

Original Article

Characteristics of Parents and Their Infants with Autistic Behaviors: Parent-Infant Interaction, Parental Depression, and Parenting Stress

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Abstract

Parents of infants with autistic behaviors frequently face difficulties in childrearing owing to their infants' behavioral traits. This study aimed to clarify the characteristics of parent-infant interaction, parental depressive symptoms, and parenting stress in the context of infants' autistic behaviors. We employed a cross-sectional, case-control observational design with a case group of 52 parents and a control group of 56 parents. We measured parent-infant interaction using the Japanese version of the Nursing Child Assessment Teaching Scale, and parental depressive symptoms and parenting stress with the Japanese version of the Center for Epidemiologic Studies Depression Scale and the Japanese Parenting Stress Index Short Form, respectively. There was no significant difference between the two groups regarding parent-infant interaction. Mothers in the case group had significantly higher depressive symptoms than those in the control group ($p < .05$). Both fathers ($p < .05$) and mothers ($p < .01$) in the case group scored significantly higher than the control group on parenting stress. Thus, parents of infants with autistic behaviors have greater mental

health problems right from infancy. We suggest that nurses should provide families with appropriate support to promote adaptive parent-infant interaction and prevent the aggravation of parental mental health problems irrespective of Autism Spectrum Disorder diagnoses.

Key Words: Autistic Behaviors, Mental Health, Nursing, Parent-Infant Interaction, Parenting

Introduction

Autism spectrum disorder (ASD) is one of the most common mental disorders in childhood. Symptoms include behavioral traits such as delayed communication skills, impaired social behavior, and inflexible adherence to routines¹. The number of children with ASD has increased owing to expansion of the disease concept^{2, 3}. Since the 2005 enactment of the Japanese law concerning support for people with developmental disorders, including ASD, there have been increasing efforts to detect ASD in a timely manner and provide the necessary support. Checking for autistic behavior in children is more common, however, the professional support provided to children with ASD and their families is still reported to be inadequate⁴. Moreover, professional support generally initiated after a formal diagnosis, but it takes an average of 3.5 years from the point at which parents first approach a health professional, to receive a diagnosis of

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* www.soumu.go.jp/menu_news/s-news/110614.html (Accessed November 14, 2019)

ASD⁴. Thus, many children diagnosed with ASD and their families fail to receive professional support, including nursing support, during early childhood.

The first three years of life mark a critical time for rapid brain growth and development⁵. A responsive and warm parent-infant relationship promotes the infant's brain development^{**}, essential for healthy growth. However, not all infants with autistic behaviors are able to build smooth relationships with their parents. Such infants have impaired social interaction across multiple contexts due to autistic traits¹. Previous studies reported that children with ASD demonstrated fewer positive emotions, lower engagement, and higher withdrawal in play with their parents than did children without ASD^{6,7}, which may make it difficult for parents to interact easily with their children. Parents of infants with autistic behaviors may experience more challenging parent-infant interaction because many infants with autistic behaviors notably demonstrate developmental delay in interpersonal skills. Worldwide, however, studies that use highly reliable and valid methods to investigate parent-infant interaction are lacking in the context of infants with autistic behaviors.

Children with ASD are also liable to demonstrate symptoms such as hypersensitivity, a deviated food habit, and sleep problems¹. These symptoms may impose an excessive burden on parents in daily life. Previous studies reported that parents had negative feelings or experiences owing to their children's ASD traits, and demonstrated high depressive symptoms or parenting stress⁸⁻¹¹. Affected children generally show signs of ASD from infancy; however, most studies have targeted parents whose children have already been diagnosed with ASD. Parents may experience difficulties in childcare much earlier than infants are diagnosed. In addition, some parents experience a time lag between onset of worry about their infants' autistic behaviors and contact with medical institutions, leaving families without professional support during a child's infancy. Thus, it is important to clarify characteristics of mental health of parents whose infants have autistic behaviors. Furthermore, although fathers play an important role in infants' healthy growth and development, they are often excluded from parenting studies. There is also a lack of case-control studies regarding the mental health of fathers of infants with autistic behaviors.

