

Study of Longitudinal Support of Children Born after the Great East Japan Earthquake and their Families

— A Comparison of FY 2016 and FY 2017 —

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1. Background

The environment in which a child is raised is an important determinant of its emotional development—this includes the connection between mother and child during infancy. Previous research has shown that trauma suffered during childhood can affect a child’s mental and physical development.^{1,2} After the Great East Japan Earthquake of 2011, several studies tracked children who had experienced the disaster first-hand and results similar to those of previous studies were reported.³ On the other hand, as we developed regional support networks, we received requests from more than a few children who were born after the disaster and did not directly experience it. There have been no studies involving child development after a large-scale natural disaster or a psychological evaluation of parents, and long-term longitudinal intervention studies on children and their families have not been conducted. There is also no clear understanding of what type of support is required. Against this backdrop, in FY 2016, we started the Michinoku Children’s Cohort, just after the Great East Japan Earthquake Study⁴ (the MiCCa JEJE Study). This initiative aims to follow children born after the disaster and their parents and guardians over the long-term, to monitor their mental and physical health, and provide them with long-lasting support.

In FY 2017, we reported the baseline survey results of the MiCCa JEJE Study in “Miyagi Disaster Mental Health Care Center Bulletin, Issue 6.” In this chapter, we will report our progress in the second year of the project and compare both sets of data points. The results of this research are a part of the “Study of Longitudinal Support for Children Born After the Disaster” project, which is being conducted in collaboration with the Iwate Child Care Center at Iwate Medical University and the Children’s Mental Health Support Project Promotion Office at Fukushima University. This manuscript contains only results from Miyagi Prefecture.

2. Purpose

This research was conducted to assess the physical and mental health of children born after the disaster in four municipalities of Miyagi Prefecture significantly damaged by it, as well as providing long-term support to high-risk households in high-risk conditions.

3. Methods

(1) Target subjects

In FY 2016, we requested families living in four municipalities of Miyagi Prefecture with children born after the disaster (between April 2011 and March 2012) to participate in our survey, and we received consent from 74 families. After conducting our second-year follow-up survey, we analyzed 69 families’ data; two families withdrew their consent, and three did not provide consent for this year.

(2) Survey procedures

Using the consent obtained in FY 2016, we contacted parents and guardians, explained to them the nature and function of our second-year survey, and confirmed their desire to continue to be a part of this study. We also explained the nature and function of our second-year survey to our target nursery schools. After obtaining the consent of all necessary parties, we implemented our survey.

(3) Survey period

The survey was conducted from August to December 2017 among the 69 families from whom we obtained consent to participate in the second-year survey.

(4) Survey methods and feedback

Questionnaires 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). 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 nursery schools, 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 nursery schools.

(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.

Table 1: FY 2017 Survey Details

		Questionnaire survey
Questionnaire survey	Children	<ul style="list-style-type: none"> - Lifestyle habits, living conditions, economic conditions, disaster conditions (Strengths and Difficulties Questionnaire, SDQ), - (Child Behavior Checklist, CBCL) - Child strengths and weaknesses: Strengths and Difficulties Questionnaire, SDQ
	Answers from childcare providers	<ul style="list-style-type: none"> Difficulties Questionnaire, SDQ) Child behavioral issues: Child Behavior Checklist, for Teachers (Teacher's Rating Form, TRF)
		<ul style="list-style-type: none"> - Lifestyle habits, living conditions, economic condition - Social relations (social capital, social networks, social support) - PTSD and other trauma disorders: Impact of Event Scale-Revised (IES-R) - PTSD and other trauma disorders: Kessler Psychological Distress Scale (K6) - Depressive symptoms: Beck Depression Inventory-Second edition (BDI-II)
Questionnaire survey	Children	<ul style="list-style-type: none"> • Evaluation of cognitive function: Wechsler Intelligence Scale for Children, Fourth Edition, WISC-IV)
	Parents	<ul style="list-style-type: none"> • Medical interview regarding any general worries

4. Results

(1) Basic attributes of target households

The attributes of the 69 children (35 boys, 34 girls) for whom we obtained consent are listed in Table 2. As of the date of their interview survey, the average age of these children was 71.2 months (SD = 4.1), and the average age of their parents/guardians was 36.1 years (5.0 = SD). 45 (65%) of the parents of the surveyed children were pregnant with or expecting these children at the time of the disaster. In terms of disaster effects, 50 (72%) of these families experienced some level of disaster damage: 20 (29%) of them lost family members or relatives, and three of them (4%) lost family members that were living with them.

