

Contributed Manuscripts

Source:

FY 2019 Grant-in-Aid for Scientific Research (Basic Research (B)) “Study of longitudinal support for children born after the Great East Japan Earthquake and their families” Symposium for Community Development that Supports the Raising of Children: What We Have Learned from the Michinoku Children's Cohort – Practical Report (2019)

**Symposium for Community Development that
Supports the Raising of Children:
What We Have Learned from the
Michinoku Children's Cohort**

Practical Report

Date: February 11, 2020 (Tuesday, a holiday)

Place: TKP Garden City, Sendai, Kotodai, 2F, Hall 1

Part 1: Research Report

Michinoku Child Cohort Background

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Our Results Thus Far

Naoki Matsuura
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cation, Special Support (Medical) Field

**General moderator: (Research member, Miyagi Prefecture
survey manager)**

Naru Fukuchi, Miyagi Disaster Mental Health Care Center

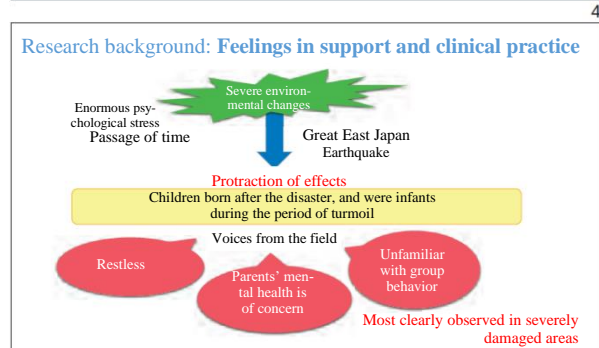
(Slide 5) Allow me to explain the background behind this situation schematically. At the site where we provide support and clinical practice, the Great East Japan Earthquake caused a drastic change in the environment, which caused a great deal of psychological stress. In situations where these effects were protracted over time, we began to hear from supporters in the field such as nursery teachers, kindergarten teachers, and public health nurses about children who were born after the earthquake. During the turmoil, infants were restless, unfamiliar with group behavior, and had parents with possible mental health issues. The supporters expressed concern about these issues. Since the earthquake, I have visited Iwate prefecture's coastal areas every week, and continue to do. I realized that the situation was precisely as described by the people in the field. We confirmed that the issues are more prominent in severely damaged areas, as we shared with Professor Masuya, who supports Fukushima, and Professor Fukuchi, who supports Miyagi.

(Slide 6) In terms of the current situation in disaster areas, Tohoku suffered from a chronic shortage of professionals. The supporters grew weary, and living in an extraordinary situation became the norm. In this way, things such as problem awareness gradually faded. What is the current situation / actual situation? We believe that developing a firm understanding of the present and advancing an appropriate support plan will help future disasters. With the idea that our first urgent task should be to investigate the actual situation, I conceptualized this study's idea.

(Slide 7) Currently we are pursuing a basic research Grant-in-Aid with a particular group (B), "Study of longitudinal support for children born after the Great East Japan Earthquake and their families." This research explores the mental health problems of children born after the Great East Japan Earthquake and their families. Our two primary goals are to closely track and investigate the long-term effects the disaster has on children's neurological development.

(Slide 8) In sum, we follow the growth and development of infants during the turmoil in the long term in selected areas of the three prefectures, and compare the situation in each prefecture. We collaborate with nursery schools and preschools to continue the necessary support. We will continue to track children until they graduate from junior high school and

Michinoku Children's Cohort study after the Great East Japan Earthquake MiCCa GEJE



Longitudinal study in 3 prefectures

Michinoku Child Cohort: the idea for the MiCCaGEJE

<http://www.miccageje.org/>

Basic Research Grant-in-Aid (B) "Study of longitudinal support for children born after the Great East Japan Earthquake and their families"

- ◆ Explore mental health problems among children born after the Great East Japan Earthquake and their families
- ◆ Investigate the long-term effects of the post-disaster period on the neurological development of children

watch and support the process of their growth and development. We are particular about continuing these efforts, including “support as needed.”

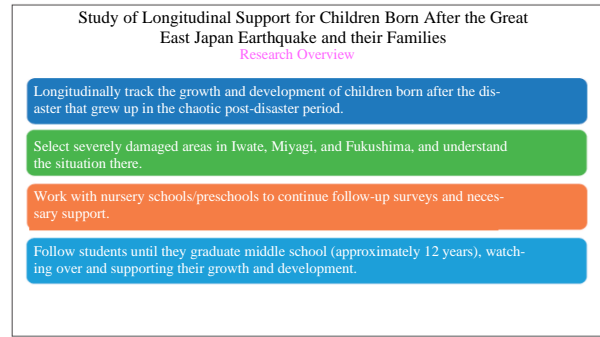
(Slide 9) I belong to Iwate Medical University, and am the principal investigator for this study. However, Iwate Prefecture's research is managed by the Iwate team. Miyagi Prefecture's research is conducted by the Miyagi team led by Professor Fukuchi. The research in Fukushima Prefecture was conducted by the Fukushima team led by Dr. Masuya. Dr. Matsuura of Mie University, who will report mainly on the data analysis results, joined the group as an analyst. The four of us have formed a research organization and have been researching with local colleagues.

(Slide 10) The significance of collecting data in this study is to be able to grasp the physical and mental conditions of children in the disaster area, to consider necessary medical care and medical care systems, and to be able to understand how children born after a significant disaster grow and develop. I thought that this would be useful for formulating effective support methods for future disasters. Further, I thought that children's psychiatrists in the three prefectures should support children with a common awareness of issues and collect data with this in mind.

(Slide 11) I will explain the flow of this research—we first mailed questionnaire forms. Subjects completed and returned them. Next, we met and interviewed parents and children and conducted psychological tests. We evaluated and returned the results to everyone. After that, the necessary support is provided to parents and children in need. This is a series of events, a discrete set.

Pilot surveys began in 2015, baseline surveys in 2016, and from the following year, annual follow-up surveys were undertaken to track the same population. From 2021, we plan to continue monitoring, but via biennial surveys.