Parents of infants with autistic behaviors are more likely to be socially isolated, to be mentally unstable, and to maltreat their infants because of difficulties in parenting¹². Thus, it is important to provide the necessary support for building adaptive parent-infant relationships and childcare to protect infants with autistic behaviors and promote their development. Among those who provide professional support of parents and infants with autistic behaviors, nurses have the most contact with families from pregnancy to childhood. Nurses can notice unnatural parent-infant deviation and field requests for help. Thus, it is useful for nurses to have a comprehensive understanding of actual family conditions. The purpose of this study was to clarify the characteristics of parent-infant interaction, parental depressive symptoms, and parenting stress in the context of infants' autistic behaviors through a comparison with parents of typically developing children. We consider nursing support for these families on the basis of our results.

Methods

Design

This study employed a cross-sectional and case-control observational design.

Participants

We included parents and their infants who were diagnosed with ASD or deemed to demonstrate significant autistic behaviors in accordance with the criteria for neurodevelopmental disorders listed in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition¹. Infants' autistic behaviors were evaluated by doctors with sufficient experience in medical treatment of ASD. The included infants were aged 0 to 36 months, and in the case where developmental tests confirmed developmental age to be under 36 months, infants over 36 months were also included. By reviewing their medical records, we also confirmed that the infants did not have any psychiatric disorders except ASD.

The control group was composed of parents of infants who were age and gender matched with the infants in the case group. We confirmed that these infants did not indicate any autistic behaviors or delayed development. In both groups, parents with infants who had a serious illness and parents whose native language was not Japanese were excluded.

** <https://46y5eh11fhgw3ve3ytpwxt9r-wpengine.netdna-ssl.com/wp-content/uploads/2012/05/The-Science-of-Neglect-The-Persistent-Absence-of-Responsive-Care-Disrupts-the-Developing-Brain.pdf>. (Accessed November 14, 2019).

Measures

Demographic data

Parents answered questions regarding themselves and their infants; parental age, years of education, employment status, number of children, and annual household income for the former and infant's age, gender, gestational age at birth, and birth weight for the latter.

Parent-infant interaction

The Japanese version of the Nursing Child Assessment Teaching Scale (JNCATS)^{13, 14} was used to assess the quality of parent-infant interaction. The JNCATS involves scientific behavioral observation based on the Barnard model^{13, 15}, which covers the assumed roles and responsibilities of dyads in the parent-child interaction. The JNCATS was confirmed to be highly correlated with the original version, and also possesses high reliability^{13, 14}. Parent-infant interactions were observed during a teaching play session. The measure includes 73 items across six subscales. The four factors concerning parental responsibility are: Sensitivity to Cues (11 items; e.g., caregiver avoids physically forcing child to complete task), Response to Distress (11 items; e.g., caregiver makes sympathetic/soothing noises), Social-Emotional Growth Fostering (11 items; e.g., caregiver gently pats, caresses, strokes, hugs, or kisses child during interaction), and Cognitive Growth Fostering (17 items; e.g., caregiver describes perceptual qualities of task materials to the child). The two factors concerning the child's responsibility are Clarity of Cues (10 items; e.g., child changes intensity or amount of motor activity when provided with task material) and Responsiveness to Caregiver (13 items; e.g., child attempts to engage caregiver in eye-to-eye contact). The scale includes 32 items to assess the contingency aspect of interaction. Smooth parent-child interaction results in higher scores. Cutoff scores corresponding to children's age were set up for the Total Parent, Total Child, and Total JNCATS Scores. Scores lower than the cutoff were considered to indicate high risk¹⁴.

Parental depressive symptoms

The Japanese version of the Center for Epidemiologic Studies Depression Scale (CES-D) was used to assess parental depressive symptoms. The reliability and validity of the CES-D have already been verified¹⁶, and it is a widely used self-report measure of depressive symptoms. The CES-D comprises 20 items on a four-point Likert scale. A higher score indicates more evidence of depression. The cutoff score is 16.

