

Training Health Professionals Engaging in 18-Month Check-up for Early Detection and Early Intervention of Autism Spectrum Disorder

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Abstract

Early detection and early intervention of Autism Spectrum Disorder (ASD) are among the most important issues in public health systems. In Japan, 18-month check-up held by each municipality provides a chance to survey ASD and other neurodevelopmental problems, which is why we developed training seminars for health professionals engaging in the check-ups. The training materials consisted of a booklet, DVD, and video clips. These materials focused on understanding neurotypical social communication development from age one to two years. Questionnaires were provided before and after the training. Overall subjective evaluation was positive. An additional finding was that public health nurses working for municipalities have lesser self-confidence in the issue before the seminars, despite the fact that they are on the front line of the check-up. Providing chances to learn about typical child development and early signs of ASD will contribute to better early detection and early interventions.

Key words; Autism Spectrum Disorder, Early detection, 18-month check-up, training seminar, pre/post questionnaire

I . Introduction

Autism Spectrum Disorder (ASD) is classified as a neurodevelopmental disorder in the fifth revision of the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-5)¹. The DSM-5, published in 2013, redefined the autism spectrum to encompass the previous DSM-IV-TR diagnoses of autistic disorder, Asperger's disorder, childhood disintegrative disorder, and pervasive developmental disorder not otherwise specified (PDD-NOS). These disorders are characterized by social deficits, communication difficulties and stereotyped or repetitive behaviors and interests. This condition was described by Wing and Gould as “Severe impairments of social interaction and associated abnormalities in children” in 1979², “autism and autistic-like conditions” by Gillberg in 1992³ and “autistic spectrum disorders” by Wing in 1997⁴. The first study using the term “autism spectrum disorders” was published in 1992⁵. As evident from above, ASD has been used in clinical and research field for over 20 years. Sometimes the term “autism” in a broader sense is used as a synonym of ASD.

Early detection and early intervention of ASD is one of the most important issues in public health system⁶. While the causes of ASDs are still unknown, studies have discovered the importance of the early detection and early interventions. If children suspected of ASD are identified and treated at an early stage of development, interventions have a dramatic impact on a child's ability to learn new skills and mitigate some of the negative consequences of developmental disorders⁷. In 2007, American Academy of Pediatrics (AAP) recommended ASD screening to general pediatricians at least two times before the age of two⁸. If reasonable early intervention is early enough, some children can move toward a more typical developmental trajectory and prevent secondary problems, such as aggressive or self-harming behaviors, which tend to manifest later^{9, 10}.

In Japan, 18-month check-up is held by every municipality based on Maternal and Child Health Act. The procedure is as following; 1) body measurements, 2) dental checkup, 3) checking gross motor skill (ability to walk by him or herself) and fine motor skill (dexterity of hands and fingers when playing with building blocks by observing block building play), 4) checking ability to communicate through speech, 5) observing reactions to questions, 6) checking hearing and vision, and 7) physical examinations (by stethoscope on the chest and back, the abdomen by touch, the state of anterior fontanel, genitals and skin). Pediatrician, dentist, and public health nurses (PHN) are indispensable. Some governments hire a speech therapist (ST) and psychologist as extra specialists.

Under the Act on Support for Persons with Developmental Disabilities which came into force on April of 2005, the early detection of the children with ASD has become one of the most important responsibilities for maternal and child health that municipalities should have. For this purpose, this check-up would be a good opportunity to find children with ASD suspected. However, in reality, many children with ASD had been overlooked in the check-up, even after the enforcement of this Act, at least, in our prefecture, Kochi. To change this situation, we developed a training seminar for early detection of ASD suspected children.

We set two main goals in the seminar, one was to make the participants understand their role in the early detection of ASD, and the other was to provide a chance to get knowledge for identifying the children with suspected ASD during 1 to 2 years of age.

We focused on social communication development during the age period when we developed training materials. Understanding of "normal" or "typical" social communication development was one of the most crucial knowledges in order to be aware of the risk of ASD in infancy and early childhood¹¹, but, at that point, we were not able to find a precedent systematic training focusing on this point in Japan. The material we developed was named "Clinical Checkpoints for Early Detection of ASD" which consisted of "booklet," "DVD" and "comparing video clips." We provided the first two to every municipality for revision or self-learning.

In this article, we introduce our training seminar and also discuss the result of a collective survey by using the same questionnaire before and after the seminar.

