Longitudinal Study of Support for Children Born after the Great East Japan Earthquake and Their Families: Report of Baseline Survey Results from a City, Miyagi Prefecture

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1. Background

Children's living environment, starting with the mother-child relationship in infancy, is important for their emotional development. Past studies have shown that traumas in infancy have an effect on children's mental and physical development.[1), 2)] Following the Great East Japan Earthquake in 2011, several follow-up surveys of children with direct experiences of the disaster were conducted, the results of which have been reported.[3)] At the same time, as we have been providing local support, we have also consulted many children born after the disaster and without direct experiences of it. We are increasingly hearing from kindergarten teachers and administrative staff in disaster areas about children born after the disaster who "have trouble staying still" or "have difficulties with group activities." We feel that this tendency is more apparent in coastal areas that were greatly affected by the disaster and where restoration is taking time and support continues to be insufficient. Although a number of factors are plausible, we do not possess expertise that can clearly identify what support is needed, as no studies involving assessments of child development and parent mental health following large-scale natural disasters or long-term longitudinal intervention studies on children and their families have been conducted. Against this background, we realized the need for a long-term follow-up survey of children born after the disaster, which was incorporated in this study.

2. Aims

This study was conducted with the aim of understanding the mental and physical health condition of children born after the earthquake in City A, which sustained considerable damage, and of providing long-term support to high-risk families. Furthermore, we would like to add that the outcomes of this study are part of the Longitudinal Support Research on Children Born after the Great East Japan Earthquake and the Their Families, which is being conducted in collaboration with Iwate Children's Care Center, Iwate Medical University, and the Children's Mental Health Support Project Promotion Office, Fukushima University.

3. Methods

(1) Participants

Eligible participants included four-year-old children at kindergartens and nurseries in City A, Miyagi Prefecture, as of April, FY2016, and their guardians or teachers who provided consent to

participate in the survey. Children who moved to the area from a disaster area at least two years after the earthquake and who belong to a respective kindergarten were excluded.

(2) Procedures for the survey

We explained the survey to kindergartens and nurseries in the city and asked for their cooperation via the competent authorities in City A. At kindergartens and nurseries where we obtained consent, we distributed explanations of the survey and consent forms to the families of their respective classes, thereby soliciting participants. At this point, we explained that participation was voluntary and that consent could be withdrawn at any time. Moreover, since the survey would continue even after the children enter primary school, we also obtained consent from the Board of Education in City A in advance.

(3) Survey duration

We conducted a pilot survey at two nurseries in February–March 2016. We conducted the main survey at nurseries that had applied in July–September 2016. The parent survey across three prefectures started in October 2015 and was planned to run until all participants finish compulsory education at age 15 (March 2027). In order to see chronological changes, the 12-year survey is to be conducted annually for the first three years and then biennially.

(4) Survey methods and feedback

We asked consenting guardians and children to fill out a questionnaire and participate in an interview as well as have nursery teachers fill out a questionnaire (Table 1). On the day of the survey, we had the parents and children come to the nursery, where the children underwent an individual cognitive function examination and the parents an individual interview. After the survey, we provided feedback on the results of the nursery as a whole to the nursery and feedback on individual results to each family. We held individual consultations with families deemed to require support as well as case meetings at the nursery.

(5) Ethical considerations

The study has been approved by the ethical boards of the School of Medicine, Iwate Medical School, and of Fukushima University. We ensured that private information was sufficiently protected.

Table 1. Survey

Questionnaires	About the children	Guardian responses	· Child problem behavior: SDQ · Child problem behavior: CBCL · Checklist for autism: Japan version of M-CHAT · PTSD assessment: created based on Parent Report of the Child's Reaction to Stress
		Nursery teacher responses	· Child problem behavior: SDQ · Child problem behavior: TRF
	About the guardians themselves	· Lifestyle habits, living environment, financial situation, disaster impact · Social relations (social capital, social networks, social support) · PTSD: IES-R · Mental health: K6, BDI-II · Happiness: WHO26 · Post-traumatic growth: PTGI · Relational style: RQ	
Interviews	The children	WPPSI	· Picture completion · Toy blocks
		KABC-II	· Counting · Word order · Picture completing
		· Linguistic development: PVT-R · Good enough facial recognition test	
	The guardians	· Mini-International Neuropsychiatric Interviews: MINI · Mothers' experiences of adversity and trauma: created based on ACE and UPIC-V · Postpartum depression: EPDS	