Parenting stress

Parenting stress was measured with the Japanese Parenting Stress Index Short Form (JPSI-SF), whose reliability and validity have already been verified¹⁷. This self-report questionnaire was designed to assess the degree of stress related to parenting. Scored on a five-point Likert scale, it consists of 19 items across four subscales: Parental Distress (the extent to which parents feel competent, restricted, conflicted, supported, and/or depressed in their role as a parent), Spousal Relationship (how a parent perceives emotional and physical support from their partner), Parent-Child Dysfunctional Interaction (the extent to which parents feel satisfied with their child and their interactions with them), and Difficult Child (how a parent perceives their child; whether the child is easy or difficult to take care of). A higher score indicates higher parenting stress. Scores above the 90th percentile of total stress indicate clinically high risk¹⁷.

Data Collection and Procedures

Both groups were recruited between October 2017 and January 2019. The case group was recruited from a pediatric hospital and a specialized clinic for pediatric psychiatry. Parents in the case group were selected from patients who were approved to participate in the study by their doctors in charge. The control group was recruited from a childcare support center and pediatric hospital. The participants in the control group were gender and age matched with the case group at the time of recruitment. Infants were tested for autistic behaviors using the Modified Checklist for Autism in Toddlers Japanese version (M-CHAT-JV)¹⁸, which has a cutoff of 3. Infants in the control group were assessed for the absence of developmental delay using the Japanese Prescreening Developmental Questionnaire II¹⁹. They were excluded from the study if they demonstrated autistic behaviors or developmental delay. We asked parents to complete questionnaires and return them in person or by mail within two weeks. Medical data were collected from the patients' files.

Some parents agreed to the filming of a teaching play session, so we videotaped about five minutes of their interaction with infants, recording expressions and behaviors of both parents and infants in a private room or in their homes. Parents selected an activity for observation that was age appropriate for their infants but developmentally challenging (e.g., stacking three blocks on top of each other). Parent-infant interaction was coded by licensed raters who trained for more than 90% reliability on the JNCATS. Before coding, we confirmed over 90% inter-rater agreement in 20% of all interactions obtained

in this study. The raters were blinded to the group of participants.

Statistical Analysis

Continuous variables were presented as mean and standard deviation (SD) and categorical variables as number and percentage. We conducted the following analyses to explore statistical differences between the two groups: (a) parental age and years of education were examined by the Mann-Whitney U test, (b) parental employment status and family income were tested by the chi-square test, and (c) parent-child interaction, parental depressive symptoms, and parenting stress were assessed with the Mann-Whitney U test because these values were not normally distributed. We calculated the number and percentage at risk in the following: (a) dyads that scored below the JNCATS cutoff, (b) parents who scored the cutoff and over on the CES-D, (c) parents in the 90th percentile and over on the JPSI-SF. We used the Fisher's exact test to explore statistical differences between the two groups at risk. As an index of effect size, we used *r*, which was calculated by dividing the z-score (derived from each test statistic) by the square root of sample size for the Mann-Whitney U test²⁰. Usually, an *r* of .1, .3, and .5 indicates small, medium, and large effect sizes, respectively. We conducted data analysis after excluding questionnaires with missing values. *P* values less than .05 were considered statistically significant. Analysis was conducted using SPSS ver. 25.

Ethical Considerations

Parents received an oral and written explanation regarding the study, including the purpose, methods, and ethical considerations. Written informed consent was obtained from all enrolled parents. The study protocol was approved by the institutional review boards of Tokyo Medical and Dental University and the National Center for Child Health and Development (receipt NO: M2017-085 and 1697).

Results

The case group consisted of 51 couples who received approval for participation from their doctors in charge. Twenty-seven couples provided written informed consent to participate, and 24 couples did not agree to participate. Two fathers who did not answer the questionnaire were excluded. Therefore, 25 couples and two mothers were included in the analysis. Thirty-one dyads in the case group (13 dyads of fathers and infants, 18 dyads of mothers and infants) agreed to have teaching