II. Methods

1. Setting and participants

We held the seminars in 6 different places in the Japanese prefecture of Kochi during March and June in 2010. The participants of the training were specialists who are engaged in the 18-month check-up held by municipalities in this Prefecture. The number of the participants was 288. Of this 288, 39 (13.5%) were medical doctors (MD: pediatricians and child psychiatrists), PHNs of municipalities (mPHN) were 133 (46.2%), PHNs of the prefecture (pPHN) were 19 (6.6%), and 97 (33.7%) were other specialists (Oth: nurses, speech therapists, occupational therapists, preschool teachers, psychologists, social workers and dieticians). There was no regional deviation in the number of participants per the population and the occupational category.

2. Procedure

The lecturer of the seminars was done by the first author who is an experienced child psychiatrist and working over 20 years with neurodevelopmental disorders. The total time of the seminar was approximately 3 hours, the first part being the introductory lecture about the purpose (approximately 30 minutes). In the second part, we used the learning material utilizing the DVD which we made originally (see “Training materials” below) for approximately 1 hour. In the third part, we used “comparing video clips (see “Training materials” below)” for approximately 1 hours. And finally, in the last part, the entire seminar was summarized in approximately 30 minutes. Though we also showed and explained some aberrant behaviors by the children with ASD, we emphasized consistently and repeatedly that an absence of a “typical” social communication behavior shown in the DVD might be a red flag of ASD in this age group. An anonymous self-rating questionnaire method survey was conducted, before and after the seminars. The questionnaires were collected on the seminar site (collective survey method).

3. Ethics

We got informed consents by written document including the research usage of the data from all parents of the children in DVD and the video clips, and also from the participants.

4. Training materials

The name of the material was “Clinical Checkpoints for Early Detection of ASD,” which consisted of three pillars, “booklet,” “DVD,” and “comparing video clips.”

1) Booklet

The booklet was provided to every municipality. The following are the contents with small abstracts:

i. Purpose and usage

It is not for diagnosis nor a screening tool of ASD, but for preventing overlooking children with ASD suspected in 18-month. Social communication developmental problems could be observed

in other neurodevelopmental disorders, also in abused child and attachment disorder. If you have some concerns about a child, continuous observation should be done and should be referred to neurodevelopmental clinical examinations by specialist.

ii. Diagnostic criteria and early detection of ASD

Introduction of ICD and DSM criteria, “Wing’s triad”, Asperger Syndrome and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS, atypical autism in ICD-10). Brief review of researches about early detection of ASD, which suggest that social communication development is different in ASD from the very early stage of life.

Even though no abnormal behaviors which are thought of characteristic in ASD, if you feel some delay or some absence of social communication development in a child, it could be an early sign of ASD.

iii. Instruction for watching DVD

Chapter 1. Response to others

In a neurotypical development young child response to others, for example, looking at a person who calls his/her name, smiling back to a familiar adult, etc.. A child with ASD may lack or delay the response.

Chapter 2. Showing

A neurotypical young child starts to show things which he/she holds to familiar adults from the age of 8 months. It is a behavior to share his/her interest to others. A child with ASD usually does not show things even at the age of 1.

Chapter 3. Sharing affection

A neurotypical young child wants to share not only things, but also his/her affection with familiar adults. When feeling joy or happiness, he/she smiles over a familiar adult. When feeling fear or surprise, he/she hold on his/her caregiver as a secure base. A child with ASD does not smile “over” someone, even if he/she smiles or fails to make himself/herself comfort and calm down by using his/her caregiver as a secure base.

Chapter 4. Social routine

At around the age of 1, a neurotypical development young child start to find out some kind of consistency or rule, which is sometimes called “social routine,” in plays and interactions with a caregiver and a familiar adult. The child expects an action toward him/her, and also try to act toward the adult by his/her own accord. He/she is also able to imagine the adult’s reaction to his/her act. Typical play with social routine is peek-a-boo. This kind of play is called “social game”, and reciprocity is the key issue in it. A child with ASD does not engage in the play, or, even when he/she seems to be playing, reciprocity lacks. The other thing about social routine (also called, “social

ritual”) behavior is greeting. Learning how to wave hands as meaning “bye-bye” is an example and an important milestone in social communication development that usually occurs between the age of 10 month and a year. A neurotypical development child understands intuitively and implicitly a person who he/she should wave a hand toward. A child with ASD does not wave bye-bye or, even when he/she seems to wave, directivity to a person is lacking.

