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Did kindergarteners who experienced the Great East Japan earthquake as infants develop traumatic symptoms? Series of questionnaire-based cross-sectional surveys

A concise and informative title: traumatic symptoms of kindergarteners who experienced disasters as infants

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ABSTRACT

Background: The Great East Japan Earthquake (GEJE) and tsunami of March 11, 2011 left behind many survivors, including children. This study aimed to assess changes in traumatic symptoms with time among kindergarteners who experienced GEJE as infants and to discuss the relationship between these symptoms and the disaster experience.

Methods: The 15-item Post-Traumatic Stress Symptoms for Children (PTSSC-15) questionnaire were distributed to the parents of kindergarteners (children aged 4–5 years) at 8, 20, 30, and 42 months after GEJE. Questionnaires regarding environmental damage conditions affecting the children were distributed to teachers 8 months after the tsunami.

Results: The number of kindergarteners was 262, 255, 236, and 202 at 8, 20, 30, and 42 months after the disaster. The PTSSC-15 total score was not different between kindergartners with and without environmental

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damage conditions. After 8 and 20 months, the PTSSC-15 total score of children who usually ate breakfast was significantly higher than that of children who did not. Moreover, after 30 and 42 months, the PTSSC-15 total score of kindergarteners who usually ate breakfast was not significantly higher than that of kindergarteners who did not.

Conclusions: The traumatic symptoms of kindergarteners were not related to disaster experiences.

1. Background

The Great East Japan Earthquake (GEJE) and tsunami of March 11, 2011 left behind many survivors, including children, with emotional/mental symptoms related to their traumatic experience (Ando et al., 2011; Iwadare et al., 2014a, 2014b; Kuwabara et al., 2015; Nohara and Nohara, 2011; Usami et al., 2013, 2014b, 2014d, 2012; Yamamto, 2011). The tsunami completely destroyed some kindergarten schools in Ishinomaki City; although several kindergarteners survived, a few died (Daily Mail Reporter, 2011).

A systematic literature review on the GEJE revealed that a considerable proportion of the surviving population was experiencing a wide array of significant emotional/mental consequences from the disaster (Kitamura et al., 2015). Although many studies discussed the mental health and social problems of the tsunami survivors (Funayama and Mizushima, 2013; Harada et al., 2015; Inoue et al., 2014; Koyama et al., 2014; Matsubara et al., 2014; Matsumoto et al., 2014; Momma et al., 2014; Nagata et al., 2015; Niitsu et al., 2014; Nishigori et al., 2014; Numata et al., 2014; Orui et al., 2014; Sekiguchi et al., 2013; Sugimoto et al., 2015; Takeda et al., 2013a; Yokoyama et al., 2014), only a few studies focused on the mental health of the surviving children (Iwadare et al., 2014b, 2014a; Kuwabara et al., 2015; Takeda et al., 2013a, 2013b; Usami et al., 2014d, 2014b; 2013; 2012; 2014a). Furthermore, there are no studies that discussed the changing mental health of kindergarteners after the GEJE disaster over time. Did the kindergarteners who experienced the GEJE as infants develop traumatic symptoms?

Parents were often confused about how to treat their children although they knew that some surviving children had been diagnosed with post-traumatic stress disorder (PTSD) on the basis of enlightenment activities conducted by professional health and welfare organizations.

We previously collected information on the activities of daily living, environmental damage, and traumatic symptoms among the kindergarteners and elementary and junior high school students who survived for 8, 20, and 30 months after the disaster (Iwadare et al., 2014b, 2014a; Usami et al., 2014d, 2014b, 2014a, 2013, 2012). The traumatic symptoms of surviving elementary and junior high school students after 8 months depended on their gender, age, and bereavement experience as well as damage to their environment. These traumatic symptoms and activities of their daily living improved after 20 and 30 months compared with those 8 months after the disaster. Our studies showed that the traumatic symptoms of elementary and junior high school students who survived the tsunami tended to improve with time. The children who did not eat breakfast had more severe traumatic symptoms than those who eat breakfast usually. These results suggested that parents may not have been able to afford a good living environment following the tsunami.

We collected the same information regarding the traumatic symptoms of kindergarteners and elementary and junior high school students who survived for 42 months after the 2011 tsunami. However, kindergarteners were very young and lacked the vocabulary to communicate emotions, such as trauma. In 2014, kindergarteners aged 4–5 years will only have experienced the huge earthquake and tsunami when they were infants (children aged 0–1 years) and may not have remembered the traumatic events. Therefore, the main hypothesis of this study was that kindergarteners who experienced the tsunami as infants will have experienced traumatic symptoms related to the disaster. This hypothesis indicated that kindergarteners 42 months after the disaster have some traumatic symptoms similar to those in kindergarteners 8, 20, and 30 months after the disaster.