4. Results

(1) Basic attributes of the participating families

Out of 128 eligible children at five nurseries in City A, we obtained cooperation from 30 families (17 boys, 13 girls, 23.4% consent rate). The children's average age in months at the time of interviews was 53.2 months (± 4.51 SD). 83% of these families had suffered damage to their houses because of the earthquake and tsunami, 33% had lost family or relatives, and 10% had co-habiting family members who had died or gone missing.

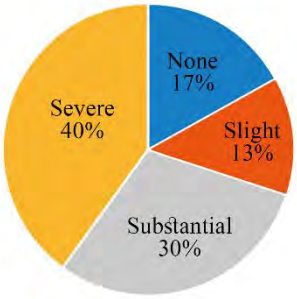

Figure 1. Extent of house damage

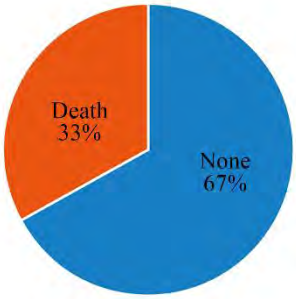

Figure 2. Harm to family and relatives

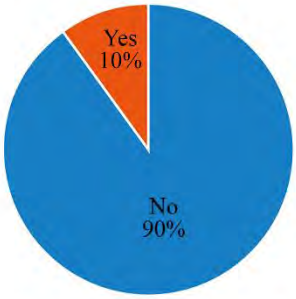

Figure 3. Co-habiting family member dead or gone missing

(2) Results of the children

① Questionnaire results (Figure 4)

a. CBCL / TRF

The total score of the child behavior checklist (CBCL) completed by the guardians showed that six children (20.0%) were borderline and four children (13.3%) were in the clinical range. At the same time, the total scores of the teacher's report form (TRF) completed by the teachers showed that seven children (23.3%) were borderline and eight children (26.7%) were in the clinical range.

b. SDQ

The TDS (total difficulties score) of the children's Strengths and Difficulties Questionnaire (SDQ)[5] showed that one child (3.3%) was in "high need" (of support) according to the guardian assessment, and one child (3.3%) was in "some need" (of support) and one in "high need" according to the teacher assessment.

c. M-CHAT

The total 23-item assessment of the Modified Checklist for Autism in Toddlers (M-CHAT) completed by the guardians showed that two children (6.7%) were in the clinical range.

② Development test results (Figure 5)

The raw scores of all test items were converted into assessment scores, aggregating them as average 10 and standard deviation ± 3. As a result, the average assessment score for each test was average or below average. We found no difference between the tests.

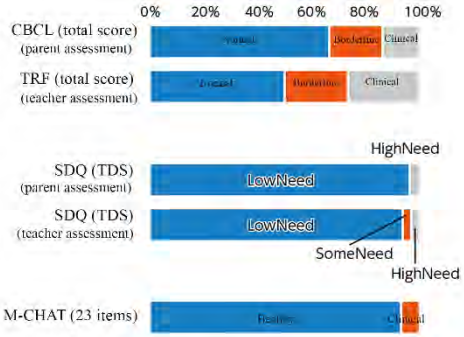

Figure 4. Results of child questionnaires

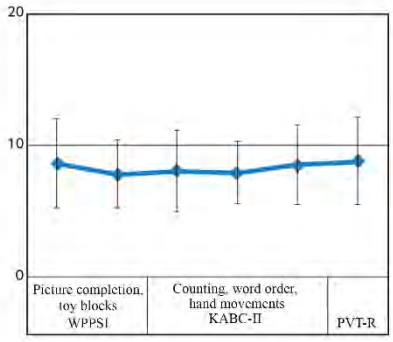

Figure 5. Results of child development tests (assessment score)

(3) Results of the caregivers

It was primarily the mothers who responded to the questionnaires and participated in the interviews, but the fathers of two families responded.