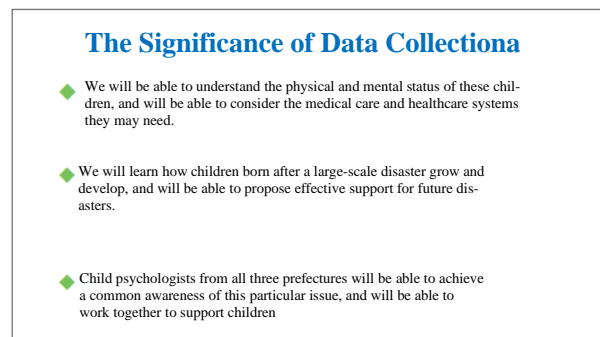
(Slide 12) In terms of our subjects, 223 pairs of parents and children from Iwate, Miyagi, and Fukushima participate in this research. Groups are broken down thus: Iwate 87 groups, Miyagi 74 groups, Fukushima 62 groups. A total of 223 groups participated in the 2016 baseline survey. From that point on, we tracked the supplement rate: how many people continued participating. The year 2018 represents admission to elementary school. Because of this, the supplement rate



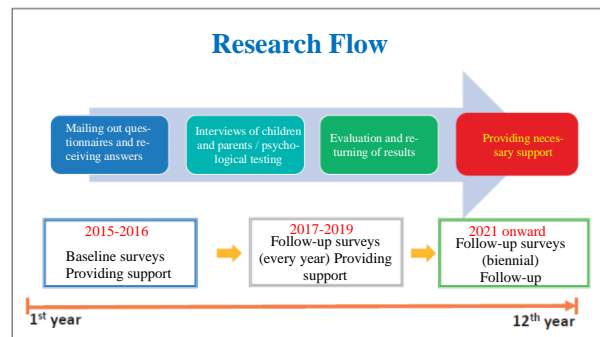
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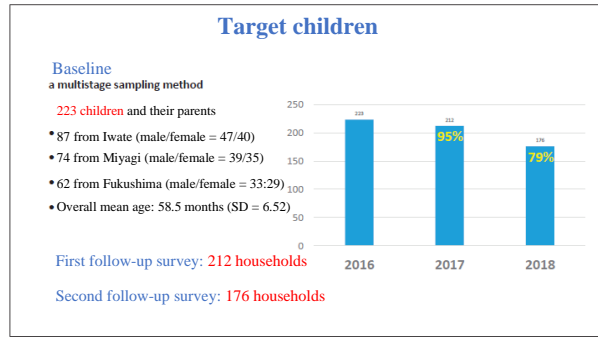
The year 2018 represents admission to elementary

ropped slightly less than 80%. Thus, about 80% of the people continued to participate. In 2019, it was almost the same; and the research is continuing with a supplement rate of about 78%.

(Slide 13) Next, I would like to share the evaluation scales or questionnaires used so far. As mentioned here, we use many standardized questionnaires and scales for evaluation. In the 2016 baseline and the second follow-up in 2018, we selected several items from the children's cognitive development and intelligence tests, such as the painting vocabulary test, WPPSI, and K-ABC II. And in the first follow-up survey in 2017, WISC-IV, an intelligence development test, was conducted on all children. A simple structured interview for psychiatric disorders called MINI was conducted with parents. A psychiatrist or psychiatrist asks questions face-to-face with the parents to check for mental illness (Slide 14). Mental problems such as those listed here can be identified through MINI.

(Slide 15) We also asked other questions to learn more about their mental health, family situation, and child development situation. (Slide 16) As shown in this photo, we rented a nursery school, and went out as a team to inspect children, listen to mothers, and provide them with advice.

(Slide 17) Next, I will discuss the kinds of intervention and support we have provided. First, we sent back results individually to all parents. I made a “feedback sheet” and gave it to everyone, saying: “The results of your child's development tests were such-and-such.” Although these were precise results and explanations, we also returned a sheet of results to each person. With the parents' permission, we gave these results to the children's nursery schools and kindergartens. We discussed with nursery schoolteachers and garden teachers how to deal with and support children who concerned us. We provided support by traveling to these sites, sharing results, and giving each other feedback. Additionally, we publish a newsletter several times a year and have launched a website that I would like you to view. Topics are published and updated frequently.



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Evaluative scales/questionnaires

Evaluation of child development characteristics (2016 baseline / 2018 second follow-up)

- Picture-vocabulary test
- WPPSI <Building blocks> <Picture completion>
- WPPSI <Building blocks> <Picture completion>
- Goodenough-Harris Drawing-a-Man Test

Child cognitive development (2017 first follow-up)

- WISC-IV (full-set)

Questionnaires, etc., for educators
Child evaluations, educator mental health, resilience, etc.

Structured interview (parents)
MINI (Simple structured interview method for mental illness)

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Structured interview

Child psychologists and clinical psychologists evaluate mental illness using a structured interview protocol known as **MINI**

<input type="checkbox"/> Major depression	<input type="checkbox"/> Post-traumatic stress disorder
<input type="checkbox"/> Dysthymia	<input type="checkbox"/> Alcohol dependence (mother only)
<input type="checkbox"/> Risk of suicide	<input type="checkbox"/> Psychotic disorder
<input type="checkbox"/> Manic episode	<input type="checkbox"/> Anorexia nervosa
<input type="checkbox"/> Panic disorder	<input type="checkbox"/> Bulimia nervosa
<input type="checkbox"/> Agoraphobia	<input type="checkbox"/> Generalized anxiety disorder
<input type="checkbox"/> Social fear	<input type="checkbox"/> Antisocial personality disorder
<input type="checkbox"/> Obsessive-compulsive disorder	

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Questionnaires, etc. for educators

Child evaluations, educator mental health, resilience, etc.

- Parental PTSD: IES-R
- Parental mental health: K6, BDI-II
- Parental social relationships (social capital, social networks, social support)
- Lifestyle, living environment, financial situation
- Happiness (WHO26)
- Post-traumatic Growth Inventory (PTGI) (Tedeschi, R.G., & Calhoun, L.G., 1996., Taku, K., Calhoun, L. G., Tedeschi, R. G., Gill-Rivas, V., Kilmer, R. P., & Cann, A., 2007)
- Parental Interpersonal Relationship Style: The Relationship Questionnaire (RQ) (Bartholomew, K., & LM (1991). Attachment styles among young adults: A test of a four-category model. Journal of Personality and Social Psychology, 61, 226-244.)
- Child's PTSD evaluation: Created based on Parent Report of the Child's Reaction To Stress (Jones, R.T., Fletcher, K., & Ribb D.R., 2002)
- Child behavior problems: SDQ (Strength and Difficulty Questionnaire, SDQ) (Goodman R, J Child Psychol Psychiatry, 1997; Matsuiishi et al, Brain Development, 2008)
- Child Behavior Checklist (CBCL) (Achenback, 1991; Toogasaki & Sakano, 1998)
- Japanese version of M-CHAT (Infant Autism Checklist)

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And for so-called high-risk children and their parents who have some concerns, as a follow-up, we have made sure to refer them to specialized agencies according to their conditions. Alternatively, we have connected them to support agencies or directly called them ourselves. In this way, we have ensured that our project is one of interventional research in which no one fails to receive support, and everyone receives some follow-up.