Table 2. Effects of the Disaster on Target Households (Parents) (N=69)

Item	Cases	%
Extent of housing damage (slight – serious)	50	72%
Lost family members or relatives	20	29%
Lived with deceased or missing family	3	4%
Lost acquaintances	31	45%
Were unable to help injured individuals	6	9%
Lost property (slight-serious)	32	46%
Suffered physical or psychological harm (slight-serious)	62	90%
Lived in an evacuation shelter	8	12%
Lived in temporary housing	10	14%
Evacuated to and residing in someone else’s home	34	49%
The family lived separately for some time	19	28%

(2) Concerning children

① Questionnaire survey results (Figure 1)

a. CBCL/TRF

The 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 Teacher’s Report Form (hereafter referred to as TRF), is an evaluation scale that the nursery school 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 the FY 2017 survey, 6 parents (8.6%) scored in the “borderline range” and 4 (5.7%) in the “clinical range.” On the other hand, in terms of TRF scores, submitted by nursery school teachers, 15 (21.4%) scored in the “borderline range,” and 22 (31.4%) in the “clinical range.”

Further, the mean total CBCL score for parents in FY 2016 was 53.5 (8.58 = SD), compared to 52.0 (8.72 = SD) in FY 2017. The means that the total TRF score (reported by nursery school teachers) in FY 2016 was 61.3 (6.01 = SD), compared to 59.7(6.32 = SD) in FY 2017. These values were compared using t-tests, and while no significant difference was found between CBCL scores ($t(69) = 2.00, p = .05, p < 0.05$), a significant difference was found between TRF scores ($t(68) = 2.22, p = .03, p < 0.05$).

