing techniques to stabilize one's feelings, using a picture story. Abdominal breathing was taught using a blowing pipe.

The caregivers' program started with a mental health professional delivering a lecture on children's mental health following massive disasters. Then, caregivers were able to participate in yoga classes and received hand massages from professionals. The caregivers were instructed in the psychoeducation and relaxation methods taught to their children, and it was recommended that they discuss and practice these methods with their children at home.

Camp facilitators were recruited from existing networks in each community. The number of staff (n=202) was about twice that of

children, with an average of 36.7 staff members per camp. The staff comprised mental health workers, local community workers, and lay people (Table 1). Prior to the camps, community workers and laypeople received training on the support of affected children from a trained child psychiatrist. They were also trained on child psychological symptoms, including PTSD and depression, active listening, and relaxation techniques (Table 2). Throughout the camping events, staff members supported children and their caregivers using the methods they had learned, and identified children who showed severe psychological symptoms and needed medical treatment. When staff detected that participants had severe symptoms, the children were referred to child psychiatrists who assessed and diagnosed them properly after the camp.

DESIGN OF EVALUATION: Although we have referred to our program as an intervention, this was not a prospective study. Rather, it should be understood as a naturalistic evaluation of a program developed to meet a particular need in a specific context, using limited resources. We developed our program through discussion with several health workers in the communities, including doctors, psychologists, and primary health care nurses, as well as teachers. The study could therefore not include a control group, and we did not have the resources to conduct non-intervention groups. We conducted a single group intervention, without a control group, in each camp and compared pre- and post-intervention psychological assessment scores of children attending each of the six camps.

MEASUREMENT: Participants' information was collected using a questionnaire that included items on age, sex, schools, place of residence, experience of relocation due to the disaster, location when the disaster took place, loss of a home, having a near-death experience, witnessing injured people, losing a family member, losing valuable possessions, witnessing a tsunami, having painful experiences before the disaster, having experience visiting psychiatric facilities before the disaster, and self-reports on their stress levels. We asked caregivers to fill out the questionnaire with their children, especially where children were below third grade in elementary school.

Table 1.
Job categories of the staff members.

Type of jobs	Job categories	Number	%
Mental health professionals	Psychiatric social workers	56	27.7
	Clinical psychologists	19	9.4
	Doctors (Psychiatrists, Pediatricians)	12	5.9
Local community workers	Nurses	18	8.9
	Primary health care nurses	17	8.4
	Teachers	13	6.4
	Social workers	2	1
	Occupational therapists	1	0.5
	Children's nurses	1	0.5
Lay people	Local university students	27	13.4
	Boy scouts / Girl scouts	11	5.4
	Workers at sports clubs	8	4
	Office workers	5	2.5
	Workers at non-profit organizations	4	2
	Others (housewives, etc.)	8	4
Total		202	100

Table 2.
The training program for the staff members.

Theme of training		Details of training program
1	Opening	The participants introduce themselves to each other with an icebreaking exercise.
2	Lecture	The participants attend a lecture on child mental health by a trained child psychiatrist. <ul style="list-style-type: none"> • How do children respond in an emergency situation? • What is the underlying mechanism? • What are the symptoms of depression and PTSD? • How should we treat these children?
3	Role-play	The participants role-play scenarios in groups. Before the role-play, they learn what active listening is: pay attention, show that you are listening, provide feedback, and respond appropriately. <ul style="list-style-type: none"> • Scenario 1: A depressed child: listening to a child to understand their feelings and experiences • Scenario 2: An excited and hyperaroused child: accepting the child's feelings and helping them to calm down
4	Relaxation	The participants learn about self-care and relaxation methods from a clinical psychologist. They also learn about relaxation methods taught to children at the camps. <ul style="list-style-type: none"> • Breathing method • Muscle relaxation method
5	Closing	The participants provide positive feedback to each other.

We used the Post-Traumatic Stress Symptoms for Children – 15 items (PTSSC-15) (Usami et al. 2014) as a self-report questionnaire on traumatic symptoms and measurement of children's lives pre- and post-intervention to assess their psychological status. The PTSSC-15 consists of 15 items designed to measure the stress reactions in children related to specific traumatic events. The items are rated on a five-point Likert scale ranging from 0 (completely disagree) to 4 (completely agree). The total score ranges from 0 to 60; a total score of 23 is used as the cut-off point for PTSD diagnosis in Japan.

DATA ANALYSIS: Using the PTSSC-15 scores, we conducted a paired t-test to evaluate the effectiveness of the intervention. For intergroup comparisons, a paired t-test was also applied. The data were analyzed using SPSS (version 21.0; IBM SPSS, Armonk, NY). Descriptive statistics were used to describe demographic characteristics and study variables.