Table 1. Demographic Data of Participants

	Case Group			Control Group		
	<i>n</i> (%)	Mean	SD	<i>n</i> (%)	Mean	SD
Father	25			28		
Age (years)		36.4	4.9		36.2	5.1
Education (years)		16.0	1.5		15.6	1.3
Employment Status						
Employed	25 (100.0)			28 (100.0)		
Mother	27			28		
Age (years)		35.3	4.7		35.4	3.7
Education (years)		15.6	1.3		15.6	1.3
Employment Status						
Employed	13 (48.2)			22 (78.6)		
Child	27			28		
Age (months)		30.9	8.5		27.3	7.2
Developmental Age (months) ^a		26.3	6.7		27.3	7.2
Gender						
Male	22 (84.5)			22 (78.6)		
Birth Week (weeks)						
≥36	27 (100.0)			28 (100.0)		
Birth Weight (g)						
≥2500	27 (100.0)			28 (100.0)		
Family	27			28		
Number of Children						
1	19 (70.4)			19 (67.9)		
≥2	8 (29.6)			9 (32.1)		
Family Income (ten thousand yen)						
<500	6 (22.2)			3 (10.7)		
500-700	4 (14.8)			9 (32.1)		
700-1000	11 (40.7)			11 (39.3)		
>1000	5 (18.5)			5 (17.9)		
Non-response	1 (3.7)			0 (0.0)		

Note. ^aDevelopmental age was confirmed only for infants aged over 36 months.

play sessions filmed.

Thirty-three couples were recruited for the control group. Twenty-eight couples agreed to participate in the study, while five couples did not agree. Thirty-nine dyads in the control group (18 dyads of fathers and infants, 21 dyads of mothers and infants) agreed to have teaching play sessions filmed.

Demographic Data

Table 1 depicts participants' demographic data. There was no significant difference between groups in terms of demographic data, excluding maternal employment status (*p* = .03). Most participants across groups had a middle to high socioeconomic status.

We performed matching, keeping in mind the developmental age of infants in the case group at recruitment, and there was no significant difference between groups

Table 2. Comparison of JNCATS Scores in the Case and Control Groups

	Father				<i>p</i> ^a	<i>r</i> ^b	Mother				<i>p</i> ^a	<i>r</i> ^b	
	Case Group (<i>n</i> = 13)		Control Group (<i>n</i> = 18)				Case Group (<i>n</i> = 18)		Control Group (<i>n</i> = 21)				Effect Size
	Mean	SD	Mean	SD			Mean	SD	Mean	SD			
Parent													
Sensitivity to Cues	9.2	.9	9.0	1.0	.52	.14	9.2	1.2	9.3	.9	.73	.07	
Response to Distress	10.3	1.0	10.2	1.0	.79	.13	10.4	.9	10.6	.9	.34	.19	
Social-Emotional Growth Fostering	8.5	1.1	8.4	1.1	.74	.18	8.6	1.0	8.6	1.0	.43	.14	
Cognitive Growth Fostering	11.9	1.7	10.9	1.7	.10	.10	11.8	1.9	12.2	2.2	.41	.14	
Total Parent	39.8	3.0	38.6	3.0	.12	.29	40.0	3.7	40.6	3.1	.73	.06	
Child													
Clarity of Cues	8.7	1.0	9.0	1.2	.27	.13	8.8	.9	8.9	.9	.75	.06	
Response to Caregiver	7.3	2.2	7.2	1.8	.97	.13	7.4	2.2	8.4	1.8	.11	.26	
Total Child	16.0	2.8	16.2	2.7	.73	.07	16.2	2.8	17.3	2.2	.17	.22	
Total JNCATS score	55.8	3.7	54.8	3.9	.41	.15	56.2	5.9	57.9	4.2	.75	.06	
Contingency scores													
Parent Contingency	15.6	2.1	14.7	2.1	.23	.06	15.5	2.9	16.1	2.4	.59	.09	
Child Contingency	7.1	1.9	6.7	1.7	.71	.09	6.8	1.9	7.7	1.5	.10	.28	
Total Contingency Scores	22.7	2.1	21.4	2.5	.16	.26	22.3	4.1	23.8	3.0	.35	.16	
.....													
Dyads of below the cutoff in the JNCATS.													
Total Parent	1 (7.7)		2 (11.1)		1.0		4 (22.2)		1 (4.8)		.16		
Total Child	5 (38.5)		4 (22.2)		.43		5 (27.8)		3 (14.3)		.43		
Total JNCATS Score	2 (15.4)		5 (27.8)		.67		5 (27.8)		2 (9.5)		.22		

Note. ^a Mann-Whitney U test. * *p* < .05 ** *p* < .01

^b Effect size: *r* was calculated by dividing the z-score (derived from each test statistic) by the square root of the sample size.