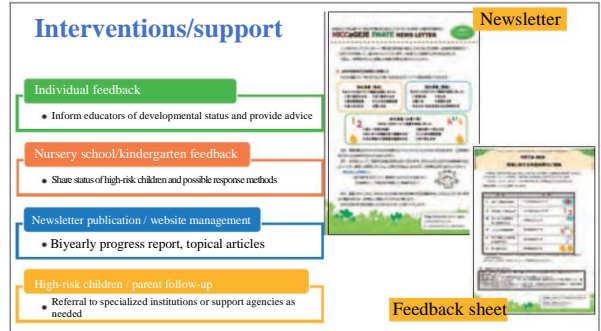
(Slide 18) This is the specific flow of our follow-up support, but it is a flow of creating a “follow-up call sheet” and deciding the level of support according to the procedure. First, we make follow-up calls to all mothers, set up individual interviews for those who wish, and for children with special needs, being sure to connect to the support and treatment mentioned earlier. That is the flow. (Slide 19) This photo is for Iwate; the sheet steps are followed to make phone calls and provide mothers with counseling as needed.

(Slide 20) From here on, I would like to briefly convey the highlights of our results. Professor Matsuura will give a more detailed supplementary explanation after this regarding the detailed analysis results.

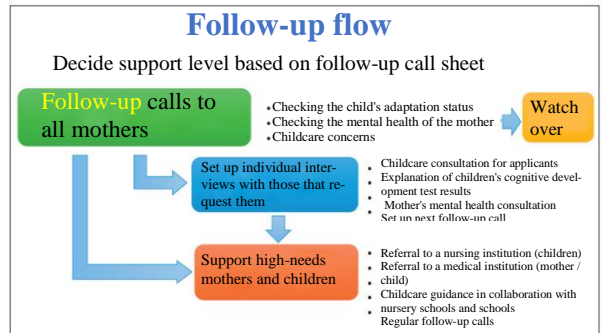
(Slide 21) As a result of the 2016 baseline survey, we examined child development, especially cognition and vocabulary. Nonetheless, many test results show half a year to several months of developmental delay (Slide 22). Regarding the mental health of mothers, the result of the interview for psychiatric evaluation called MINI, indicated that the percentage of mothers who were thought to require some sort of mental health support via psychiatric evaluations was 35% on average in the three prefectures and about 40% for Iwate. (Slide 2). According to the questionnaire that mothers themselves answered, the K6 questionnaire, often used for screening for anxiety and depression, the percentage



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of mothers deemed to be in the so-called clinical area, was about 35 to 36%. According to the BDI-II, a scale for depression, about 35% of mothers are considered to be in the moderate to clinical range, meaning that about one in three mothers is anxious or depressed.

On the other hand, the IES-R is a questionnaire about trauma. These questions were answered with regards to the earthquake and its effects, and the results indicated that about 14% of mothers are in the clinical range. What can be deduced from the above is that one in three mothers have general depression and anxiety, but only about 14% have strong traumatic symptoms due to the earthquake. At this point, rather than many people having trauma-related symptoms specific to the earthquake, about one in three residents of these communities live with general depression and anxiety, regardless of the causes thereof. Arguably, depression, anxiety, and general mental health problems are more serious issues than the earthquake's trauma.

(Slide 24) Next, let's examine the relationship between children's behavioral and emotional problems and their parents' mental health. The results of the "child behavior checklist" questionnaire and the maternal K6 (anxiety/depression questionnaire) scores seen earlier, show that the proportion of children with CBCL scores in clinical and borderline areas is significantly higher for children of mothers whose anxiety and depression levels are in the clinical area. It is also clear that children with mentally healthy mothers who have no anxiety or depression problems have fewer behavioral problems.

(Slide 25) Now, let us examine the relationship with the depression scale BDI-II. In cases of children with normal behavioral problems, mothers with moderate or severe depression were, as you can see here, relatively uncommon. On the other hand, when the child's behavioral issues are in the clinical area,

2016 baseline survey results Highlights



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Child development Cognition and vocabulary

	Iwate		Miyagi		Fukushima		Total	SD	F or z value	post hoc
	M	SD	M	SD	M	SD				
WPPSI										
Picture completion	8.6	3.5	8.5	3.2	9.6	3.1	8.8	3.3	3.0	
Building block pattern	7.3	2.8	8.9	3.4	8.4	2.7	8.1	3.1	8.1*	Iwate < Miyagi
KASDC										
Counting out loud	8.1	2.9	9.0	3.4	8.9	3.3	8.6	3.2	1.7	
Word order	8.4	3.2	8.3	2.8	8.6	3.6	8.4	3.2	0.2	
Hand movement	8.4	2.9	8.2	3.2	9.4	3.1	8.6	3.1	2.8	
Picture vocabulary										
Standard score	8.9	3.2	9.1	3.4	8.6	2.7	8.9	3.1	0.4	
Picture vocabulary										
Correct answers	19.3	9.3	20.7	10.8	18.8	8.5	19.7	9.6	0.7	
Developmental age	52.3	13.3	53.5	15.8	50.4	12.4	52.2	14.00	0.8	

*p < 0.05

• Many test results indicate half-year or several-month developmental delays

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Mother mental health

Mini-International Neuropsychiatric Inter-

The ratio of having some kinds of mental illnesses in each pref. by Mini-International Neuropsychiatric Interview (M.I.N.I. 6.0)

		Iwate	Miyagi	Fukushima	Total
MINI	none	59.8	71.6	66.1	65.4
	some	40.2	28.3	33.9	34.6

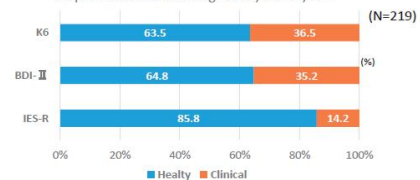
Percentage of mothers designated as "needs-support" via psychiatric evaluations across all 3 prefectures: ~35%

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Mother mental health

K6 (anxiety/depression), BDI-II (depression), IES-R (trauma)