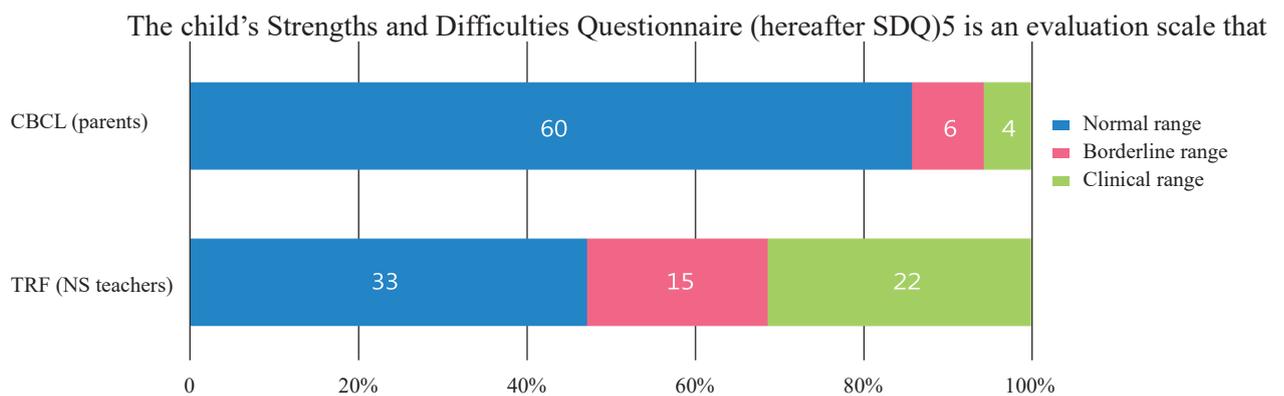


Figure 1: FY 2017 CBCL/TRF scores

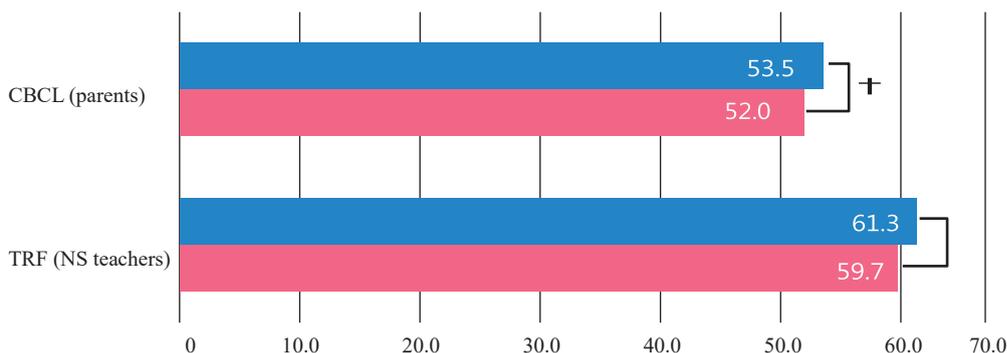


Figure 2: Comparison of CBCL & TRF scores in FY 2016 and FY 2017

screens children’s behavioral problems in much the same way 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 the FY 2017 survey, 5 parents (7.1%) scored their children in the “some need” range, and 1 (1.4%) scored in the “high need” range. When scored by nursery school teachers, 4 children (5.7%) were in the “some need” range, and 3 (4.3%) were in the “high need” range.

Further, the mean parent SDQ score in FY 2016 was 7.39 (3.78 = SD), compared to 7.41 (3.99 = SD) in FY 2017. The mean nursery school teacher SDQ score in FY 2016 was 7.59 (5.47 = SD), compared to 7.41 (5.08 = SD) in FY 2017. These values were comparing using t-tests, and no significant differences were observed for parent-scored ($t(69) = 0.74, p = .94, p < 0.05$), and nursery school teacher-scored ($t(69) = 0.38, p = .71, p < 0.05$) SDQ values.