^c Fisher's exact test.

in terms of infants' age. In the case group, six infants (22.2%) had a definite diagnosis of ASD. As per doctors' assessments, all infants in the case group required medical support and were receiving some care focused on rehabilitation to improve autistic behaviors. None of the infants in the control group demonstrated autistic behaviors or delayed development. The average M-CHAT JV score was 5.9 (*SD*: 3.4) in the case group and 0.5 (*SD*: 0.6) in the control group. The percentages of infants who scored over the M-CHAT JV cutoff were 80.7% in the case group and 0.0% in the control group.

Characteristics of Parent-Infant Interaction, Parental Depressive symptoms, and Parenting Stress

Parent-infant interaction

The data for the JNCATS were obtained from 31 dyads in the case group and 39 dyads in the control group who agreed to have their teaching play sessions filmed. There were no significant differences in JNCATS scores between the two groups when comparing the median

value, and effect sizes were small as a whole. (Table 2).

In the two groups, there was no significant difference in scores in the Total Parent, Total Child, and Total JNCATS Scores regarding the number of dyads who scored below the cutoff, as determined by Fisher's exact test (Table 2). Father-infant dyads in the two groups and mother-infant dyads in the control group did not score below the cutoff in the Total Parent, Total Child, and Total JNCATS Scores. Three mother-infant dyads in the case group (16.7%) scored below the cutoff in the Total Parent, Total Child, and Total JNCATS Scores. Their mean scores were: 31.0 (*SD*: 1.0) for the Total Parent; 12.7 (*SD*: 0.6) for the Total Child, and 46.7 (*SD*: 1.2) for the Total JNCATS Scores.

Parental depressive symptoms

The data for the CES-D were obtained from 25 couples and two mothers in the case group and 28 couples in the control group. Table 3 illustrates scores on the CES-D.

Mothers in the case group reported significantly higher scores than mothers in the control group (*p* = .01). There

Table 3. Comparison of Mental Health Scores in the Case and Control Groups

Variable	Father				<i>p</i> ^a	Effect Size <i>r</i> ^b	Mother				<i>p</i> ^a	Effect Size <i>r</i> ^b
	Case Group (n = 25)		Control Group (n = 28)				Case Group (n = 27)		Control Group (n = 28)			
	Mean	SD	Mean	SD			Mean	SD	Mean	SD		
CES-D	8.2	5.6	6.3	4.3	.23	.16	13.4	9.5	8.0	7.5	.01*	.35
JPSI-SF												
Parent Domain												
Parental Distress	17.4	4.5	15.8	3.7	.20	.18	20.7	5.9	16.3	5.1	.00**	.41
Spousal Relationship	4.4	1.9	3.7	1.4	.00**	.86	5.5	2.3	4.0	1.7	.02*	.32
Parent Domain Scores	21.7	5.7	19.4	4.3	.16	.19	26.1	7.0	20.3	5.9	.00**	.43
Child Domain												
Parent-Child Dysfunctional Interaction	8.6	2.3	6.7	1.9	.00**	.41	10.1	2.5	3.1	1.9	.00**	.67
Difficult Child	14.0	3.0	12.5	2.9	.11	.22	16.4	4.3	11.3	3.4	.00**	.55
Child Domain Scores	22.6	4.4	19.2	4.1	.01*	.38	26.4	6.2	17.3	4.9	.00**	.63
Total Scores	44.4	8.4	38.6	7.5	.02*	.33	52.6	11.4	37.6	9.0	.00**	.59
	<i>n</i> (%)		<i>n</i> (%)		<i>p</i> ^c		<i>n</i> (%)		<i>n</i> (%)		<i>p</i> ^c	
Parents of the cutoff and over in the CES-D.	2 (8.0)		1 (3.6)		.60		7 (25.9)		4 (14.3)		.33	
Parents of the 90th percentile and over in the JPSI-SF.												
Parent Domain Scores	3 (12.0)		1 (3.6)		.33		11 (40.7)		4 (14.3)		.04*	
Child Domain Scores	6 (24.0)		2 (7.1)		.13		18 (72.0)		2 (7.1)		.00**	
Total Scores	6 (24.0)		1 (3.6)		.04*		15 (53.6)		2 (7.1)		.00**	

Note. ^a Mann-Whitney U test. * $p < .05$ ** $p < .01$

^b Effect size: r was calculated by dividing the z-score (derived from each test statistic) by the square root of the sample size.