Furthermore, previous studies have shown that traumatic symptoms tend to heal spontaneously over time (Dyb et al., 2011; Iwadare et al., 2014b; Jia et al., 2010; Kim et al., 2009; Piyasil et al., 2007, 2011;

Table 1
Damage to the living conditions of children affected by the 2011 Japan earthquake and tsunami.

Items			Kindergarteners, elementary, junior, high school students N = 11639		Kindergarteners N = 246	
House damage	No		6986	(60.0%)	204	(82.9%)
	Yes	Total collapse	2243	(19.3%)	17	(6.9%)
		Half collapse	2354	(20.2%)	25	(10.2%)
		Total	4597	(39.5%)	42	(17.1%)
	Unknown		56	(0.5%)	0	(0.0%)
Evacuation experience	No		8228	(70.7%)	217	(88.2%)
	Yes	Currently living in an evacuation center	90	(0.8%)	0	(0.0%)
		Used to live in an evacuation center	2845	(24.4%)	20	(8.1%)
		Living in temporary housing	976	(8.4%)	8	(3.3%)
		Used to live in temporary housing	51	(0.4%)	1	(0.4%)
		Evacuation experience at least once	3248	(27.9%)	29	(11.8%)
	Unknown		163	(1.4%)	0	(0.0%)
Bereavement experience	No		9241	(79.4%)	204	(82.9%)
	Yes	Father	71	(0.6%)	0	(0.0%)
		Mother	66	(0.6%)	0	(0.0%)
		Brothers and sisters	44	(0.4%)	0	(0.0%)
		Grandfather and grandmother	355	(3.1%)	1	(0.4%)
		Classmates	1498	(12.9%)	5	(2.0%)
		Teacher in charge	32	(0.3%)	37	(15.0%)
		Others	270	(2.3%)	0	(0.0%)
		At least one bereavement experience	2103	(18.1%)	41	(16.7%)
	Unknown		295	(2.5%)	1	(0.4%0)

M, mean; SD, standard deviation; N, number of cases.

Table 2
The numbers of children enrolled in municipal kindergarten in Ishinomaki City.

	2011 After 8 months	2012 After 20 months	2013 After 30 months	2014 After 42 months
Number of kindergartens	262	255,	236	202
Obtained Answers	261	245	236	192
	99.6%	96.1%	92.4%	95.0%
Number of kindergartens who experienced GEJE	246	238	218	189
Number of Effective responses	246	238	218	189
Males / Females	119/127	111/127	95/123	90/99
	93.9%	93.7%	89.4%	93.6%

Ularntinon et al., 2008; Usami et al., 2014d, 2014b). However, there were no studies that discussed the traumatic symptoms of surviving children over 4 years after huge disasters. Therefore, one of the minor hypothesis of this study was that traumatic symptoms of kindergarteners did not improve progressively with time. Traumatic symptoms of kindergarteners after 8 and 20 months were related to breakfast consumption (Usami et al., 2014b). Another minor hypothesis was that their traumatic symptoms were related to breakfast consumption. These hypotheses indicated that traumatic symptoms of kindergarteners were caused by both traumatic experiences and daily life activities.

2. Methods

2.1. Study design and settings

The present study and the studies we conducted at 8, 20, and 30 after the GEJE were questionnaire-based cross-sectional surveys of the surviving children (kindergarten, elementary, junior high school students) in Ishinomaki City (Iwadare et al., 2014b, 2014a; Usami et al., 2014b, 2014a; 2013; 2012; 2014c).

Ishinomaki City suffered catastrophic damage as a result of the supermassive tsunami (Inoue et al., 2014; Matsumoto et al., 2014; Usami et al., 2012). Before the disaster, the population of Ishinomaki City was approximately 16 million. As of February 15, 2011, the total number of collapsed houses and buildings, including half-destroyed houses, was 33,378; 7298 temporary houses had been constructed. As of April 31, 2014, the death toll in Ishinomaki City had reached 3,270, and 438 people were still considered missing.