RESULTS

Table 3 shows the characteristics of the participants in each camp. When we analyzed all six interventions, the total number of participants was 115 children (57 boys and 58 girls), aged between four and 12 years (mean=8.4 years). The average participation rate of each school was 3.2% in the three schools of A city, 1.24% in the two schools of B city, and 0.41% in the two schools of C city throughout all six camps. The camps were held six times (July 2011, Oct 2011, Oct 2012, Oct 2013, Oct 2014, and Oct 2015), and there were approximately 20 participants in each camp. Of the children attending the first camp, 19% had a history of visiting psychiatric facilities before the intervention. This rate increased with the second camp, and gradually decreased over time. The frequency of participants who scored above the cut-off point on the PTSSC-15 before the intervention was high at the first two camps, and decreased gradually over the next four camps. A total of 59 children (51.3%) scored above the cut-off point for the high-

risk category prior to the camps, and 21 (18.3%) were identified and diagnosed (Table 4). The number of children identified and diagnosed was the highest at the first two camps, and the number decreased over time.

Table 5 shows the children's mean pre- and post-intervention PTSSC-15 scores for each camp. Across the six groups, the mean pre-intervention score was 23.2 (SD=14.7), and the mean post-intervention score was 20.4 (SD=14.3) [$t(114) = 2.97, p < 0.01$]. The mean pre- and post-intervention scores were 24.7 (SD=12.4) and 21.2 (SD=15.4), respectively, for the first camp, with the highest average score reached in the second camp, and the average scores gradually decreasing over time.

Table 1 presents the job categories of staff members. The number of mental health professionals (psychiatric social workers, clinical psychologists, and psychiatrists) was 87 (43.1%). The number of local community workers (nurses, primary health care nurses, teachers, social workers, occupational therapists, and children's nurses) was 52 (25.7%). The number of lay people (local university students, boy and girl scouts, workers at community sports clubs, office workers, and workers at non-profit organizations, among others) was 63 (31.2%). The majority of lay people had worked with children in the affected communities before the disaster, and they wanted to continue providing support.

Table 2 presents details of the training program for staff members. Influenced by time and resource constraints, we provided a two-hour program for local community workers and laypeople. The Psychological First Aid (PFA) for Child Practitioners program was developed by Save the Children Denmark (2013) to facilitate training in child-focused PFA. The intervention aimed at developing skills and competencies that will help community workers and laypeople reduce the initial distress of children exposed to a traumatic event. In 2014, at the conclusion of our study and once the Japanese version had been developed, we provided the PFA for Child Practitioners program to staff members who wished to

Table 3.
Characteristics of the participants of each camp.

	1st		2nd		3rd		4th		5th		6th		Total	
	Jul. 11		Oct. 11		Oct. 12		Oct. 13		Oct. 14		Oct. 15		No	%
	No	%	No	%	No	%	No	%	No	%	No	%		
No	21		22		18		21		19		14		115	
Boys	11	52.4	12	54.5	10	55.6	5	23.8	12	63.2	7	50	57	49.6
Girls	10	47.6	10	45.5	8	44.5	16	76.2	7	36.8	7	50	58	50.4
Mean age	8.1		8.3		8.3		8.3		8.8		8.9		8.4	
Lost a home	2	9.5	6	27.3	6	33.3	7	33.3	6	31.6	6	42.9	33	28.7
Had a near-death experience	2	9.5	6	27.3	6	33.3	5	23.8	5	26.3	3	21.4	27	23.5
Was injured	0	0	1	4.5	0	0	0	0	0	0	0	0	1	0.9
Witnessed injured people	0	0	4	18.2	4	22.2	1	4.8	2	10.5	3	21.4	14	12.2
Lost a family member	5	23.8	9	40.9	8	44.4	8	38.1	6	31.6	5	35.7	41	35.7
Lost valuable possessions	2	9.5	12	54.5	7	38.9	10	47.6	9	47.4	6	42.9	46	40
Witnessed the tsunami	2	9.5	6	27.3	7	38.9	7	33.3	6	31.6	7	50	35	30.4
Had a painful experience in the past	4	19	4	18.2	1	5.6	3	14.3	3	15.8	2	14.3	17	14.8
Had a history of visiting psychiatric facilities before the intervention	4	19	9	40.9	5	27.8	2	9.5	0	0	1	7.1	21	18.3
Scored above the cut-off point before the intervention	13	61.9	16	72.7	9	50	9	42.9	7	36.8	5	35.7	59	51.3
Needed medical attention	8	38.1	7	31.8	3	16.7	2	9.5	1	5.3	1	7.1	21	18.3

Table 4.
Diagnoses of children who were identified by staff and needed medical treatment at each camp.

Camp	No	Diagnoses of children
1st	8	2 PTSD, 2 Depression, 3 ADHD, 1 ASD
2nd	7	3 PTSD, 1 Depression, 2 ADHD, 1 ASD
3rd	3	1 PTSD, 2 ADHD
4th	2	1 Depression, 1 ADHD
5th	1	1 ADHD
6th	1	1 Depression
Total	21	6 PTSD, 5 Depression, 8 ADHD, 2 ASD

PTSD: Post-Traumatic Stress Disorder
ADHD: Attention-Deficit Hyperactivity Disorder
ASD: Autism Spectrum Disorder

Table 5.
The mean pre- and post-intervention PTSSC-15 scores of children.