^c Fisher's exact test.

were no significant differences between the two groups regarding the number of parents who scored at the cutoff and over on the CES-D. Seven mothers in the case group scored at the cutoff and over on the CES-D, and five of them were employed.

Parenting stress

The data for the JPSI-SF were obtained from 25 couples and two mothers in the case group and 28 couples in the control group. Table 3 illustrates scores on the JPSI-SF.

Fathers in the case group scored significantly higher than fathers in the control group in the Child Domain Scores ($p = .01$). Mothers in the case group also scored significantly higher than mothers in the control group in both the Parent Domain Scores ($p = .00$) and Child Domain Scores ($p = .00$). The number of parents who scored in the 90th percentile and above on the JPSI-SF was significantly different between the two groups regarding paternal Total Score ($p = .04$), maternal Parent Domain Score ($p = .04$), Child Domain Score ($p = .00$), and Total Score ($p = .00$). Fifteen mothers in the case group were in the 90th percentile and above in Total Score on the JPSI-SF, and nine of them were employed.

Discussion

This study was conducted to clarify the characteristics of parent-infant interaction, parental depressive symptoms, and parenting stress in the context of infants' autistic behaviors. In terms of demographic data, there was a significant difference between the two groups regarding maternal employment status. Maternal employment has been reported to have both positive and negative impacts on maternal mental health²¹⁻²³. Thus, the results regarding maternal mental health require careful interpretation because of the possible influence of maternal employment status. Among infants in the case group, the ratio of male to female was 4:1, which is similar to the ratio of patients with ASD²⁴.

In terms of parent-infant interaction, there was no significant difference between the two groups, and effect sizes were small as a whole. However, maternal depressive symptoms and parenting stress were significantly higher in the case group than in the control group. These findings highlight the necessity of two aspects of nursing support for families of infants with autistic behaviors: supporting the parent-infant interaction and the provision of support right from infancy.

Characteristics of Interactions Between Parents and Infants with Autistic Behaviors

There was no significant difference between the two groups with regard to parent-infant interaction. This contradicts previous findings that children with ASD demonstrated specific behaviors such as poor emotional expression in parent-child interaction^{6, 7}. With approximately 80% scoring above the M-CHAT JV cutoff, most infants in the case group indicated a high level of autistic behaviors. It is natural for their autistic behaviors to lead to impairments in social interaction, including parent-infant interaction. However, the present results suggest that they were able to demonstrate clarity of cues and responsiveness to the caregiver in parent-infant interactions. A previous study reported that caregivers of infants with impediment made an effort to maintain smooth parent-infant interaction²⁵. We believe that similar parental inclinations may be reflected in our result. It is reasonable to assume that parents in the case group endeavored to enhance their interactions, taking infants' impairments into consideration. Parents in the case group may belong to the population with high awareness of their infants' autistic behaviors because they are able to notice infants' traits and access professional institutions during infancy. In other words, such parents observe their infants closely and make an effort to interact smoothly with them on a daily basis.

It is surprising that paternal JNCATS scores were not significantly different between the ASD and control groups. A previous study reported that fathers had significantly lower scores on the NCATS than mothers²⁶. Although this study did not make a comparison between fathers and mothers, in the case group, paternal mean score in the Total JNCATS Score was much the same as the maternal score in the Total JNCATS Score. There is a possibility that fathers who participated in this study were more interested and actively involved in daily childcare than the general population. On the other hand, it is possible that they have been adapted to infants' autistic behaviors through daily father-infant interaction. Future studies should conduct longitudinal observation of parent-infant interaction because it may change with time and because parent-infant interaction is also composed of plural factors not evaluated by the JNCATS.

However, not all parent-infant dyads in the case group demonstrated adaptive interaction; 16.7% of mother-infant dyads demonstrated extremely fewer interactive behaviors in their teaching play sessions. As a result, these dyads could not interact smoothly with each other. In addition, most of parents in the case group experienced parenting stress in their interactions owing to the

JPSI-SF. It is possible that they may feel stronger stress because of more than ordinary efforts in parent-infant interaction. Stressful parent-infant interaction can lead to parents expressing negative emotion toward their infants and increase the risk of maltreatment. Thus, we believe that these families need nursing support to interact with each other comfortably.