The total number of child survivors evaluated at 8, 20, 30, and 42 months after the disaster was 11,639, 10,597, 10,812, and 10,467, respectively, with almost equal number of boys and girls (Iwadare et al., 2014b, 2014a; Usami et al., 2014c, 2014b, 2014a, 2013, 2012). Table 1 shows their PTSSC-15 total scores. Technically, this study was not a cohort study because the population of Ishinomaki City changed between the four surveys, with older students leaving and younger children entering the population.

2.2. Recruitment and participants

Each survey was conducted as part of the school education program under the initiative of the Board of Education in Ishinomaki City. Surveys were distributed to all children who attended the five participating kindergartens in Ishinomaki City, Miyagi Prefecture. The survey was conducted in November 2011, November 2012, September 2013, and September 2014, which represented 8, 20, 30, and 42 months after the disaster, respectively.

The method of administering the surveys was the same at each time point. First, the Education Committee of Ishinomaki City explained the survey method to the principals of all schools. Then, teachers distributed a letter to all children and their parents in which the Education Committee explained the survey. The letter clearly stated that by completing the questionnaire, both the student and parents were consenting to participate in the survey. The letter also specified that the survey results would be used to provide children with psychological care to facilitate their education and that the results would be published as a medical research article. Thus, informed consent was obtained when the students completed the questionnaire. The Ethics Committee of the National Center for Global Health and Medicine approved the survey protocol, including the consent procedure.

In November 2011 (8 months after the disaster), the 15-item Post-traumatic Stress Symptoms in Children (PTSSC-15) questionnaire was distributed to all children enrolled in the municipal kindergartens of Ishinomaki City (Usami et al., 2012). This self-rating questionnaire assesses PTSD symptoms (Tominaga et al., 2002). A questionnaire on the environmental damage experienced by the children was also distributed to their teachers. Copies of the PTSSC-15 were redistributed to all children enrolled in municipal kindergartens (and to their teachers) in 2012, 2013, and 2014, as detailed. Parents of kindergartners were asked to complete the questionnaire by questioning their children.

Table 2 showed the numbers of children enrolled in municipal kindergarten in Ishinomaki City at 8, 20, 30, and 42 months after the disaster, obtained answers, kindergartens who experienced GEJE, effective responses, and gender.

Answers to the environmental damage questionnaire 8 months after the disaster were obtained from teachers for all 246 children. Table 1 shows the data for gender, age, and damage to environmental conditions (house damage, evacuation conditions, and bereavement experience) at this point. When teachers had no information regarding house damage, evacuation conditions, or bereavement experiences, the answer was marked “unknown.”

2.3. Measures

2.3.1. PTSSC-15

This was a paper-based survey with self-rating questions about traumatic symptoms to assess stress reactions in children after a disaster. Five questions that are believed to reveal important psychosomatic characteristics after a disaster (flashbacks; appetite loss; somatic reactions, such as headache and abdominal pain; attention deficit; and anxiety) were added to the 10-item Post-Traumatic Stress Symptoms (PTSS-10) questionnaire used after the Great Hanshin earthquake and the 2004 Southeast Asia tsunami (Hafstad et al., 2012; Kato et al., 1996). PTSSC-15 consisting of 15 questions was constructed in Japan (Tominaga et al., 2002). Each question in the questionnaire is scored on a six-point scale: 0 = completely disagree; 1 = mostly disagree; 2 = partially disagree; 3 = partially agree; 4 = mostly agree; and 5 = completely agree. A higher total score indicates more severe traumatic symptoms.

The depression subscale consists of questions about insomnia (Question 1), withdrawal (Question 5), appetite loss (Question 12), inattention (Question 13), and physical symptoms (Question 14). The PTSD subscale consists of questions about irritability (Question 4), displeasure (Question 6), emotional upset (Question 7), avoidance (Question 8), nervousness (Question 9), guilt (Question 10), flashbacks (Question 11), and anxiety (Question 15). Tominaga et al. have demonstrated the reliability and validity of the PTSSC-15 in Japanese children and adolescents (Tominaga et al., 2002).

2.4. Environmental damage conditions

The authors and the educational committee in Ishinomaki City developed a questionnaire to assess the conditions of environmental damage experienced by the included children. The form was designed to be completed by teachers, and they were asked about disaster-related damage, bereavement experiences, and life in evacuation centers. One of the following three answers was available when assessing the environmental damage of the children’s houses: “no damage,” “total

collapse by the earthquake or tsunami (incapable of living in the house)," "half collapse by the earthquake or tsunami (necessary to repair the house before living in it)." Regarding the living conditions in evacuation centers, multiple-choice questions were asked with the following options: "no experience," "currently living in an evacuation center," "used to live in an evacuation center," "living in a temporary house," and "used to live in a temporary house." Bereavement experience (including the experience of unexplained disappearance due to the earthquake) was assessed by marking the following eight responses (multiple responses were allowed): "no experience," "father," "mother," "brothers and sisters," "grandfather and grandmother," "kindergarten and school classmates at the time of the earthquake," "teacher in charge of the class at the time of the earthquake," and "others."

