

## **Longitudinal Study of Support for children Born after the Disaster : Report on baseline survey results in Miyagi Prefecture**

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### **1. Background**

In the emotional development of a child, the environment in which the child grows is important, including the connection between the mother and child during infancy. Previous research has shown that trauma suffered during childhood can affect a child's mental and physical development.<sup>1),2)</sup> After the 2011 Great East Japan Earthquake, several studies tracked children who had directly experienced the disaster, and results similar to those of previous studies were reported<sup>3)</sup>. On the other hand, as we developed regional support, we received requests from more than a few children who were born after the disaster and did not directly experience it. Childcare providers and administrative personnel in the affected areas conveyed the impression that children born after the disaster are “restless” or “do not fit into group activities,” and we are finding increasing opportunities to offer consultation to these children. This trend is most noticeable in coastal areas that have taken a long time to recover from earthquake damage. Support for these comments is still insufficient. There have been no studies involving child development after a large-scale natural disaster or the psychological evaluation of parents, and long-term longitudinal intervention studies on children and their families have not been obtained. There is also no clear understanding of what type of support should be developed.

From this background, we identified a need for long-term tracking of children who were born after the earthquake and embarked on this study. The results of this research are a part of the “Longitudinal support research for children and their families born after the Great East Japan Earthquake,” which is being conducted in collaboration with Iwate Child Care Center at Iwate Medical University and the Children's Mental Health Support Project Promotion Office at Fukushima University. This is a study that has compiled results only for Miyagi Prefecture. The survey began in October 2015, and the plan is to follow all subjects until the completion of their compulsory education at the age of 15 (until March 2027). To observe changes over time, the survey will be conducted for the first three of the twelve years, and every other year thereafter for the duration of the study.

### **2. Purpose**

This research was conducted for the purpose of assessing the physical and mental health of children born after the earthquake in Miyagi Prefecture—where the damage was great—and of providing long-term support to households in high-risk conditions.

### **3. Method**

#### **(1) Target subjects**

As of April 2016, we focused our study on households that had given their consent to participate in this research, with the cooperation of preschools in four municipalities in Miyagi Prefecture, children in their four-year-old classes, and their parents and caregivers. These children were born between April 2011 and March 2012, after the Great East Japan Earthquake. Children who moved from other areas to the disaster area more than two years after the earthquake and were enrolled in preschools were excluded from the study.

(2) Procedures for the investigation

Through the departments in charge of the four municipalities, we explained the project purpose and cooperated with the directors of daycare centers and preschools. In cases where consent was obtained, survey documents and consent forms were distributed to the families of the appropriate class, and survey collaborators were recruited. At the time, we explained that participation in the study was optional and that withdrawal of consent was possible at any time.

(3) Duration of study

We conducted a pilot survey of two preschools in February and March 2016 to confirm whether there were any problems in proceeding with the study. After that, a survey was conducted from July to September 2016, the recruitment period, and then we proceeded to conduct the study at the schools that had agreed to participate.

(4) The questionnaire and interview surveys were conducted with parents and children from whom we had obtained consent, and a questionnaire survey was conducted with the relevant childcare providers (Table 1). Although various tests were carried out, the results not shown in Table 1 because it is not directly related to the survey report. On the day of the survey, parents and children came to the preschool, and we conducted cognitive development tests for each child, and structured interviews with their parents. After the survey, all children’s results were reported back to the preschools, and we provided individual feedback to each household. We conducted individual consultations with families for whom we judged support was needed, connected them to the necessary support agencies, and held case conferences at the preschools.

(5) Ethical considerations

This research was approved by the ethics committee of the Iwate Medical University School of Medicine and Fukushima University, and care was taken to ensure that the personal information of participants was protected.

This study was approved by the ethics committee of the Iwate Medical University School of Medicine and Fukushima University, and it was conducted in consideration of the issue of the sufficient protection of personal information.

Table 1. Survey contents

		Answers from parents	<ul style="list-style-type: none"> <li>• Children’s problem behavior: SDQ</li> <li>• Children’s problem behavior: CBCL</li> <li>• Autism Checklist: M-CHAT, Japanese version</li> </ul>
Questionnaire survey	Concerning children	Answers from child care providers	<ul style="list-style-type: none"> <li>• Children’s problem behavior: SDQ</li> <li>• Children’s problem behavior: TRF</li> </ul>
	Concerning parents themselves	<ul style="list-style-type: none"> <li>• Lifestyle habits, living conditions, economic conditions, disaster conditions</li> <li>• Social relations (social capital, social networks, social support)</li> <li>• PTSD : IES-R</li> <li>• Mental health: K6, BDI-II BDI- II</li> </ul>	
Interview survey	Children	WPPSI	<ul style="list-style-type: none"> <li>• Completion of pictures</li> <li>• Toy blocks</li> </ul>
		KABC- II	<ul style="list-style-type: none"> <li>• Number of recitations</li> <li>• Language arrangement</li> <li>• Completion of pictures</li> </ul>
	Parents	<ul style="list-style-type: none"> <li>• Language development: PVT-R</li> <li>• Mini-International Neuropsychiatric Interview</li> </ul>	