Chapter 5. Joint attention

Joint attention is the shared focus of two individuals on an object. Following another’s eye gaze and point occur the age of 10 months to a year. Until the age of 18 months, a child starts to point an object with looking back a person who he/she wants to share their interest. This behavior is one of the most important milestones in social communication development. A child with ASD follows gaze, point and even if he/she points something, the child does not look back another person to share his/her interest.

Chapter 6. Interaction play

A neurotypical development young child likes to play with a familiar adult with an interaction using toys, gestures and gaze. A child with ASD tends to play by him/herself without interaction with another.

Chapter 7. Imitation

The crucial point of evaluating imitation is whether a child imitates behaviors of familiar persons. Some autistic children “reproduce” a TV commercial or a DVD film, but it is not an imitation, instead a kind of delayed echolalia.

Chapter 8. Facial expression

A neurotypical development young child in this age period has already rich variety of facial expressions. They are changeable depends on social situations. Facial expressions of a child with ASD are limited and rarely reflecting social situations.

Chapter 9. Communication

A neurotypical development young child uses pointing, other gestures, sounds, voices and words to request and comment something to others. Also, the child starts understand the meaning of other’s gestures and words and follow instructions appropriate for his/her age. In a child with ASD, delay or unbalance of both verbal and non-verbal communication is observed. Sometimes, the direction of communication is not clear or inadequate (not to the person) in a child with ASD.

iv. Observation points and tips of setting in 18-month check-up

- Make a child relax
- Wait for child’s reaction; do not lead too much

- How to use blocks to observe social communication development
- Family play is extremely useful to evaluate social, interactive and imitation ability
- Using toys funny, interesting, and novel (e.g. soap bubble, blowouts and shiners)
- Prepare something to attract intense interest on ceiling or wall (for checking Joint Attention)
- Observe behaviors in natural setting (Reaction name call, showing, sharing affection, facial expression, greeting, etc.)

v. Parent interview form

The followings are examples that you should ask parents;

- How does a child cry?
- How is a child held?
- How does a child react to name calling?
- How does a child play?
- How does a child react to situation changing?
- Others (sleep, feeding, regression, etc.)

2) DVD and “comparing video clips”

The DVD was also provided to every municipality and used in the seminars. It is a set of edited video clips focusing on typical social communication development during age 1 to 2. The chapters and contents were mentioned above. The “comparing video clips” was used only in the seminar because of ethical considerations. In these video clips, we showed that typical social communication behaviors in the DVD lacked in the children with ASD. Additionally, we showed some aberrant behaviors (obsession with particular objects, flapping hands, waving hands with facing palm to him/herself, walking on tiptoes and self-injurious behavior) which observed in the children with ASD.

5. Pre/post questionnaire

The questionnaire was designed specifically by Kochi prefectural government. The subjects were all 288 participants of the seminars. We used collective survey method. Before the seminars, at a seminar room, the participants asked to answer all questions, and after the seminars, at the same place, they were asked to answer same questions. The data was anonymized.

The questionnaire consisted of three questions. Q1 (see “Table 1 in Results” below) was about the understanding of the meaning of early detection of ASD and self-role for it, consists of eight questions. Each question is a rating on a five-point scale of “1: Strongly Disagree” to “5: Strongly Agree”. Q2 (see “Table 2 in Results” below) was about the most crucial things for the early detection of ASD in public health checkups for infants. The participants asked to choose three items in the order of importance. In the analysis, we compared the number that was chosen as the most important thing. As we mentioned above, we emphasized the importance of the knowledge of the typical social development, we expected the augmentation of the item 7(Knowledge about typical child development). Q3 (see “Table 3 in Results” below) was about the understanding of the contents of the seminar, consists of twelve questions. Each

question is a rating on a five-point scale of “1: Very Low” to “5: Very High”. We expect higher scores in the post-seminar than in the pre-seminar. Additionally, we examined the difference according to occupations in each question of Q1.