2.5. Statistical analysis

In all tests, a significance level of 0.05 was used in two-sided tests. Previous studies show that the average total score in PTSSC-15 varied by gender and school grade (Usami et al., 2012); hence, the kindergarteners were subdivided into boy and girl groups.

2.5.1. PTSSC-15 and environmental damage conditions

We examined the house damage, evacuation conditions, and bereavement experience and took the average PTSSC-15 total score by school grade and gender; for bereavement experience, the average PTSSC-15 score was calculated separately in the subjects who experienced bereavement. Children were categorized by house damage, evacuation conditions, and bereavement experience, and the difference in the average PTSSC-15 score between the groups was statistically analyzed by two-factor analysis of variance (ANOVA) in each grade and gender group. In addition, the number of disaster experiences (house damage, evacuation conditions, and bereavement experiences) of the children was examined and compared with the average PTSSC-15 score by gender.

2.5.2. PTSSC-15 total score, depression subscale, and PTSD subscale

The average PTSSC-15 total score, depression subscale score, and PTSD subscale scores were calculated by gender group for the four time points after the tsunami. The differences in the three scores were then assessed by two-factor ANOVA for each gender and for each time point. To compare the time points, the differences were compared using the Bonferroni post-test.

2.5.3. PTSSC-15 total score and breakfast consumption

The differences in the average PTSSC-15 total score between those who had breakfast and those who did not was separately analyzed by two-factor ANOVA for each gender group after 8, 20, 30, and 42 months.

3. Results

3.1. Environmental damage of kindergarteners after 8 months

The average PTSSC-15 total score was compared with house damage experience (Table 3), evacuation experience (Table 4), and bereavement experience (Table 5), according to school grade and gender groups. However, the PTSSC-15 total scores were not different between kindergartners with and without exposure to these variables.

3.2. PTSSC-15 total score, depression subscale, and PTSD subscale after 8, 20, 30, and 42 months

The PTSSC-15 total scores changed significantly when assessed by two-factor ANOVA for each gender and time point. However, when using Bonferroni post-tests to compare the time points, the PTSSC-15 total score did not change significantly. Furthermore, the depression and PTSD subscales of the PTSSC-15 did not significantly change with time at 8, 20, 30, and 42 months (Table 6).

3.3. PTSSC-15 total score and breakfast consumption after 8, 20, 30, and 42 months

After 8 months, the PTSSC-15 total score of children who usually ate breakfast was significantly higher than that of those who usually did not (Table 6; $F(1235_{)} = 10.19$, $p < 0.01$). Similarly, after 20 months, the PTSSC-15 total score of children who usually ate breakfast was significantly higher than that of those who usually did not (Table 7, $F_{(}1231_{)} = 4.976$, $p < 0.05$). However, after 30 and 42 months, the PTSSC-15 total score of kindergarteners who usually ate breakfast was not significantly higher than that of those who usually did not.

4. Discussion

4.1. Traumatic symptoms of Kindergarteners after disasters

In our previous studies, the PTSSC-15 total score, PTSD subscale score, and depression subscale score of elementary and junior high school students decreased significantly with time (Usami et al., 2014d, 2014b). However, this study provides data on the PTSSC-15 scores, environmental damage, and breakfast consumption related to kindergarteners living in a disaster area following the 2011 Japan earthquake and tsunami.

Kindergarteners born in 2009 or 2010 experienced the tsunami as infants. The age of kindergarteners would therefore have been between 0 and 1 year at the time of the 2011 tsunami. At that time, Ishinomaki City was destroyed, and people were unable to use water, electrical devices, or mobile phone. Some surviving mothers may not have consumed milk. Together, these make the conditions very difficult to provide care for infants. Therefore, it is reasonable to assume that a number of kindergarteners would have experienced some traumatic symptoms. However, our results showed that traumatic symptoms did not change with time. Furthermore, traumatic symptoms did not appear to be related to environmental conditions, such as house damage, evacuation experience, and bereavement experience. Therefore, our major hypothesis was rejected.