4. Results

(1) Basic attributes of target households

We requested cooperation from 28 preschools in four cities and towns and were able to obtain consent from 18 locations. We asked the families of 353 students enrolled in these preschools for their

cooperation with the survey and were able to obtain consent for 74 children (39 boys, 35 girls, consent rate 20.9%). Four of them who had some missing data were excluded, and 70 subjects were analyzed. No data concerning parents was lost, and 73 subjects were analyzed (one family had twins). The average age in months of the children at the time of the interview survey was 59.1 months (6.4 SD), and the average age of parents was 36.2 years (5.1 SD). Additionally, 25 of the parents (33.8%) were women who were pregnant with a child at the time of the disaster.

The family casualty situation was 70% for families who suffered slight to serious harm because of the earthquake/tsunami (Table 2); 29% for those who lost family members or relatives; and 4% for those who had family members they lived with die or be listed as missing.

Table 2 Situation of affected households (parents) (n = 73)

Item	Number of events items	(Number of events/total number)
Extent of housing damage (slight to serious)	51	70%
Deceased family members or relatives	21	29%
Deaths and missing persons in families living together	3	4%
People with acquaintances who have died	31	42%
Injured persons who were ignored or not helped	6	8%
Loss of property (slight to serious)	34	47%
Psychological and physical damage (slight to serious)	63	86%
Experience of dwelling in a shelter	10	14%
Experience of dwelling in temporary housing	12	16%
Experience of evacuation to someone else's home	35	48%
Family has lived in different places	22	30%

(2) Concerning children

① Results of questionnaire survey (Figure 1)

a. CBCL/TRF

Child Behavior Checklist (CBCL) 4 is a widely used evaluation scale for measuring problem behavior in children. Parents fill out the evaluation, which consists of 100 questions. The child checklist (Teacher's Report Form, hereafter referred to as TRF) is an evaluation scale that the teacher (preschool teacher) fills out using the same criteria as CBCL. These two evaluations are combined and then classified into "normal range," "borderline range," and "clinical range" in total scores and subscales. In this survey, 10 (14.3%) total CBCL scores by parents were "borderline," and 9 (12.9%) were "clinical." On the other hand, 17 (24.3%) of the TRF total scores submitted by preschool teachers were "borderline," while 24 (34.3%) were "clinical."

b. SDQ

The child's Strengths and Difficulties Questionnaire (hereafter SDQ) <sup>5)</sup> is an evaluation scale for screening children's behavioral problems such as the CBCL. Scores for the 25-item questionnaire, which is answered by parents and caregivers, are categorized as "low need," "some need," or "high need" for combined total scores and subscales. In this study, the total score based on parents' responses was 2 children with "some need" (2.9%) and 1 with "high need" (1.4%). According to evaluations completed by childcare providers, there were 2 children with "some need" (2.9%) and 6 with "high need" (8.6%).

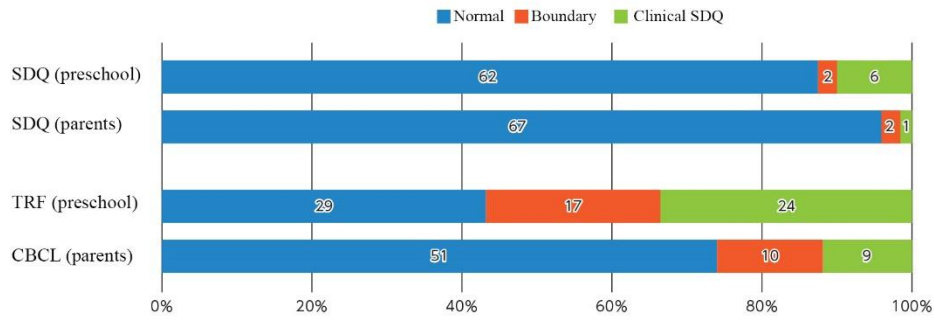


Fig. 1. Score results for CBCL and SDQ

c. M-CHAT

Infant Autism Checklist (Modified Checklist for Autism in Toddlers; hereafter M-CHAT) <sup>6)</sup> is an evaluation tool developed for the purpose of screening autism spectrum disorders. A parent is asked to fill out a 23-item questionnaire. Total scores are classified as “healthy range” and “clinical range.” In this study, nine (14.3%) M-CHAT surveys completed by parents resulted in an identification of “clinical range.”