Proportions of Clinical range in K6, BDI-II, IES-R



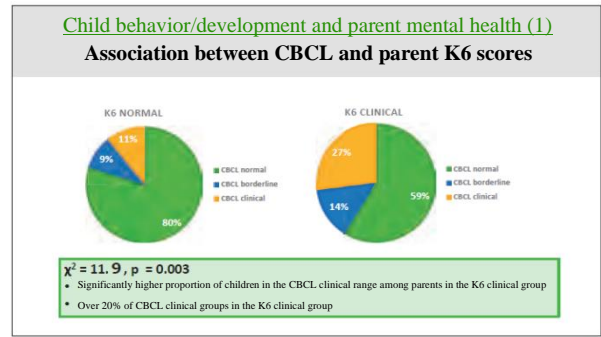
Approximately 35% of mothers have depression or anxiety (1 in 3)
Approximately 14% of individuals have strong disaster trauma symptoms

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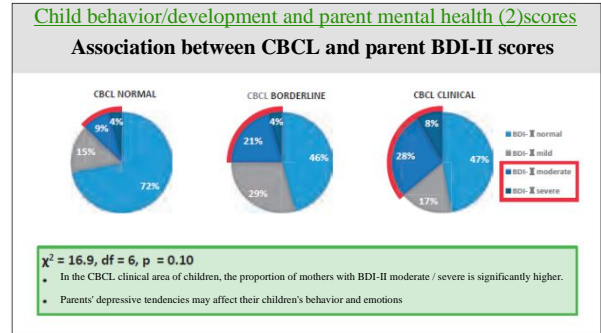
the proportion of mothers with clinical depression is significantly large, and the percentage of mothers who need support relatively high. Therefore, it has become clear that there is a significant relationship between behavioral problems in children and depressive symptoms in mothers (Slide 26). Furthermore, we implemented the PVTR, a test that measures the vocabulary development of a child. We examined the relationship between vocabulary development in children and mental illness as identified by the simple structured interviews mentioned earlier, the MINI. The result was that the children of mothers who were considered to fall in the above category had a delay in vocabulary development.

(Slide 27) To summarize this baseline survey so far, first of all, 35% of parents had some psychiatric symptoms as identified by MINI. However, most of these mothers were not connected to any specialized institutions. Notably, most had never consulted anyone. Next, the cognitive development test of children showed a delay of about one standard deviation on average. Further, the child's delay in vocabulary development was found to be significantly related to the result of the mother's MINI. There is a lot of other data, but the baseline survey found a significant relationship between the child's behavioral and emotional problems and vocabulary development, and the state of the mother's mental health. That is why we have been implementing the follow-up flow mentioned previously. We have watched over these individuals as they receive necessary support, and remain connected to them.

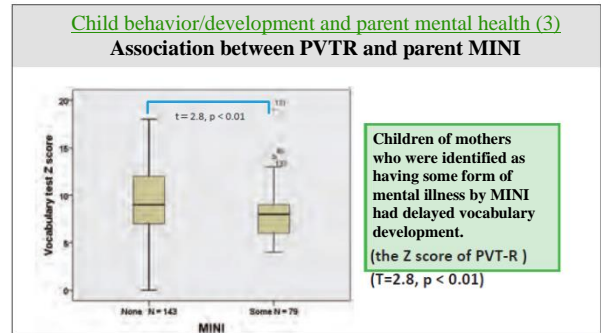
(Slide 28/29) In the first follow-up survey, we compared cognitive development test results in the first and second years. While all the same tests were not performed, we calculated and compared the combined scores. Thus, while this is not an entirely accurate number, I think a certain tendency can be ascertained. Compared to the first year, a significant increase in the so-called mean IQ is observed in the second year, which means that there was apparent growth. Professor Matsuura will talk in a little more detail about that after this.



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MiCCa Baseline Summary

- Baseline survey structured interviews (MINI) showed some psychiatric signs in 35% of parents. However, few people were connected with medical institutions or specialized institutions.
- The results of the cognitive development test of the child showed a delay of about 1 standard deviation on average, and the delay in vocabulary development was significantly associated with the result of the mother's MINI.
- A significant association was found between the child's behavioral and emotional problems and the mother's mental health status.

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(Slide 30) Now, among the things we have learned from continuing follow-up surveys since 2016, I would like to focus on mothers' social capital and mothers' mental health. (Slide 31) To understand this social capital, we asked the following questions, the first is: "Do you think your neighbors trust each other?" This was to ascertain how much their mothers trust the community. Green is "I think so," blue is "I suppose I think so," yellow is "I suppose I don't think so," and deep green is "I don't think so." In 2016, nearly 70% of the people who "think that their neighbors trust each other" are almost the same in 2018. In terms of local trust, we found that some solid social capital has been cultivated. (Slide 32) Now, let's look at it from the perspective of mutual aid with the question, "Do you think the people in your neighborhood help each other?" Nearly 75% of the respondents said, "I think so," or "I suppose I think so." The trend is almost the same in 2016 and 2018 (Slide 33). The significant change is in the percentage of "social participation."

When asked, "Do you belong to an organization or club?" as of 2016, one-third of respondents belonged. In 2018, in the third-year follow-up survey, the number of people who belonged increased to about two-thirds. The trend for trust in the community and mutual aid did not change. Nevertheless the percentage of people who started participating in community gatherings increased. (Slide 34) Also, if you compare the average scores for depression of mothers in 2016 and 2018, you can see that they are significantly reduced. (Slide 35) Trauma scale scores also improved.

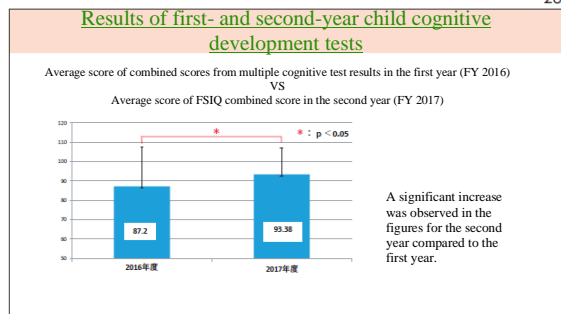
(Slide 36) We compared the aforementioned social capital with respondents' anxiety/depression and trauma scores. The anxiety/depression score of those who answered "yes" to "participating in the community" was low. Mothers who responded that they did not participate in the community tended to have more anxiety and depression problems. Moreover, mothers who thought that their communities were trusting and had mutual aid had low mental health problems and trauma problems, whereas those who answered that they did not believe so had more mental health problems. In this way, the results turned out quite clear and orderly.

(Slide 37) Finally, we compared the children's cognitive development scores in the first and third years with the same tests and found an increase.