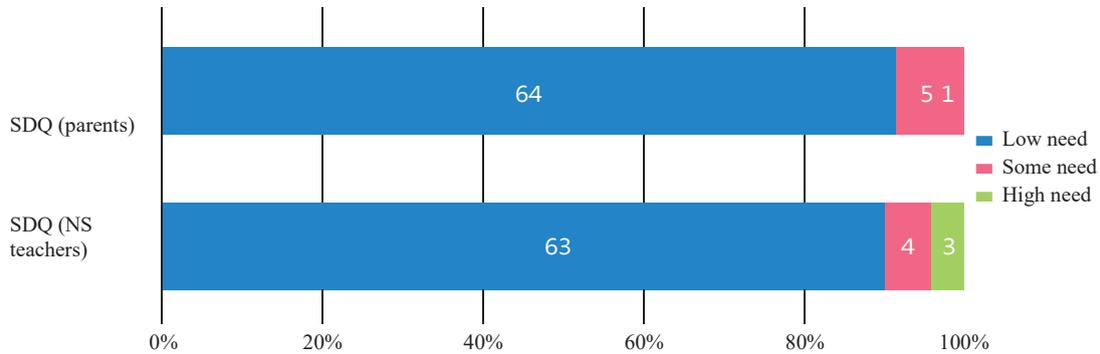


Figure 3: FY 2017 SDQ scores

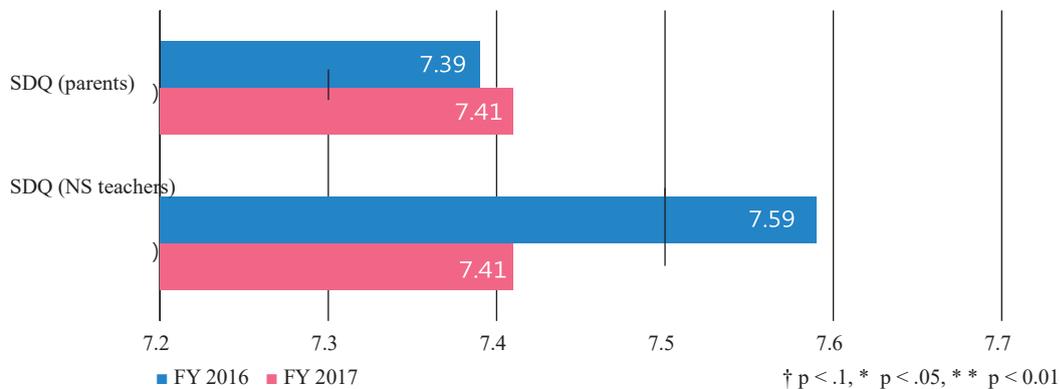


Figure 4: FY 2016 and FY 2017 SDQ Scores

② Results of cognitive development tests (Figure 5)

The Wechsler Intelligence Scale for Children, Fourth Edition⁸ (WISC-IV) is a test of cognitive function that can be administered to children between the ages of 5 years 0 months and 16 years 11 months. It comprises 15 subscales (10 basic tests, 5 supplementary tests) which yield 5 composite scores (1 full-scale IQ measurement and 5 index scores).

In this study, we attempted to administer the WISC-IV to all cases, but if, for some reason, we were unable to do so, we used Tanaka-Binet⁹ as a replacement test. Means for the various scores and indexes of the WISC-IV are as follows: full-scale IQ (FSIQ) = 95.93, Verbal Comprehension Index (VCI) = 97.54, Perceptual Reasoning Index (PRI) = 96.03, Working Memory Index (WMI) = 89.43, Processing Speed Index (PSI) = 97.85. We excluded the scores of the three children that took the Tanaka-Binet test due to high variability in their results.

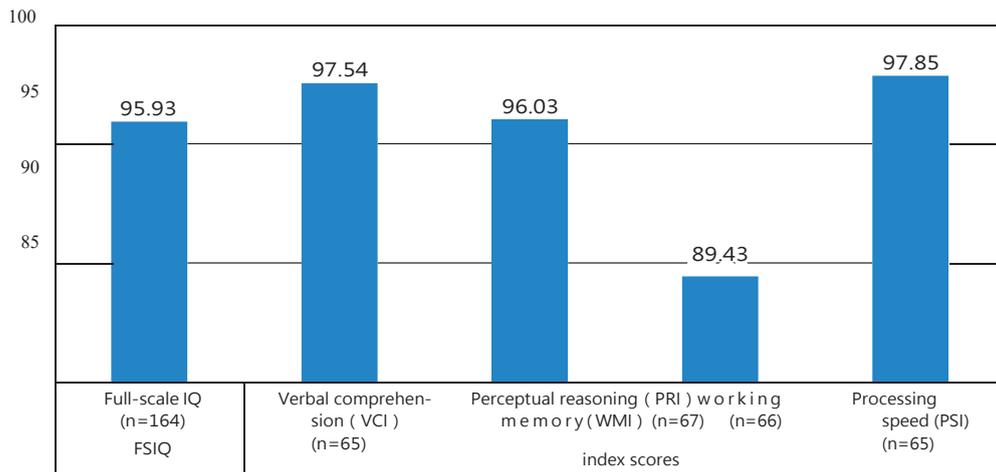


Figure 5. Cognitive Development Test Results

(3) Parent questionnaire results (Figures 6, 7)

Generally, mothers were asked to fill out questionnaires and attend survey interviews, but for three families, it was the fathers who participated instead. In FY 2017, we did not hold structured interviews, and instead used questionnaires.

The Kessler Psychological Distress Scale (K6)¹⁰ 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)¹¹ 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,” with the cutoff for the first two ranges at 21 points, and the last two at 31 points. The Impact of Event Scale-Revised (IES-R)¹² 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 as belonging to a “healthy group” and a “clinical group.”