Table 1 The change of understanding of the meaning of early detection of ASD and self-role for it between pre- and post-seminar (Q1)

Q1	Question items		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	unmarked	median	Z
			1	2	3	4	5	-		
			N (%)	N (%)	N (%)	N (%)	N (%)	N (%)		
1	Early detection of ASD suspect children in public health checkups in infants is one of the most crucial things in public health.	pre	0 (0.0)	3 (1.0)	28 (9.7)	108 (37.5)	147 (51.0)	2 (0.7)	5	-7.91 ***
		post	0 (0.0)	1 (0.3)	11 (3.8)	52 (18.1)	222 (77.1)	2 (0.7)	5	
2	I have enough knowledge and skills for early detection of ASD suspected children.	pre	72 (25.0)	99 (34.4)	76 (26.4)	36 (12.5)	3 (1.0)	2 (0.7)	2	-10.99 ***
		post	16 (5.6)	57 (19.8)	103 (35.8)	96 (33.3)	11 (3.8)	5 (1.7)	3	
3	I want to participate seminars or training for early detection of ASD as much as I can.	pre	0 (0.0)	1 (0.3)	19 (6.6)	84 (29.2)	184 (63.9)	0 (0.0)	5	-4.80 ***
		post	0 (0.0)	0 (0.0)	11 (3.8)	55 (19.1)	219 (76.0)	3 (1.0)	5	
4	I am interested in the current findings about child development.	pre	0 (0.0)	2 (0.7)	12 (4.2)	84 (29.2)	189 (65.6)	1 (0.3)	5	-3.05 ***
		post	0 (0.0)	0 (0.0)	12 (4.2)	60 (20.8)	214 (74.3)	2 (0.7)	5	
5	I understand the meaning of early detection of ASD.	pre	0 (0.0)	2 (0.7)	18 (6.3)	80 (27.8)	186 (64.6)	2 (0.7)	5	-5.80 ***
		post	2 (0.7)	1 (0.3)	6 (2.1)	49 (17.0)	226 (78.5)	4 (1.4)	5	
6	I notice that cooperation and coordination with other organizations are very important for early detection and follow-up after that.	pre	0 (0.0)	5 (1.7)	19 (6.6)	94 (32.6)	167 (58.0)	3 (1.0)	5	-5.88 ***
		post	1 (0.3)	1 (0.3)	8 (2.8)	63 (21.9)	212 (73.6)	3 (1.0)	5	
7	The early detection must be accompanied with community based early intervention for ASD children.	pre	1 (0.3)	4 (1.4)	13 (4.5)	60 (20.8)	209 (72.6)	1 (0.3)	5	-3.36 ***
		post	1 (0.3)	2 (0.7)	4 (1.4)	49 (17.0)	230 (79.9)	2 (0.7)	5	
8	Working in the field of early detection of ASD suspected children, being key person for leading children to diagnostic process and early interventions are important responsibility in my profession.	pre	3 (1.0)	31 (10.8)	66 (22.9)	121 (42.0)	66 (22.9)	1 (0.3)	4	-10.34 ***
		post	0 (0.0)	5 (1.7)	18 (6.3)	107 (37.2)	155 (53.8)	3 (1.0)	5	

Z : Results of Wilcoxon signed rank test (According to signed-rank post < pre)

*p < .05 **p < .01 ***p < .001

Table 2 The change of the most important thing for early detection of ASD in public health checkups for infants between pre-post seminar (Q2)

Q2	items	pre	post	χ^2
		N (%)	N (%)	
1	Cooperation with other organizations	36 (12.5)	9 (3.13)	19.31 ***
2	Information from parents	28 (9.72)	18 (6.25)	2.70
3	Nurturing environment	2 (0.69)	0 (0)	a
4	Direct observation	66 (22.92)	72 (25.00)	0.34
5	Continuous training for early detection	5 (1.75)	5 (1.75)	-
6	Occupational experience	0 (0)	0 (0)	-
7	Knowledge about typical child development	38 (13.19)	133 (46.18)	78.20 ***
8	Knowledge of autistic features in early age	91 (31.60)	41 (14.24)	25.54 ***
9	Items in questionnaire	2 (0.69)	1 (0.35)	a
10	Collaboration among staffs(e.g. MD and PHN)	19 (6.60)	4 (1.39)	a***
11	Others	1 (0.35)	3 (1.04)	a
N/A		0 (0)	2 (0.69)	-
Total		288 (100)	288 (100)	

χ^2 : Results of McNemar's test

a: calculating p from binomial distribution (N<25)

*p < .05 **p < .01 ***p < .001

Table 3 The change of practical level for using the knowledge related to following in 18-month check-up among pre- and post-seminar (Q3)