Results of first follow-up survey
Child development




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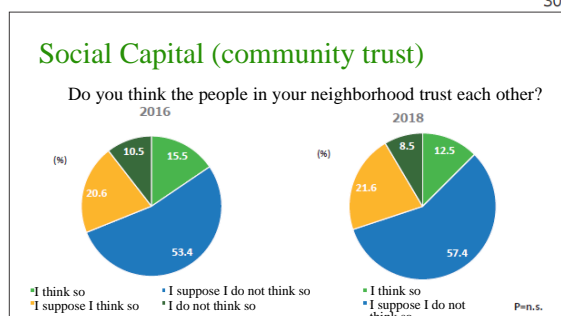


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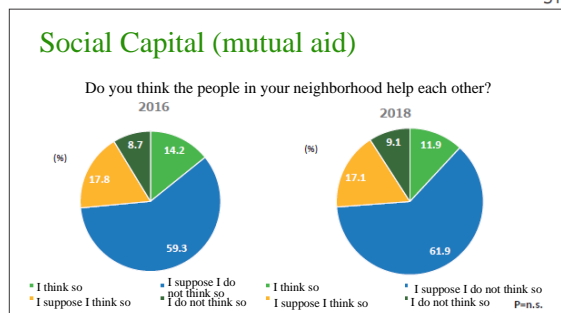
Comparison of 2016-2018 survey results
Mother-child mental health / QOL



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(Slide 38) To summarize what we have learned from the ongoing surveys from 2016 to 2018, mothers' mental health problems were still serious six years after the disaster. And there was an average delay of about one standard deviation in the cognitive development of the child. These are the baseline results. Here, it was found that there seems to be a clear relationship between the mother's mental health and the behavior and development of the child.

In the follow-up survey one year later, the average IQ of children improved. However, although not shown in the data presented here, maternal mental health problems were still protracted. However, the following year, in the second follow-up survey, child development was further promoted and improved. Additionally, with the improvement of the environment (omitted from slide) and the increase in community participation, there were also signs of recovery in maternal mental health problems. This became clear from the first year to the third year. We believe again that it is essential to continue this survey and appropriate support in the future.

(Slide 39) Here is our take home message: After a large-scale disaster, it is necessary to continue long-term support for children and their families who have directly experienced the tragedy and the children (and their families) born in turmoil after the earthquake. We consider it important to continue extensive long-term support for children and their families born in a period of turmoil, that is, those who have not directly experienced the disaster.

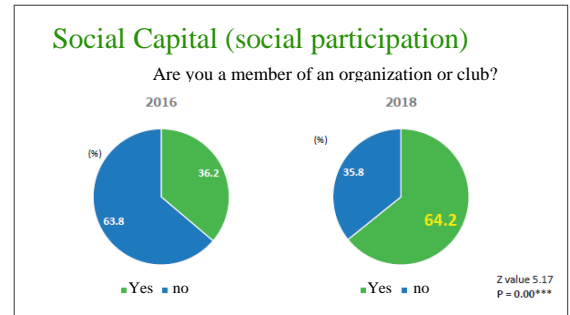
(Slide 40) This is an example of the Iwate version of the newsletter in the early days, but we have received many mothers' impressions.

From a mother who was worried about raising her child:

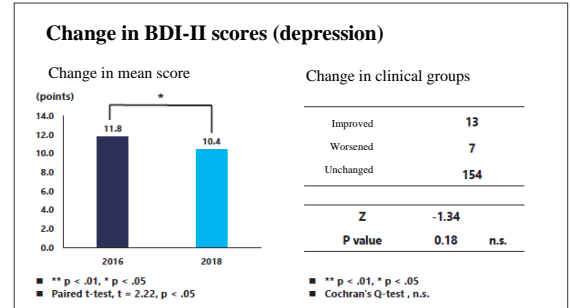
While talking about the child's appearance and my feelings, I was able to realize that "Oh, I was like this" and "This child is growing up more than I expected." After the earthquake, there were so many things that I couldn't afford to think about something carefully.

I was worried that it might affect my child's mind and development, but I was relieved in that respect as well. I think it is imperative to have time to come to terms with yourself and your child slowly.

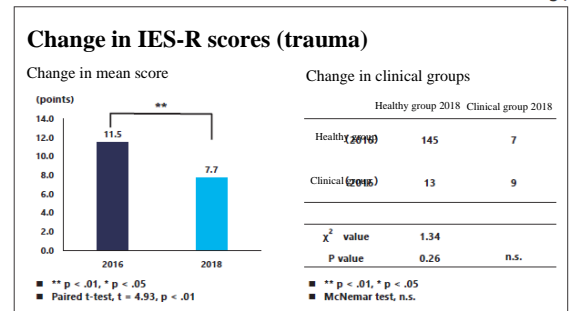
I hope that you will continue this activity and research in the future.



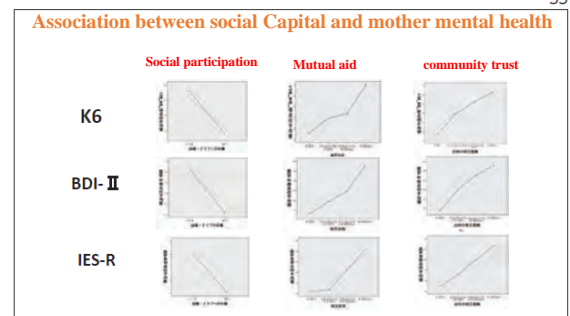
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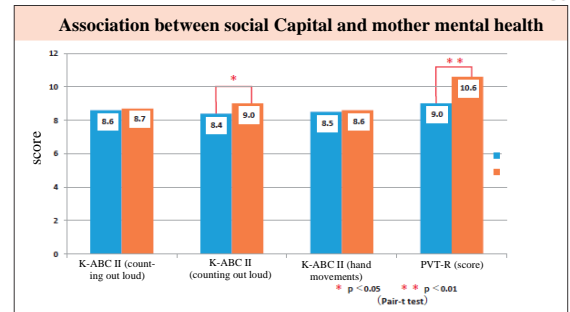
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From a mother who was worried about raising her child:

○ At first, I thought, “This is going to take a lot of my time,” But I was grateful that I was able to understand the specific problems that my child was having and to be taught how to deal with them. I couldn't take this step on my own, so this was an excellent opportunity for me.

○ These individuals provided their permission for these examples to be used. Their children have been appropriately diagnosed and are well supported.

Key points of the 2016-2018 survey results
Six to eight years after the earthquake ...