As part of the FY 2017 study, we had the parents and guardians of each child complete the evaluations listed above. Twenty-four parents (34.8%) were in the K6 “clinical group;” 5 (7.2%) were in the BDI-II “moderate” range; 1 (1.4%) was in the “severe” range, and 4 (5.8%) were in the IES-R “clinical group.”

The means for each of these metrics in FY 2016 and FY 2017 were as follows, respectively: K6: 3.42 (3.15 = SD) and 3.43 (3.03 = SD); BDI- II: 10.7 (7.07 = SD) and 9.75 (6.90 = SD); IES-R: 11.0 (12.2 = SD) and 8.30 (10.6 = SD). Scores from both years for each metric were compared with one another using t-tests. Statistically significant differences were observed for the IES-R scores only ($t(68) = 2.95, p = .04, p < 0.05$), and not for the K6 ($t(68) = 0.04, p = .97, p < 0.05$) or the BDI- II ($t(68) = 1.27, p = .21, p < 0.05$) scores.

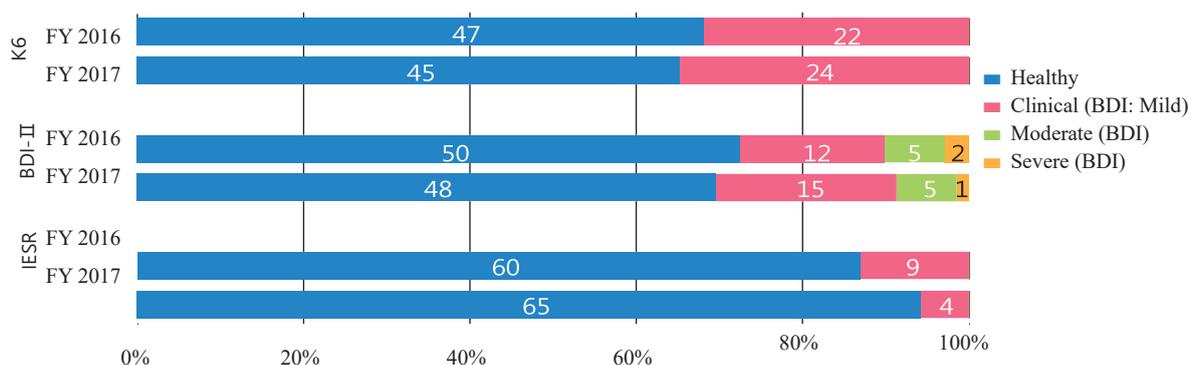


Figure 6. Parent Mental Health Questionnaire Results

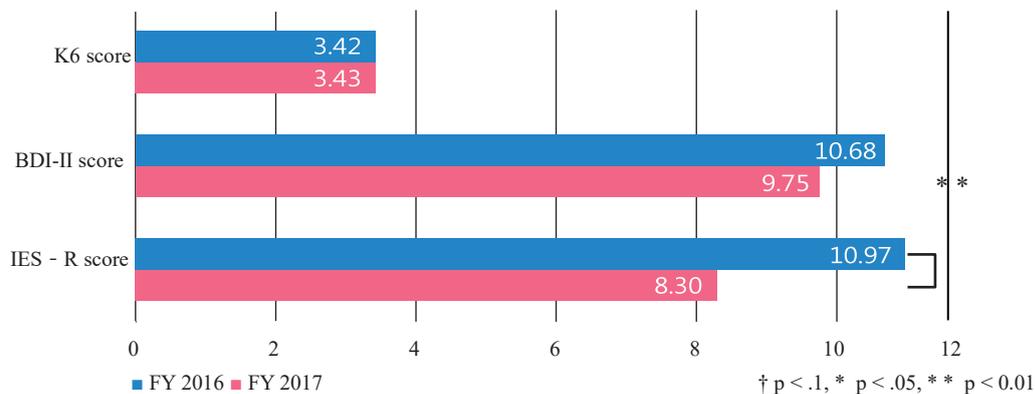


Figure 7. Comparison of FY 2016 and FY 2017 Scores for K6, BDI- II, and IES-R

(4) Flagging and follow-up for families needing support

Based on a comprehensive assessment of the survey, including the survey questionnaire results, and the results of the survey interview, the criteria (outlined below) were formulated for families that required support. The following four items were presented, and a family was flagged as requiring support if they met any one criterion.