Q3	Question items		Very Low	Relatively Low	OK	Relatively High	Very High	unmarked	media	Z
			1	2	3	4	5	-		
			N (%)	N (%)	N (%)	N (%)	N (%)	N (%)		
1	Knowledge about ASD	pre	49 (17.0)	86 (29.9)	114 (39.6)	30 (10.4)	4 (1.4)	5 (1.7)	3	-10.38***
		post	3 (1.0)	46 (16.0)	149 (51.7)	74 (25.7)	12 (4.2)	4 (1.4)	3	
2	Knowledge about typical development to 2 years old	pre	27 (9.4)	67 (23.3)	140 (48.6)	48 (16.7)	5 (1.7)	1 (0.3)	3	-9.26***
		post	3 (1.0)	32 (11.1)	135 (46.9)	95 (33.0)	19 (6.6)	4 (1.4)	3	
3	Response to others in typical development	pre	38 (13.2)	86 (29.9)	121 (42.0)	32 (11.1)	6 (2.1)	5 (1.7)	3	-11.22***
		post	2 (0.7)	31 (10.8)	130 (45.1)	101 (35.1)	20 (6.9)	4 (1.4)	3	
4	"Showing" in infancy	pre	86 (29.9)	93 (32.3)	77 (26.7)	24 (8.3)	3 (1.0)	5 (1.7)	2	-12.61***
		post	1 (0.3)	34 (11.8)	133 (46.2)	92 (31.9)	22 (7.6)	6 (2.1)	3	
5	Development of sharing affection	pre	76 (26.4)	83 (28.8)	91 (31.6)	25 (8.7)	5 (1.7)	8 (2.8)	2	-11.81***
		post	2 (0.7)	36 (12.5)	127 (44.1)	98 (34.0)	19 (6.6)	6 (2.1)	3	
6	Development of social routine	pre	42 (14.6)	79 (27.4)	125 (43.4)	35 (12.2)	3 (1.0)	4 (1.4)	3	-11.13***
		post	1 (0.3)	33 (11.5)	119 (41.3)	109 (37.8)	21 (7.3)	5 (1.7)	3	
7	Development of joint attention	pre	92 (31.9)	91 (31.6)	73 (25.3)	23 (8.0)	2 (0.7)	7 (2.4)	2	-12.75***
		post	1 (0.3)	40 (13.9)	127 (44.1)	97 (33.7)	17 (5.9)	6 (2.1)	3	
8	Interactive play in infancy	pre	49 (17.0)	91 (31.6)	104 (36.1)	37 (12.8)	3 (1.0)	4 (1.4)	3	-11.36***
		post	2 (0.7)	34 (11.8)	122 (42.4)	100 (34.7)	24 (8.3)	6 (2.1)	3	
9	Development of imitation	pre	41 (14.2)	79 (27.4)	126 (43.8)	37 (12.8)	3 (1.0)	2 (0.7)	3	-10.87***
		post	1 (0.3)	33 (11.5)	121 (42.0)	109 (37.8)	18 (6.3)	6 (2.1)	3	
10	Range of facial expression in infancy	pre	46 (16.0)	84 (29.2)	115 (39.9)	37 (12.8)	4 (1.4)	2 (0.7)	3	-11.55***
		post	1 (0.3)	25 (8.7)	130 (45.1)	100 (34.7)	27 (9.4)	5 (1.7)	3	
11	Development of communication	pre	36 (12.5)	77 (26.7)	127 (44.1)	41 (14.2)	2 (0.7)	5 (1.7)	3	-10.27***
		post	2 (0.7)	35 (12.2)	130 (45.1)	95 (33.0)	21 (7.3)	5 (1.7)	3	
12	Characteristic autistic behaviors to 2 years old	pre	64 (22.2)	83 (28.8)	97 (33.7)	38 (13.2)	3 (1.0)	3 (1.0)	2	-10.50***
		post	3 (1.0)	41 (14.2)	134 (46.5)	90 (31.3)	12 (4.2)	8 (2.8)	3	

Z : Results of Wilcoxon signed rank test (According to signed-rank post < pre)

* $p < .05$ ** $p < .01$ *** $p < .001$

6. Statistical analysis

Differences in pre–post change on subjective scales (Q1 and Q3) were examined using the Wilcoxon signed rank test. The McNemar's test was used to compare changes from pre- to post-seminar in the point of view for early detection of ASD (Q2). The Kruskal–Wallis test was used to determine differences in four occupation groups, and if significant, Steel–Dwass test was applied (Q1). The Steel–Dwass test was performed using “R” version 2.15.0 (the R Foundation for Statistical Computing, Vienna, Austria). Other statistical analysis were performed using PASW Statistics 18 (SPSS IBM Japan Inc., Tokyo, Japan) and statistical significance was defined as $p < 0.05$.