Parental Mental Health during Child's Infancy

Maternal depressive symptoms in the case group were significantly higher than in the control group, and parenting stress in the case group was also significantly higher than in the control group. These findings are similar to previous results^{9, 10, 22, 27}. It is likely that the mental health problems of parents of infants with autistic behaviors start in their children's infancy.

Maternal depressive symptoms in the case group were particularly serious. It has been reported that 4.3% of mothers with infants in Japan demonstrated depressive symptoms²⁸. The proportion of mothers with depressive symptoms in the case group was much higher than among mothers of typically developing infants. In contrast, most fathers in the two groups demonstrated scores below the CES-D cutoff, which is similar to the results of a previous study⁹. The prevalence of depression is lower in men than women, and a possible reason may be that fathers have more social roles outside the home. However, some fathers in the case group showed high depressive symptoms. Thus, there is a need for careful evaluation of paternal mental condition as well. Parental depressive symptoms during their children's infancy may hinder sensitive and responsive childcare and negatively influence the parent-infant relationship as well as infants' development. Therefore, we think if infants demonstrate some autistic behaviors irrespective of the degree of those behaviors, nurses should assess parental mental health and support them promptly if needed.

Parenting stress in the case group was significantly higher than in the control group. These results are similar to previous research demonstrating that parents of toddlers with ASD are more stressed by their children than are parents of typically developing toddlers^{22, 23, 27}. In particular, parents in the case group indicated high scores in the Child Domain Scores. One reason for this result could be the difficulty involved in parenting owing to infants' autistic behaviors. Although this study included only six out of 27 infants diagnosed with ASD, parents of infants with autistic behaviors indicate high parenting stress even before infants receive an official diagnosis. Thus, it is important for them to receive support from the time their children are in infancy, preventing aggravation

of parental mental health whether or not infants have been clinically diagnosed.

Implications for Nursing

Based on the findings of this study, we have identified some implications for clinical practice. This study showed that families of infants with autistic behaviors experienced difficult parent-infant interaction and parents experienced mental health problems. The earliest period of childhood is particularly important for infants' growth and development. Thus, it may lead early detection of parents and infants with autistic behaviors who need professional support that nurses assess parent-infant interaction and parental mental health regardless of clinical diagnostic.

Nurses play an important role supporting these families; we believe that nurses should help families understand infants' autistic characteristics and the meaning of infants' behaviors. Greater parental understanding may lead to smoother daily childcare and parenting confidence. It may be useful for parents to receive specific educational support matched to their infants' traits because each infant is markedly different in autistic behavioral ranges. Fathers in particular do not have many opportunities to talk to others or ask for advice about infants and childcare; thus, we recommend that nurses help the whole family. Nurses should always stay close to them supportively and help them to promote healthy parent-infant relationships and infant development.

Limitations

The results should be carefully interpreted owing to the small sample size and differences in maternal employment status between the two groups. Further, it was particularly difficult for us to find fathers of infants with autistic behaviors to participate in this study. Many fathers were unable to participate because they did not have time to answer questionnaires or be filmed in a teaching play session. When fathers could not come to the hospital, a researcher visited their home and collected data.

The possibility of sampling bias can also not be excluded, although we recruited most parents of infants with autistic behaviors through their doctors. It is possible that parents in the case group had a high level of interest in infant behavior and childcare. In addition, most families in both the case group and the control group were middle-class, which may have been reflected in childcare. Parental interest and family economic status may have influenced parental factors in this study; the results, therefore, cannot be easily generalized. Future studies should use larger sample sizes and include

families from various backgrounds, including those less interested in childcare, those from lower socioeconomic classes, and single-parent families.

Conclusions

There was no significant difference between the case group and the control group regarding parent-infant interaction. However, parents of infants with autistic behaviors experienced high parenting stress and mothers demonstrated high depressive symptoms from infancy. It is suggested that both mothers and fathers should be provided with nursing support from infancy so as to facilitate an adaptive parent-infant relationship and prevent the aggravation of parental mental health, which will ensure infants' healthy growth and development.

Conflict of Interest Statement

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