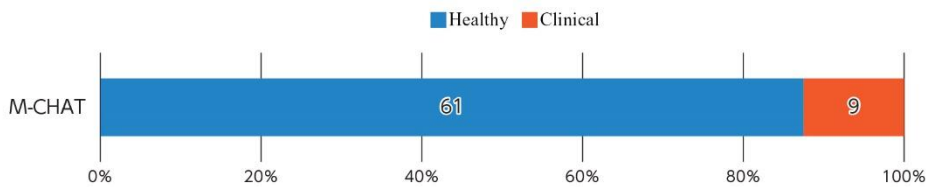


Fig. 2. M-CHAT Score results

② Results of cognitive developmental tests (Fig. 3)

The Wechsler Preschool and Primary Infant Intelligence Test (WPPSI) is a 10-item intelligence test for infants that can evaluate their language and motor abilities. The Kaufman Assessment Battery for Children (K-ABC) is a 14-item intelligence test for infants that evaluates their intellectual activity and is characterized also by its usefulness in teaching.

The Picture Vocabulary Test-Revised (PVT-R) measures the child’s verbal development by having the child select the most appropriate of four pictures. For this survey, the “picture completion” and “blocks” segments from the WPPSI and the “number recitation,” “word sequence,” and “hand movement” segments of the K-ABC II were extracted; the PVT-R was conducted as usual.

All test results were converted from approximate points to evaluation points, calculating the aggregate with average 10 and standard deviation ± 3. Each evaluation point was assessed as follows: painting completion 8.70 (3.13 SD), blocks 8.94 (3.40 SD), number recitation 9.06 (3.31 SD), word sequence 8.27 (2.70 SD), hand movements 8.19 (3.18 SD), and painting and verbal examination 9.20 (3.40 SD). The evaluation point average for each test was within the range of average to below-average. Differences among test items were not observed.

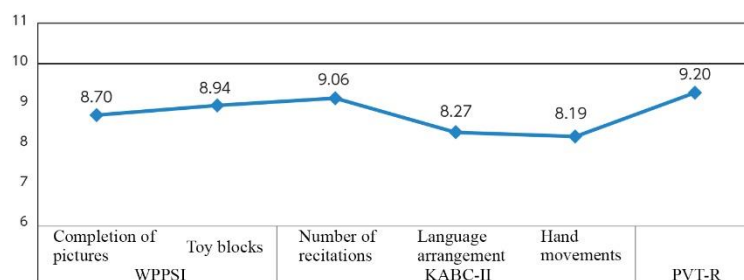


Fig. 3. Children's developmental tests

(3) Concerning parents

In principle, the answers to questions and the interview survey for parents were intended for mothers, but in four families, the father was the person who cooperated with this study.

① Results of questionnaire survey (Fig. 4)

The Kessler Psychological Distress Scale (K6)<sup>7)</sup> was developed as a tool for screening overall mental health, a simple scale consisting of six items, with the cutoff point for the total score being 13 points; scores are classified as belonging to the “healthy group” or the “clinical group.” The Beck Depression Inventory-Second Edition (BDI-II)<sup>8)</sup> is a measure developed to screen for and evaluate the extent of depression; it consists of 21 questions, and total scores are classified as “very mild,” “mild,” “moderate,” or “severe.”

The Impact of Event Scale-Revised (IES-R)<sup>9)</sup> is a measure for evaluating the symptoms associated with PTSD screening and trauma; the cutoff point for the total score is 23 points, and scores are classified into a “healthy group” and “clinical group.” In this survey, parents were asked to fill out their respective evaluation scales. The K6 “clinical group” had 22 people (30%); the BDI-II “moderate” group had 5 people (7%), and the “severe” group had 3 people (3%); and the IES-R “clinical group” had 9 people (12%).

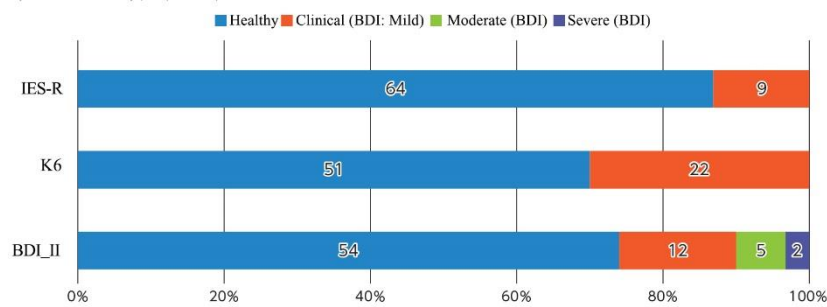


Fig. 4. Results of questionnaire on parents' mental health

② Results of interview survey (Table 3)

The Multi-International Neuropsychiatric Interview (M.I.N.I.)<sup>10)</sup> is a simple structured interview method developed to diagnose mental illness; it is meant to be administered without any changes at all in advance to question items or their order. This tool can evaluate the risk of mental illness and suicide without being affected by the bias of the interviewer. In this study, M.I.N.I. was administered to parents, and some mental illness was detected in 20 people (27%). The breakdown of the diagnoses is shown in the table below.