III. Results

The response rate to the questionnaire was 100%, although there were a few unmarked answers.

1. The effect of the seminar for understanding of the meaning of early detection of ASD and self-role for it (Q1: Table 1)

The total score of understanding of early detection of ASD were significantly higher ($Z = -11.78$, $p < .001$, Wilcoxon signed rank test) post-seminar ($mean = 35.69$, $sd = 3.89$) than pre-seminar ($mean = 33.51$,

$sd = 4.11$) (Figure 1). In the all questions of Q1, post-seminar scores were significantly higher than pre-seminar scores (Q1-1: $Z < -3.0$, $p < .01$, Wilcoxon signed rank test). The number of the participants who chose 5 (strongly agree) and 4 (agree) increased, while 2 (disagree) and 1 (strongly disagree) decreased (Table. 1).

Additionally, we examined the difference according to occupations in each question of Q1. Scores of understanding before the seminar (pre-seminar) were significantly different among these four groups in five questions (Q1-1, 2, 4, 5, 8: $\chi^2 > 8.0$, $p < .05$, Kruskal–Wallis test). The pre-seminar scores of understanding in Q1-1 were significantly higher in Oth than in mPHN ($t = 2.84$, $p < .05$), and in Q1-2 were significantly higher in MD ($t = 3.88$, $p < .001$), pPHN ($t = 2.85$, $p < .05$) and Oth ($t = 3.04$, $p < .05$) than in mPHN, and in Q1-4 were significantly higher in Oth than in mPHN ($t = 4.17$, $p < .001$) and pPHN ($t = 3.26$, $p < .001$), and in Q1-5 were not significantly different among each group, and in Q1-8 were significantly higher in Oth than in mPHN ($t = 3.08$, $p < .05$, Steel-Dwass test, Figure 2). Scores of understanding at post-seminar were not significantly different among these four groups in all questions ($p > .05$, Kruskal–Wallis test).

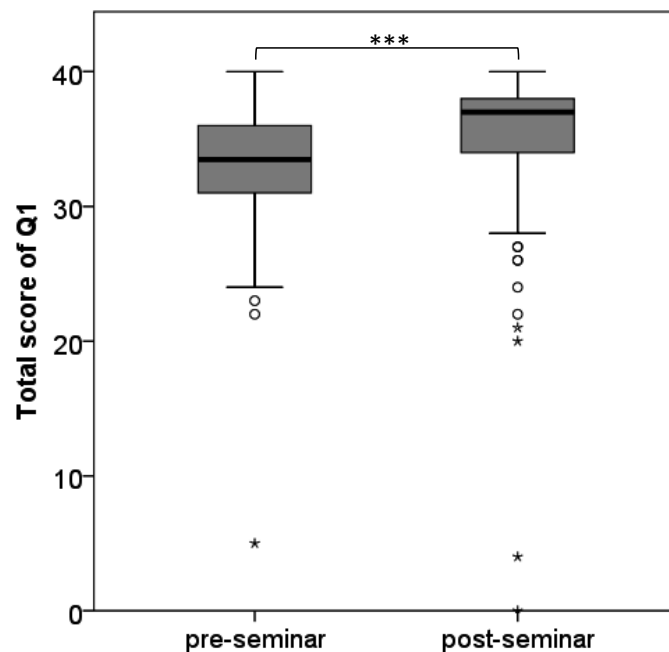


Figure 1 The total score of understanding of the early detection of ASD just pre- and post-seminar (Q1). Bar in each box: score of median. * $p < .05$, ** $p < .01$, *** $p < .001$ (Wilcoxon signed rank test).