Camp	Pre-Intervention			Post-Intervention		
	No	M	SD	M	SD	t-value
1st	21	24.7	12.4	21.2	15.4	1.35
2nd	22	31.5	15.3	28.4	15.4	1.15
3rd	18	22.6	16.4	20.6	14.8	1.05
4th	21	20.8	14.6	20.9	12.1	0.02
5th	19	18.3	13.5	15.2	13.1	1.42
6th	14	18.9	12.9	12.6	10.3	3.03**
Total	115	23.2	14.7	20.4	14.3	2.97**

* p<0.05, ** p<0.01

participate.

DISCUSSION

Our analysis of the children's mean pre- and post-intervention PTSSC-15 scores indicated a statistically significant improvement (Table 5). Although we confirmed an improvement in the sixth camp, we could not find the same result in the first to fifth camps. This can be attributed to the sample size being too small for the wide variation in SD. From this result, there is a possibility that the camps were effective in decreasing children's post-disaster psychological distress. The number of participants who scored above the cut-off point before the intervention and needed medical attention, gradually decreased afterward (Table 3). There is a possibility that the number of children with psychological symptoms decreased due to time-related recovery, necessarily translating into a decrease in the rate of participants with psychological symptoms.

Several preventive strategies and treatments were reported to help children minimize negative psychological symptoms and promote their recovery after natural disasters. (Newman et al. 2014) identified the following as potentially effective intervention elements: cognitive behavioral therapy (CBT), other exposure-based treatments, psychoeducation, and relaxation strategies. In our study, although we could not provide completely structured therapy, we did provide brief psychoeducation and relaxation strategies using Japanese traditional toys with local community workers and laypeople. Our results show that the provision of brief psychoeducation and relaxation techniques by non-mental health professionals may contribute to relieving children's psychological distress.

Over the course of the six camps, staff members identified 24 children displaying certain psychological symptoms (Tables 3 and 4). We recommended that their caregivers seek medical help for these children, and connected them to medical resources where they could receive treatment from child mental health professionals. The children were eventually diagnosed with mental disorders such as PTSD, depression, attention-deficit hyperactivity disorder, and autism spectrum disorder, and could receive appropriate treatment. It seems that brief training can equip community workers and laypeople with the knowledge and skills necessary to identify whether children who display psychological symptoms need medical attention. This is in line with the findings of (Rahman, et al. 2008), showing that non-professional groups who receive training on the treatment of residents with psychological problems can make a significant contribution to their communities. Since it is difficult to increase the number of mental health professionals during emergency situations in rural areas, it is possible that training local community workers on the identification of children's psychological symptoms is an appropriate method for community recovery.

STUDY LIMITATIONS

Several limitations of this study must be addressed. First, the participants were not representative of all children, as our intervention included only children who volunteered to participate in the camps. The number of participants in each camp was quite small. This was due to the fact that the children and caregivers in

the affected areas did not want to participate in the camps because they were afraid to be separated from each other. Second, there is no control group for the comparison of our results, and we could not confirm whether our intervention was better than other methods. Third, we could not identify whether the effectiveness of the intervention was attributed to psychoeducation alone, or to the single-day camp program as a whole. Fourth, we should prudently interpret the intervention effects. Although we conducted the program in three cities and seven schools, the participation rate was different in each camp. Therefore, random effects might have arisen due to potential confounding factors. Finally, since we assessed the children's mental health condition only pre- and post-intervention, we could not confirm whether the positive effects of the intervention continued into the future.

CONCLUSION

In conclusion, the results of the present study highlight the effectiveness of a brief post-disaster psychoeducational intervention in the improvement of children's psychological distress. The study had two aims. First, we aimed to identify whether camps with brief psychoeducation were effective in relieving the distress of children who experienced the 2011 disaster. The second aim was to identify whether the brief training of local community workers and laypeople in rural areas, conducted by trained child psychiatrists, was effective. Our findings show that, while we could not provide a well-organized and structured intervention, brief psychoeducation for children and their caregivers did provide some relief for their psychological symptoms. Additionally, our findings indicated that the training of non-professional workers may be effective in the recovery of child mental health, even in rural areas where there is a lack of mental health resources. Lay caregivers and volunteer workers, even with limited training, can play a very important role in post-disaster recovery.

ETHICAL CONSIDERATIONS

In this context, the use of control or non-intervention groups would arguably constitute a breach of ethical principles, which further informed our decision to not include control groups in this study. This study was approved by the Miyagi Disaster Mental Health Care Center Ethics Committee (No 2018-01).

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DECLARATIONS

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