Concerning daily life activities, the PTSSC-15 total scores were related to breakfast consumption at 8 and 20 months. It is possible that breakfast consumption among kindergarteners is related to the presence of a mother, orphaning, poverty-related adversity, issues in caregiver functioning, or another factors. In contrast, these scores were not related to breakfast consumption after 30 and 42 months, which is consistent with the results of previous studies in which traumatic symptoms in adults improved progressively with time. This study used the results of questionnaires rated by parents, and therefore, may have been affected by the parents' mental state, reflecting a progressive improvement in the traumatic symptoms of parents. Although our results

Table 3
Average PTSSC-15 score (grade, gender, and house damage).

Gender	House damage							F	p value
	Absent			Present					
	M	SD	N	M	SD	N			
Male	14.94	12.80	95	16.50	11.63	24	Gender × House damage	0.32	N.S.
Female	14.90	12.10	109	18.89	15.26	18	House damage	1.67	N.S.
							Gender	0.30	N.S.

M, mean; SD, standard deviation; N, number of cases; NS, not significant; PTSSC-15, the 15-item Post-Traumatic Stress Symptoms for Children.

Table 4
Average PTSSC-15 score (grade, gender, and evacuation experience).

Gender	Evacuation experience							F	p value
	Absent			Present					
	M	SD	N	M	SD	N			
Male	14.73	12.58	105	19.14	11.99	14	Gender × Evacuation	0.1643	N.S.
Female	15.21	12.11	112	17.57	16.68	14	Evacuation experience	1.791	N.S.
							Gender	0.04644	N.S.

M, mean; SD, standard deviation; N, number of cases; NS, not significant; PTSSC-15, the 15-item Post-Traumatic Stress Symptoms for Children.

indicated that some kindergarteners had traumatic symptoms, they may not have been directly related to the environmental damage caused by the tsunami but may be related instead to the living environment and/or mental state of the kindergartners' parents.

4.2. Limitations

This survey had some methodological limitations. First, it was conducted at only four points: 8, 20, 30, and 42 months after the 2011 tsunami. In addition, and as stated, the survey was based on questionnaires rated by parents and was conducted in only one district in Japan, and no information was collected about the mental state of the parents. Therefore, the relationship between a child's traumatic symptoms and the parent's mental state remains unclear. Furthermore, the information about environmental damage was collected from teachers. Consequently, it is not possible to calculate the severity of PTSD in children after the 2011 Japanese earthquake and tsunami based on the results of our survey. Therefore, the relationship between traumatic symptoms in children and environmental damages also remains unclear. Another important limitation is that few kindergarteners did not eat breakfast, making the statistical power of the analysis weak. This study used breakfast consumption, because Japanese culture places great emphasis on eating breakfast among childhood. This parameter is only used in our study(Usami et al., 2014b). However, this parameter should be discussed to be a comprehensive indication of those issues after disasters. Breakfast consumption as a parameter should be more mentioned to its relationship with not only poverty but also the mental state of their parents, their living environment, such as child abuse, orphan, and poverty after the tremendous disaster.

PTSSC-15 was self-rating questionnaires of traumatic symptoms. PTSSC-15 did not include a question about the sort of traumatic experiences. Therefore, these results indicated that clinicians should be more attention to peer relationship of junior high school children than elementary school children, and that clinicians must evaluate the sort of traumatic experiences in order to treat their psychiatric symptoms. However, in this study parents of kindergartners were asked to complete PTSSC-15 by questioning their children. This was possible to difficult to comprehend this questionnaire. Validity and reliability exercises of parent-rating PTSSC-15 would be needed to be confident that the ratings were accurate compared the other results used this self-rated PTSSC-15.

Finally, the survey did not record the cause of each individual's traumatic symptoms. Our study shows only the improvement in traumatic symptoms of children in Ishinomaki City. Therefore, this study cannot serve as an epidemiological survey or cohort study and cannot provide a firm psychiatric diagnosis. Examination by child psychiatrists using operational diagnostic criteria and structured interviews would be necessary for accurate psychiatric diagnosis. Moreover, the results of this study on children in Ishinomaki City do not reflect the characteristics of all children affected by the 2011 Japanese earthquake and tsunami.

4.3. Public health implications for children's mental health after disasters

Our study showed that kindergarteners had traumatic symptoms, they did not have been directly related to the environmental damage caused by the massive tsunami. However, their traumatic symptoms might be related instead to the living environment and/or mental state of the kindergartners' parents. Professions for children's mental health (i.e., child and adolescent psychiatrists, psychologist, teachers, nurses etc.) should pay close attention to child abuse, financial poverty, divorce, orphan, relocation and bullying after tremendous disasters (Najarian et al., 2017). These issues of children might induce traumatic symptoms that do not improve long time.