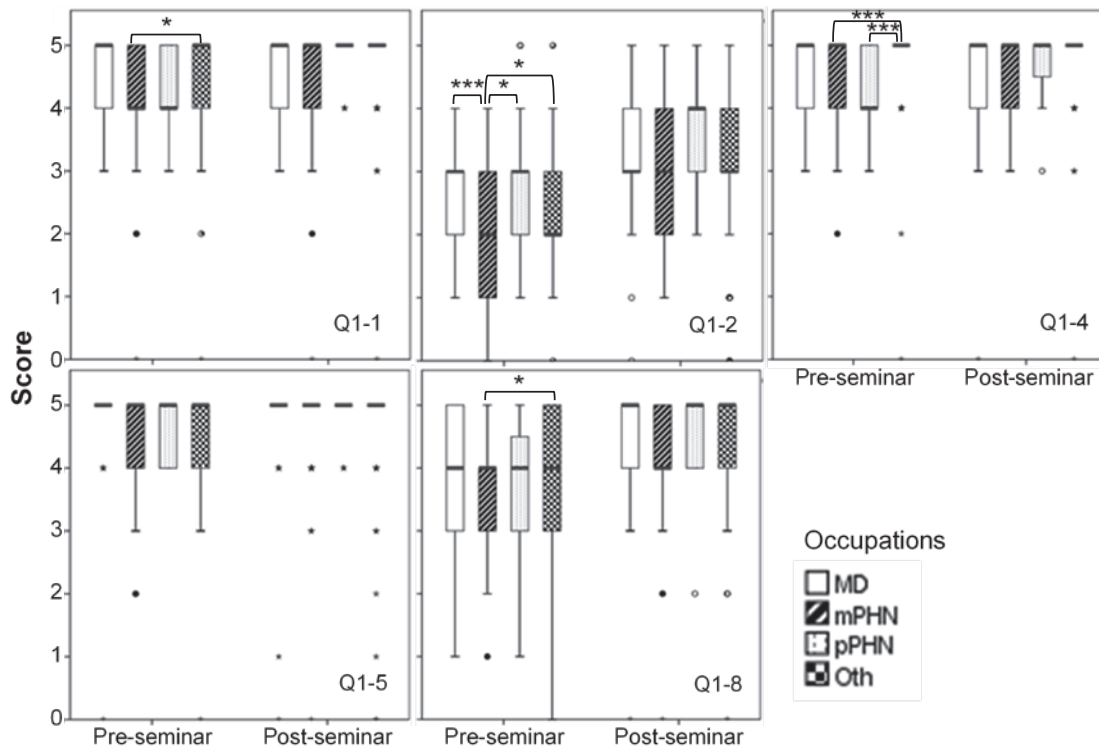


Figure 2 Differences in scores of understanding between occupations in each question of Q1. Bar in each box: score of median. MD: medical doctors, mPHN: PHN (public health nurses) of municipalities, pPHN: PHN of the prefecture, Oth: other specialists. * $p < .05$ ** $p < .01$ *** $p < .001$ (Steel–Dwass test).

2. The change of the most important thing for early detection of ASD in public health checkups for infants between pre- and post-seminar (Q2: Table 2)

Before the seminar, the number of item 8 (Knowledge of autistic features in early age) was the biggest (31.60%). After the seminar, the number of item 7 (knowledge about typical child development) became the biggest (46.18%). The decrease of choosing item 1 (cooperation with other organizations) ($\chi^2 = 19.31$, $p < .001$, McNemar's test) and item 8 ($\chi^2 = 24.54$, $p < .001$, McNemar's test), and the increase of choosing item 7 ($\chi^2 = 78.20$, $p < .001$, McNemar's test) were statistically significant.

3. The effect of the seminar for the practical level for using the knowledge related to following in 18-month check-up (Q3: Table3)

The total score of the practical level for using the knowledge related to following in 18-month check-up (Q3) were significantly ($Z = -13.26$, $p < .001$, Wilcoxon signed rank test) higher post-seminar ($mean = 39.76$, $sd = 8.88$) than pre-seminar ($mean = 29.23$, $sd = 9.86$) (Figure 3). In the all questions of Q3, post-seminar scores were significantly higher than pre-seminar scores (Table 3, $Z < -9.0$, $p < .001$, Wilcoxon signed rank test).

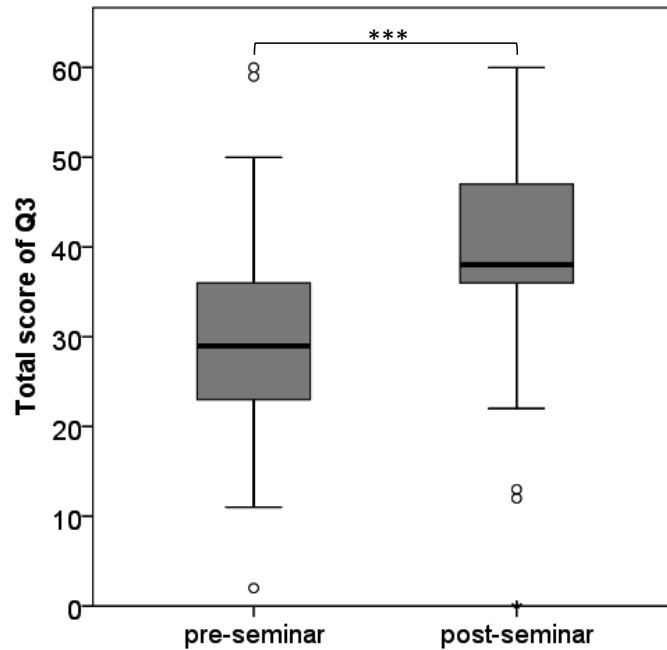


Figure 3 The total score of Q3 at pre- and post-seminar. Bar in each box: score of median. $*p < .05$, $**p < .01$, $***p < .001$ (Wilcoxon signed rank test).