① Questionnaire results (Figure 6)

We used the Kessler Psychological Distress Scale (K6)[7] to screen general mental health, the Beck Depression Inventory-Second Edition (BDI-II)[8] to assess depression, and the Impact of Event Scale-Revised (IES-R)[9] to assess PTSD. The results showed seven persons (23.3%) in the K6 clinical group (cut-off point at 13 points), three persons (10.0%) suffering from light depressive symptoms and three persons (10.0%) suffering from intermediate depressive symptoms according to the BDI-II, and three persons (10.0%) in the IES-R clinical group (cut-off point at 23 points).

② Interview results (Table 2)

The assessment using the Mini-International Neuropsychiatric Interviews (MINI) showed that one person had previously suffered a major depressive episode, one person a manic episode, two persons alcohol addiction, and two persons alcohol overconsumption, and one person was deemed to suffer from generalized anxiety disorder. Moreover, two persons were deemed to have light suicide risk.

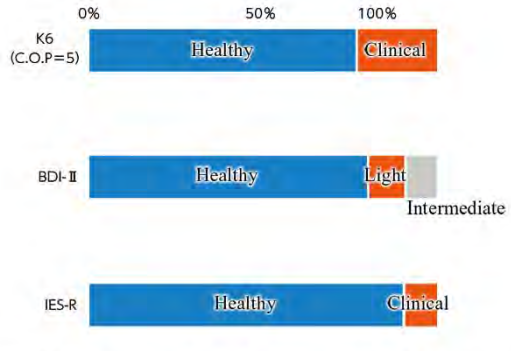

Figure 6. Questionnaire results for guardian mental health

Table 2 clinical diagnoses by MINI (overlap)

Major depressive episode (past)	1 person
Manic episode (past)	1 person
Suicide risk (light)	2 persons
Alcohol addiction	1 person
Alcohol addiction + generalized anxiety disorder	1 person
Alcohol overconsumption	2 persons

(4) Children requiring follow-up

Based on a comprehensive assessment of the baseline survey, we set criteria for high-risk children (families) using the questionnaire and interview results, by which criteria 11 families were deemed to require follow-up. We provided individual consultations with a child psychiatrist and case meetings at the nursery. We also provided support for guardians if we deemed it necessary and helped connect them with help organizations.

5. Discussion

This study involved a baseline study on the basis of obtaining consent and registering 30 families living in City A, Miyagi Prefecture, which allowed us to build a foundation for a continuous long-term longitudinal survey. The baseline survey yielded criteria for families requiring follow-up based on a comprehensive assessment of questionnaires and interviews. This resulted in 11 families requiring follow-up. Furthermore, this survey was part of a larger survey across three prefectures and surveys were also conducted in parallel in three other cities in Miyagi Prefecture, but the results of those surveys are not included in this report, as they were not available at the time of writing.

We conducted a cognitive function assessment of the children, consisting of a behavioral assessment using questionnaires and psychological tests. The behavioral assessment showed that 33.3% of the children were either borderline or in the clinical range according to the guardians' CBCL assessment, and this figure reached 50.0% according to the teachers' TRF assessment, which is a high proportion. The proportion of children requiring some form of support according to SDQ was 6.7% and thus not high. At the same time, the child development assessment showed no major difference from the general population. Since this study only involved 30 persons, it is difficult to verify that there were statistically significant differences, but it suggests that attention should be paid to the children's behavior overall.

With regard to the guardians, the BDI-II showed that 10.0% had intermediate depressive symptoms and IES-R that 10.0% were in the clinical range, while there were also guardians who fulfilled the MINI clinical

diagnosis. Again, despite the small sample, the results suggest that there is a need for comprehensive support that includes not only children but also guardians, as there are many in need of consideration.

This study suggested the possibility that prolonged stressful life after a disaster can have an effect on the development of children born after the disaster. The plan is to continue regular longitudinal surveys from next year to understand the reality and changes of children's and guardians' mental health in the aftermath of disaster lifestyle and the Great East Japan Earthquake as well as keeping up comprehensive interventions for families requiring follow-up.

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