- ◆ Six years after the disaster, mothers' mental health problems remained serious.
- ◆ An average delay of about one standard deviation was observed in the cognitive development of children.
- ◆ A clear association was found between the mental health of the mother and the behavior and development of the child.
- ◆ In a follow-up survey one year later, the average IQ of children was improving, and mothers' mental health problems were still protracted.
- ◆ In the second follow-up survey, child development was further promoted and improved, and with **improvement in the environment and increased social participation**, there were signs of recovery in the mental health problems of mothers.
- ◆ It is important to continue the investigation and appropriate support in the future




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Take Home Message

In support after a large-scale disaster, it is necessary to continue long-term support not only for children and their families who directly experienced the disaster, but also for **children and their families born in the turmoil after the earthquake.**



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From a mother who was worried about raising her child:
While talking about the child's appearance and my feelings, I was able to realize that "Oh, I was like this" and "This child is growing up more than I expected". After the earthquake, there were so many things that I couldn't afford to think about things carefully.
I was worried that it might affect my child's mind and development, but I was relieved in that respect as well. I think it is very important to have time to slowly come to terms with yourself and your child.
I hope that you will continue this activity and research in the future.

From a mother who was worried about raising her child:
At first, I thought, "This is going to take a lot of my time," But I was grateful that I was able to understand the specific problems that my child was experiencing and to be taught how to deal with them. I couldn't take this step on my own, so this was a good opportunity for me.

From a nursery school teacher that participated:
I am grateful for your cooperation even though many years have passed since the earthquake. Both children and parents have various problems, and I feel that it is very important to be able to provide counseling to these parents.
As a member of a nursery school, having the opportunity to consult a doctor was a great learning experience and encouraged me.

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From a nursery school teacher who participated:

○ I am grateful for your cooperation even though many years have passed since the earthquake. Both children and parents have various problems, and I feel that it is essential to provide counseling.

As a nursery school member, having the opportunity to consult a doctor was a great learning experience and encouraged me.

These examples of the kind feedback we received, which encouraged us. We have received further authorization to continue this research and support.

Now, for the last bit of this presentation, I'd like to advertise a little. As part of our support activities this year, the "Care Caravan" will be held for parents involved in this research to report on the research results and further support child-rearing. Our team comprising three child psychiatrists, are planning this project. The session in Miyagi has already ended, but on January 26 we went together to Higashimatsushima City and Iwanuma City. The contents included a research progress report, a mini-lecture on child-rearing, group work and talk, and a stress check with a body checker. The questionnaire was generally well-received. It will be held again on February 15-16 in Miyako and Kamaishi, Iwate, and on March 1 in Fukushima and Minamisoma.

Feedback and parenting support

MiCCa Care Caravan 2020

2020

January 26 (Sun) Miyagi Higashi Matsushima / Iwanuma

February 15 (Sat) Iwate Miyako

February 16 (Sun) Iwate Kamaishi

March 1 (Sun) Fukushima Minamisoma

- Research progress report
- Mini lecture about parenting
- Group work and talk
- Body checker

Encouraging the growth of social capital

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The mothers who participated in the caravan project adopted the expression "social capital." We realize that this kind of opportunity fosters and promotes social capital, where people get together and talk about things they can't usually talk about, such as their concerns. The mothers who participated also left such impressions. It was an experience that reminded me that the results obtained from this research and the phenomena that occur overlap in reality. It is vital to make full use of the research results in designing appropriate support. We would like to continue to provide support while firmly conducting this research.

While it was a bit rushed, that concludes my overview of our progress thus far. Thank you for your attention.

The Results We Have Obtained Thus Far



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Introduction

This study is a longitudinal study of the mental health of children and mothers after the earthquake. Various disasters occur all over the world, but there are few such studies, rare even from an international perspective. The reason is that “longitudinal intervention research” can be problematic. “Longitudinal” means investigating something over time. For example, even when the earthquake struck, we surveyed the victims. This is called “cross-sectional research.” “Cross-sectional” can be done by one survey, but “longitudinal” is quite tricky. It takes time and money, and the burden is heavy. Those who are investigated must cooperate with the investigation many times. Therefore, “longitudinal research” yields very high-quality data, but is challenging to conduct.

Moreover, this study is an intervention study. Many studies are observations. In other words, observational research involves listening to people who have been damaged by the earthquake and collecting data while observing them. On the other hand, this study leads to direct, guaranteed intervention for people with needs (the children and parents).

“Longitudinal research” is conducted worldwide, but “longitudinal research of earthquake disasters” is rare. Moreover, there are even fewer studies that intervene rather than observe. I hope I have helped you to appreciate the value of this approach.

Survey Methods

This study targets both children and their parents. It is a comprehensive assessment of children's cognitive and emotional issues. The evaluation scale is not evaluated by one or two, but by everything. The evaluation of children is conducted from the perspective of both the mothers and the caregivers (teachers). In these cases, the teachers evaluate the children much more rigorously than the parents. These results in turn, are rigorously evaluated by faculty members nationwide, regardless of the survey. Therefore, it is essential to obtain a proper evaluation from both parties.

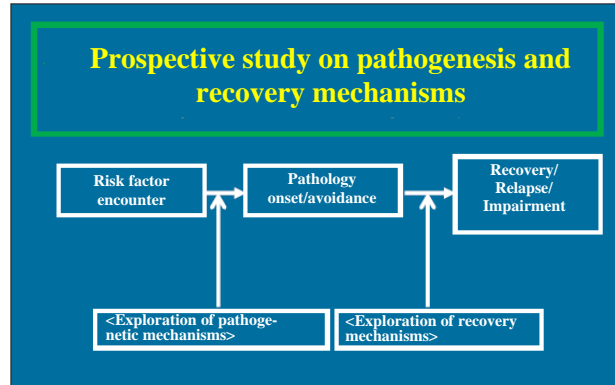
For parental interviews, experts conducted structured interviews. Evaluation was performed according to a proper procedure (protocol). We received full cooperation from government agencies in conducting this research.

Characteristics and originality of this study

- Longitudinal **intervention** study after the Great Earthquake
- For both children and mothers
- Comprehensive assessment of children's cognitive, behavioral and emotional issues
- The evaluation of the child is mother + caregiver or teacher
- Experts are conducting structured interviews
- With the full cooperation of government agencies
- Will be supplemented from 3, 4 to **15 years old**

Significance of Longitudinal Design

From the start, we decided that we will track children from 3-4 years old to 15 years old. The assumption is that we would support and intervene if required. Allow me to get a little academic. Humans contract various illnesses, but we must account for their “encounters with risk factors.” There is also a predisposition for a “risk factor” from the beginning. In this study, the primary risk factor is the disaster itself. However, the problems of family conflict after the earthquake, community collapse, or economic difficulties may also be risk factors. For example, if your mother developed depression or anxiety disorders, you might have some developmental problems when you were a child. Some people develop some pathology; others do not. What is the difference other than the risk factors between those who develop pathology and those who do not? By analyzing that, we can understand the mechanism of how pathology is born. Some people who have had a single illness recover, relapse, or become severe, but if you follow these people, what kind of viewpoint and what kind of mechanism cures them, or turns the condition to serious? Tracking a specific person longitudinally along the time axis reveals quite a lot.