IV. Discussion

Early detection and early intervention for the children with ASD has been regarded as one of the most critical maternal and child health issues which a municipal government shall perform. For this purpose, many municipalities in Japan start using parent questionnaires. However, ASD screening in community-based child health programme with using a well-validated did not improve early identification of ASD¹². Instead, direct observation by well-knowledged practitioners and specialists play a key role in it. Nevertheless, the importance of direct observation was not understood enough by themselves¹³. We intended to enrich the participants' knowledge for the direct observation through the seminar with focusing social communication development. One study shows that if specialists engaging ASD surveillance in a community-based setting know early signs of ASD as the lack or delay of “normal” or “typical” in the development of social communication, they can identify correctly and refer infants and toddlers with ASD¹⁴. Another article for family physician also suggests that the earliest sign of ASD is the delayed attainment of social communication developmental milestones¹⁵. These findings might support that the contents of our training seminar could be accurate.

The result of Q1 suggests that the participants felt they understood more about the meaning of early detection of ASD and self-role for it after the seminar. The interesting thing was PHNs of municipalities tend to choose negative, means “smaller numbers”, answers compared with other occupations in the pre-seminar. It is particularly interesting that this tendency was strongly shown in Q1-2 that is “I have enough knowledge and skills for early detection of ASD suspected children”. It implies that they have low self-confidence to identify themselves as a practitioner for the surveillance of the children with ASD suspected,

despite they are the practitioners who are playing the most critical role in it. According to a document of Japanese Nursing Association (2011)¹⁶, PHNs of municipalities are working on the front line of the public health system, and their work volume is increasing continuously. As a result, they are difficult to find the time for self-improvement of their knowledge and skill in ASD screening. Because of this, their confidence would be lower than other “specialists”. After the seminar, there was no statistical significant difference between occupations. It would mean that the seminar could provide them a chance to encourage their self-confidence.

The most underscored point throughout the seminars was that we should focus on absence or delay of social communication behaviors which are observed in “neurotypical” development when we try to identify ASD suspected children in 18-month check-up. Another thing we emphasized was that aberrant behaviors which tend to be accompanied with ASD are not enough useful predictors in this age group. Not all the children with ASD exhibit aberrant behaviors and, usually, these behaviors emerge after 2 to 3 years of age^{17, 18}. If a child is under two years of age, even though the child does not show any aberrant behavior, we should not exclude the possibility of ASD. The result of Q2 shows a positive effect of the seminars on this crucial point.

The result of Q3 might be interpreted that the materials and the procedure are appropriate for the purpose to provide a chance to get knowledge of early signs of ASD through learning social communication development during 1 to 2 years of age.

We especially tried to encourage the PHNs in municipalities to participate the seminars, because they are the persons who can be “the specialists” of child development surveillance. They are seeing children at key stages in their development. There are several infant and toddler check-up held by municipalities without 18-month, for example, 4-month, 10-months and 36-month. They are also doing “Newborn baby visit”, of a PHN, the act of visiting a house of a newborn baby to give some advice about baby care. They are not only the best place to monitor abnormal development, but also most expert to do so, given their extensive knowledge and training on developmental milestones. With a firm knowledge of early child development, the PHNs can identify potential problems via observation of the child’s responses, interactions, and play through routine check-ups^{14, 19, 20}.

There are two limitations in this study. One is that the objectivity of the questionnaire is not secured sufficiently. The result of the questionnaire would be subjective and affected by response shift or effort justification bias. The other one is that we cannot estimate positive effects of the seminar in 18-month check-up in the municipalities in practice. A further study to investigate the correlation between the result of the questionnaire and the accuracy of ASD screening in 18-month check-up with using the control group is needed.

V. Acknowledgements

We would like to send special thanks to the children and their parents who cooperated to create our visual teaching materials.

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