Fig.3: Parents' clinical diagnosis based on M.I.N.I.

Diagnosis name	Number of people
Major depressive episode (past)	1
Major depressive episode (present)	2
Major depressive episode with melancholic-type features	1
Hypomanic episode (past)	4
Hypomanic episode (present)	1
Manic episode (past)	2
Suicide risk (mild)	4
Suicide risk (moderate)	1
Suicide risk (high)	1
Alcoholism	3
Alcohol abuse	2
Agoraphobia	1
Generalized anxiety disorder	1
Dysthymia	1
Panic disorder (present)	1
Total	26
Number of persons	20
Percentage of clinical group (number of people / n for each municipality)	27%

#### (4) Selection and follow-up for families that need support

Based on a comprehensive assessment of the survey, including the questionnaire survey results and the results of the interview survey, criteria were set for families that required support. The following four items were presented, and it was determined that a family required support when two or more corresponded to a family's situation.

- ① Three or more of the six evaluation points in the cognitive development test for children are present.
- ② In the TRF and CBCL administered to parents, more than one clinical area is identified.
- ③ A categorization of the child being in the "clinical" range according to the M.I.N.I. administered to parents.
- ④ A categorization of "high need" according to the SDQ administered to the child care provider; the M-CHAT administered to parents has the result of "clinical range"; the K6 or IES-R administered to parents has the result of "clinical range"; and the BDI-II administered to parents has a result of "medium" or "severe."

According to these criteria, 15 families were assessed as requiring support, and personal consultations with a child psychiatrist and case meetings in preschools were convened. We also provided support to parents in families that had been assessed as needing support and encouraged them to connect with an institution that could provide the appropriate consultation.

## 5. Discussion

This report is the result of analyzing only Miyagi Prefecture among the three prefectures participating in the Joint Health Survey. In the first year of the overall 12-year plan, after obtaining the agreement and registration of 74 families residing in four cities in Miyagi Prefecture, we were able to form the basis for a long-term longitudinal investigation. We set the required support criteria based on a comprehensive evaluation by means of questionnaire and interview surveys of children and parents, and we sought to provide immediate assistance when it was needed. In the evaluation of children, behavioral aspects were assessed by means of a questionnaire, and cognitive development was assessed based on psychological tests. In the behavioral evaluation, children who were judged to need some kind of support constituted 14.3% in the CBCL based on parental evaluation, and 24.3% in the TRF based on evaluation by childcare providers.

When a similar questionnaire was administered to the general population, the proportion of support required for children in this study was high because it constituted about 10% of the required support. On the other hand, children who were judged to require some kind of support according to the SDQ constituted

4.3% based on parental evaluations and 11.5% based on evaluations by preschools, and neither was a high ratio compared with the general population.

In the evaluation of cognitive development of children, the results were less than one standard deviation from the average value in all test items. Although it is difficult to verify whether there was a statistically significant difference in this research report, given that the number of subjects was only 74, the results suggest that it is necessary to carefully observe the progress of children's cognitive development. Parental evaluations were assessed through questionnaires, and psychiatric diagnosis was performed through structured interviews. Parents with a moderate or higher depressive state according to the BDI-II constituted 10%; parents with some trauma-related symptoms according to the IES-R constituted 12%; and parents with moderate or greater psychiatric symptoms according to the K6 were 30%.

All these are high percentages when compared with those of the same questionnaire administered to the general population. Additionally, parents who meet the criteria for clinical diagnosis on the M.I.N.I. reached 27%. As a result of these outcomes, it is clear that the mental health of parents living in disaster areas has been challenged even six years after the disaster, and the need for comprehensive support, not only for children but also for parents, has been reconfirmed. There are, however, some limits to this study.

First, it is difficult for the subjects of this research to serve as a group representing the region because the consent rate of families whose cooperation was requested was 20%. Because of the uneasiness that persists in these children and families, there was little possibility of their agreeing to the study and requesting support. Next, because the study is based on a one-time questionnaire and a single interview, it is not possible to confirm the status of children and parents only by using the information obtained. Finally, because this study did not establish a control group of children in a nonaffected area with which to compare this group, we could not conduct research on whether the subjects of this study are in a difficult situation compared to those in nonaffected areas.

In this study, we suggest that living in stressful circumstances for a prolonged period after an earthquake may be influencing the development of children born after the earthquake. Periodic longitudinal surveys have been conducted since the year after the disaster, and we plan to continue to work toward understanding and changing the circumstances of children and guardians in the wake of the Great East Japan Earthquake, and to continue to carry out interventions for families participating in the study.

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