About Evaluative Scales

I will explain the technical terms. First is the evaluation scale for children, the "cognitive development index." This index has an average of 10 or 100. The cognitive development index is also called a psychological test, or an intelligence test. This was conducted on a full scale once every two years. Next is the Child Behavior Checklist (CBCL). This is a survey of children's behavioral and emotional issues that is used around the world. It evaluates the child's hyperactivity, impulsivity, tantrums, and frequent crying. "SDQ" evaluates a child's strengths and difficulties. For example, the items "I'm getting along with my friends," and "I fight with my friends" evaluate the child's social strengths and weaknesses. I use many other things, but these three are the evaluation scales for children that I will talk about today. Next is the evaluation of parents' mental health. "MINI" is a simple structured interview method for mental illness, in which a psychiatrist or psychiatrist interviews parents one-on-one to evaluate the presence or absence of mental problems. These scales are used worldwide.

Our questionnaire uses the following evaluation scales:

- "WHOQOL26": A test created by the WHO World Health Organization to measure quality of life (QOL) that includes questions about the factors that determine satisfaction, stability, and well-being.
- "K6": Evaluates anxiety and depression
- "BDI": Evaluates depressive tendency
- "IES-R": Evaluates trauma and stress

Analysis Results of 2016 Baseline Survey

Regarding cognitive development, we performed two test items from the WPPSI test that measures overall intelligence and three test items from the test called K-ABC. Ten is the average, but the results showed that all the items were about 8.5 on average, therefore I was concerned that development might be a little late overall. Next, was the "CBCL," that is, the child behavior checklist with results in the boundary area = "I'm a little worried" and the clinical area = "If possible, it is better to see a specialist." The proportion of children was about 30% when the three prefectures were combined. The national average rarely exceeds 10%, so we found that the percentage of children with behavioral and emotional problems was above average.

According to the "SDQ," children's strength and difficulty questionnaire, the total of the three prefectures showed that 10% to 15% of children required support.

Analysis Results of 2016 Baseline Survey (Parents)

The evaluation was made in five aspects: physical areas, psychological areas, social areas, environmental areas, and overall quality of life. All areas were poor. The "QOL26," is often used in Japan, therefore the average value of the Japanese population is available. What was the difference between the average Japanese person and the mental health of parents in these disaster areas? We carried out these comparisons. However, as a result of implementing the measure in 2017 and 2018, this will improve. I will talk about it later.

When "K6" was used to evaluate overall anxiety, and "BDI" was used to assess depression, the percentage of those worried was 35%. Additionally, according to the trauma stress evaluation scale called "IES-R," it was found that about 14% of people are suffering from trauma or stress caused by trauma, even though it has been several years since the earthquake.

As you can see, 35% were in a tense situation, but none of them sought help from a specialized hospital. Perhaps they thought: "There are others that have it worse," or "I can't allow myself to get stuck in a hospital."

Analysis Results of 2016 Baseline Survey (Association between Child and Parent Results)

According to CBCL results, about 30% of children were in the borderline/clinical area. Moreover, about 30% of parents had mental health problems.

- Association with Child Verbal Ability

Using 2016 data, we answered the following question: "Is there any relationship between the vocabulary of children and the mental health of parents?" In the 2016 parental structured interview "MINI," 79 people were in the clinical area, and 143 people in the normal area. There was a significant difference between these two groups when we examined the vocabulary of the children in the clinical range and those in the normal range. The causal relationship present here remains unknown. We do not know if there was a problem with the children because of their mothers' mental health problem or if there was a problem with the mothers' mental health because the children experienced difficulties. The cause and effect direction is unknown, but it is clear that the two are related.

- Association with Child Behavioral and Emotional Issues

Now let us discuss the mother's mental health and the behavioral and emotional issues of the child. The mother's "K6" results were analyzed separately for children in the normal range and those of the mother in

Child Cognitive Development (2016)

	Iwate		Miyagi		Fukushima		M	SD	F or t value	post hoc
	M	SD	M	SD	M	SD				
Picture completion	8.6	3.5	8.5	3.2	9.6	3.1	8.8	3	3.0	
Building block pattern	7.3	2.8	8.9	3.4	8.4	2.7	8.1	1	6.1*	Iwate < Miyagi
Counting out loud	8.1	2.9	9.0	3.4	8.9	3.3	8.6	2	1.7	
Word order	8.4	3.2	8.3	2.8	8.6	3.6	8.4	2	0.2	
Hand movement	8.4	2.9	8.2	3.2	9.4	3.1	8.6	1	2.8	
Picture vocabulary	8.9	3.2	9.1	3.4	8.6	2.7	8.9	1	0.4	
Tests	19.3	9.3	20.7	10.8	18.8	8.5	19.7	6	0.7	
Developmental age	52.9	13.3	53.5	15.8	50.4	12.4	52.2	14	0.8	

*p < 0.05

- * Many test results show a delay of about 1 standard deviation
- * Developmental delay of six months to several months in age
- * Significant delays in building blocks and word arrangement
- * A similar tendency was confirmed in the picture vocabulary test

Parental mental health (Some mental problem)

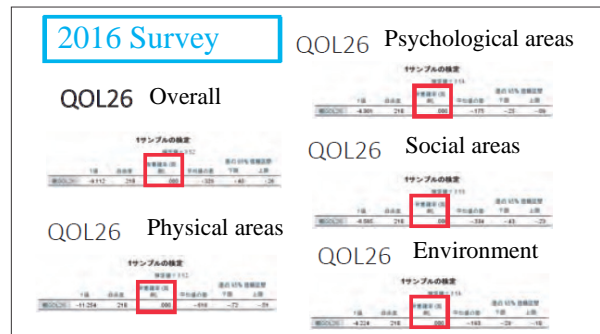
Mini-International Neuropsychiatric Interview, Structured Interview (M.I.N.I. 6.0)
(%)

		Iwate	Miyagi	Fukushima	3-prefecture total
MINI	Not applicable	59.8	71.6	66.1	65.4
	Applicable	40.2	28.3	33.9	34.6

On average, the percentage of parents with some kind of mental illness (mental problem) in the three prefectures is about 35%, and there is no significant difference between the three prefectures. There were many alcohol dependence and signs of depression.