- ① A WISC-IV FSIQ of 75 or lower for their child, or a significant bias or lopsidedness in their child’s five index scores
- ② A parent K6 or IES-R score in the “clinical range,” or a parent BDI- II score in the “moderate” range or higher

These criteria flagged 15 families as requiring support. We arranged individual counseling with child psychiatrists and case study conferences in nursery schools for these families. We also provided support to the parents of these families as needed, and we worked to connect them to counseling organizations. As a result, three children were referred to specialized medical institutions.

5. Discussion

The research results outlined above are a part of the “Study of Longitudinal Support for Children Born After the Disaster” project, which is being conducted in collaboration with the Iwate Child Care Center at Iwate Medical University and the Children’s Mental Health Support Project Promotion Office at Fukushima University. They contain results from Miyagi Prefecture only. We are in year two of the 12 years that this project is slated to run. After obtaining participation consent from 70 families in four municipalities in Miyagi Prefecture, we used holistic, comprehensive evaluations based on the results of questionnaires, and interviews conducted with the children and parents of these families, to determine criteria for flagging individuals requiring support; we then proceeded to provide immediate support to the individuals we had identified.

When evaluating the children, behavioral aspects were assessed using a questionnaire, and cognitive development was assessed based on psychological tests. For the CBCL/TRF and the SDQ, all behavioral measures, the percentage of “needs support” children were higher here than they were in the general population. This suggests that even though seven years have passed since the disaster, the children we targeted here still have behavioral issues, at least to some degree. When we compared the means of each of the two years that this study has been running, we only observed a statistically significant improvement for nursery teacher-reported TRF scores. Statistically, significant improvements were not observed for the other three metrics (parent-reported CBCL, parent-reported SDQ, and nursery teacher-reported SDQ). We cannot therefore conclude that child behavioral issues have improved over the last two years. In our evaluation of child cognitive development using the WISC-IV, results lower than the prescribed benchmark were only observed in the case of the Working Memory Index (WMI). Because our sample size is limited to 70 individuals, a rather small number, it is difficult for us to demonstrate statistical significance. Nevertheless, we must carefully monitor changes in the cognitive development of these children.

In our evaluations of parents, we only utilized questionnaire-based measurements of psychiatric symptoms. The percentage of parents flagged as “needs support” by their results on the K6, BDI- II and IES-R tests was higher than it was among the general population. Upon comparing the metrics and their respective means across the two years that this study has been running, a statistically significant improvement was observed only for IES-R scores. No significant changes were observed for other metrics. Based on these results, we see that even now, seven years later, parents who live in disaster-affected regions are burdened with mental health issues, clearly indicating a need for comprehensive support efforts that cater to parents as well as to children. The

improvements we have observed in IES-R scores, however, indicate that even in the absence of targeted support, trauma-related symptoms may simply improve with time.

This research effort has several limitations. First, because we were only able to achieve a household consent rate of 20%, the representativity of our sample size cannot be guaranteed. It is quite possible that those who consented to support were already aware of some level of anxiety and unease in their own lives or the lives of their children. Next, this study did not establish a control group of disaster-unaffected children. For this reason, we cannot determine whether or not the subjects studied herein are better or worse off than those living in regions that have not been affected by the disaster.

The results of this study thus far suggest that the life-arresting circumstances caused by post-disaster stress may have affected the development of children born under those conditions. In FY 2018 and beyond, we plan to conduct regular cross-sectional surveys to understand how the Great East Japan Earthquake affects both the current state of, and any prior, post-disaster changes in the mental health of children and parents in disaster-struck regions. We will also continue to provide comprehensive interventions to families flagged as needing support.

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