Because young children cannot verbally complain about their symptoms or situation, teachers, school social workers and public health nurses could carefully observe and were important local gatekeepers for children's mental health problems. Therefore, to ensure the public health of children over a long period of time after devastating disasters, child and adolescent psychiatrists and psychologists should collaborate with them to follow children with family problem, financial problems, and/or trauma symptoms.

5. Conclusion

In this study, we found that the traumatic symptoms of kindergarteners who survived the massive tsunami did not improve with time. The traumatic symptoms of kindergarteners were not related to disaster experiences. These traumatic symptoms may have been related to the mental state of their parents and to their living environment, such as child abuse, orphan, and poverty after the tremendous disaster.

Table 5
Average PTSSC-15 score (grade and gender and bereavement experience).

Gender	Bereavement experience							F	p value
	Absent			Present					
	M	SD	N	M	SD	N			
Male	15.02	11.98	94	16.12	14.64	25	Gender × bereavement experience	0.11	N.S.
Female	15.26	12.57	110	17.81	12.97	16	Bereavement experience	0.69	N.S.
							Gender	0.19	N.S.

M, mean; SD, standard deviation; N, number of cases; NS, not significant; PTSSC-15, the 15-item Post-Traumatic Stress Symptoms for Children.

Table 6
Average score on the PTSSC-15 total score, depression subscale, and PTSD subscale (by grade, gender, or period).

Grade group	Gender	Months after disaster													
		2011 After 8 months			2012 After 20 months			2013 After 30 months			2014After 42 months			F	p value
		M	SD	N	M	SD	N				M	SD	N		
Total score	Male	15.1	12.5	119	13.2	11.6	111	15.8	13.0	95	12.0	10.7	90	Gender × Period	0.167	N.S.
	Female	15.7	12.8	127	14.2	12.5	127	16.4	10.7	123	14.0	11.5	99	Period	3.184	*
														Gender	1.685	N.S.
PTSD subscore	Male	3.9	4.1	119	3.4	3.8	111	3.5	3.3	95	3.2	3.4	90	Gender × Period	1.950	N.S.
	Female	3.8	3.8	127	3.8	3.9	127	2.5	2.8	123	3.7	3.7	99	Period	2.116	N.S.
														Gender	0.042	N.S.
Depression subscore	Male	9.3	7.7	119	8.2	7.1	111	9.2	7.9	95	7.3	6.6	90	Gender × Period	1.488	N.S.
	Female	9.4	8.0	127	8.4	7.4	127	7.5	6.5	123	8.5	7.1	99	Period	1.556	N.S.
														Gender	0.010	N.S.

M, mean; SD, standard deviation; N, number of cases; N.S., not significant; PTSSC-15, the 15-item Post-Traumatic Stress Symptoms for Children; PTSD, post-traumatic stress disorder. *p < 0.05.

Table 7
Average PTSSC-15 total score (grade, gender, and breakfast consumption) after 8, 20, 30, and 42 months of disaster.

	Gender	Eating breakfast								
		Yes			No				F	p value
		M	SD	N	M	SD	N			
After 8 months	Male	14.1	11.5	110	35.4	13.5	5	Gender × breakfast consumption	3.762	N.S.
	Female	15.3	12.7	120	20.5	10.1	4	Breakfast consumption	10.19	* *
								Gender	2.724	N.S.
After 20 months	Male	12.4	11.3	105	24.3	9.8	4	Gender × breakfast consumption	0.4711	N.S.
	Female	14.1	12.6	121	20.4	7.9	5	Breakfast consumption	4.976	*
								Gender	0.073	N.S.
After 30 months	Male	15.2	12.9	87	21.0	12.9	8	Gender × breakfast consumption	0.001	N.S.
	Female	12.4	10.8	114	18.0	10.8	2	Breakfast consumption	1.449	N.S.
								Gender	0.375	N.S.
After 42 months	Male	11.7	10.8	86	20.0	2.2	3	Gender × breakfast consumption	2.050	N.S.
	Female	13.9	11.0	90	11.0	9.9	6	Breakfast consumption	0.4766	N.S.
								Gender	0.7558	N.S.

M, mean; SD, standard deviation; N, number of cases, N.S., not significant; PTSSC-15, the 15-item Post-Traumatic Stress Symptoms for Children. * p < 0.05, * * p < 0.01.

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