Mental health of parents in 3 prefectures (2016)

- Use WHO-QOL26 to assess the mental health of parents in the disaster area.
- Compared to standard value for Japanese general population 20-29 years old (QOL 3.52 ± 0.46, body 3.54 ± 0.57, psychology 3.53 ± 0.63, society 3.54 ± 0.71, environment 3.48 ± 0.53)
- The test is a one-sample t-test
- WHO-QOL26 is capable of such comparisons



the clinical range. The results showed that mothers in the clinical range were more likely to have children with behavioral and emotional problems. The causal relationship here is also unknown. We must take a careful look to determine causality and correlation. Correlation does not equal causation.

- **Association with Child Cognitive Development**

For each "K6," "BDI," and "IES-R," we analyzed the relationship between mothers in the normal range and mothers in the clinical range and their children's cognitive development. There was no difference in cognitive development.

Analysis results of 2018 Second Follow-Up Survey (Association between Child and Parent Results)

As a result of dividing the results of "K6" and "BDI" into mothers in the normal range and mothers in the clinical range, and analyzing the relationship with the child's cognitive development, no difference was found.

From 2016 to 2018, we can see that the traumatic problem seen in "IES-R" affects children's cognitive development.

Relationship between Child Problems and Parental Mental Health

We tried to determine whether or not child issues affected parental mental health. All of our results indicated that a relationship does exist. The result was that as the score for children's problems increased from normal to borderline to clinical, so did the mother's anxiety score. It's a clean pathological reaction. This is the same for both depression and traumatic stress. This kind of thing doesn't happen very often. This appears to show that the children's problems have something to do with the parents' mental health. However, it is difficult to say that parents' problems influence the cognitive development of children.

Summary

The cognitive development test results increased from 87 to 93.3 when comparing the first year and the second year. Since it is a composite score, there are some variations.

Furthermore, when comparing the first year and the third year, the vocabulary score exceeded 10 points in the third year. In other words, 10 is the average, so we are catching up with the average. In addition to vocabulary development, many other evaluative items for children in difficult situations have improved significantly since the earthquake. I am looking forward to the results of the full-scale cognitive development test next year.

Consideration

In both the 2016 and 2018 surveys, maternal psychological indicators did not directly predict child cognitive development.

On the other hand, behavioral and emotional problems of children directly affect the psychological indicators of mothers. I don't know the causal relationship between them, but it can be said that they are related to each other. A pathological reaction relationship was observed. Significant improvements have been confirmed in the cognitive development of children. This is a fact that I would like many people to know. It is imperative to continue this work in the future. It is difficult to carry out such large-scale research with such a small number of people, therefore we hope that at least some of you will become interested in cooperating with us or understanding our research. Thank you for your attention.

(This report has been summarized and edited based on the recordings recorded on the day of the symposium.
Editing: Yagi, Tamayama)

Question and Answer Period

Fukuchi: Here, I would like to set aside time for questions regarding Professor Yagi and Professor Matsuura's presentations. If you have any questions, please raise your hand, and the staff will bring the microphone to you. First, please tell us your affiliation and the content of your question. Any takers?

Q1: I am working at a hospital in Kesenuma City. I would like to ask about two points. When you discussed the second and third years of the first survey, it was first mentioned that a dropout group appeared. What were the characteristics of the members of the dropout group? I was a little worried about that, and I wonder if there is a possibility that those who have difficulty dropped out. The other point is probably something that will be clarified in future research, but what are the possible causes of children's recovery? I would like to know.

Matsuura: Regarding the first one, I would like to ask Dr. Yagi, the team leader.

Yagi: Yes, thank you. Regarding the parents and children who dropped out, as Dr. Matsuura said, there are some cases where more concerning children left the program. However, not all dropped-out parents and children were high-risk; for example, some moved, or had family situations that got in the way, such as divorce. There were various situations, and some said that it would be a little difficult or troublesome to participate in the survey, and would therefore refrain from doing so. Also, as Dr. Matsuura mentioned, some people might have grown distant because the results (of the baseline survey) were not so good. However, we do know that, for example, the result did not improve (i.e., average scores did not increase) because all the high-risk children were eliminated. Parents and children of various levels left the program for various reasons.

Matsuura: Regarding the second problem, there are specific improvements in various indicators. However, rather than stating that these children "grew," my current feeling is that the situation calmed down a little, and the power that these children already possessed came to the fore. In other words, these children did not initially have low ability or capability. Instead, the performance we see now is the potential they had originally, which was cultivated. By the way, thank you for your question. It reminded me to divide the results into two groups, those who improved and those who didn't, and to analyze it correctly. Maybe this will reveal some factors.

Q2: I am from Iwanuma City Hall. Some children from Iwanuma participated in this study, and when I heard about it, I was extremely grateful for the support you provided them. I was very impressed by the fact that rather than merely leaving the children that were found to be of concern as is, you all made an effort to refer them to necessary support organizations. While listening to your talk just now, I thought that maybe these children improved because of their support. I would like to ask about the factors. However, you did mention that you are still analyzing them, and I am very much looking forward to those results. Thank you.

Yagi: A little supplement. Earlier, when Professor Matsuura talked about the data, there was a question, "Were maternal or teacher evaluations stricter?" We did not present any detailed data on that point today, but when evaluating behavioral issues, it's clear that nursery teachers and schoolteachers are harsher. But when you think about it, relationships between children and mothers are generally one-to-one or one-to-two. On the other hand, teachers and nursery teachers evaluate children's behavior in a group, so it is natural that their results will be more severe. In other words, teachers and nursery teachers can more clearly identify children whose behavioral problems become apparent when they are grouped (even if they are not as noticeable as problems at home). Previous studies suggest that having children with significant behavioral problems may negatively impact the mental health of mothers. I think that the

causal relationship will become clear as we proceed with a detailed analysis. Nonetheless, at the very least, we can state that problems with the mother do not cause problems with the development of the child, but instead that mothers of children with significant behavioral problems are themselves subject to specific issues (the psychological burden is heavy). Since the earthquake, this has appeared to be more prominent, and it is becoming clear that we must provide substantial support to mothers. I think this is an important point. We weren't able to mention this today during our presentation, but it is something that we have come to notice in our analyses.

Fukuchi: Thank you to Dr. Yagi and Dr. Matsuura.