

Influence of the COVID-19 pandemic on children with autism spectrum disorder and their mothers in Japan

Autism & Developmental Language Impairments
Volume 8: 1–18
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DOI: 10.1177/23969415231212347
journals.sagepub.com/home/dli



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Abstract

Background and aims: Research on the psychological impact of the coronavirus disease 2019 pandemic has highlighted its negative and positive effects on children with autism spectrum disorder and their families. However, little is known about the neutral effects that remain the same, even in particular circumstances, and how children with autism spectrum disorder and their parents perceive each other. We explored how children with autism spectrum disorder and their mothers perceived and experienced the pandemic in Japan.

Methods: A mixed-methods design was employed. Thirteen children with autism spectrum disorder and 12 mothers participated. Data were collected through online semi-structured interviews and analyzed using thematic analysis. Similarities and differences in perceptions were compared.

Results: The results revealed six broad themes and 27 categories. Regarding neutral effects, some mothers reported no substantial impact because there were no changes in their jobs or other dramatic life changes. In addition, some children were not affected because they had had no social contact before the pandemic or because their lives had not changed dramatically. Regarding the perceptions of children/mothers, most expressed that they/their children enjoyed spending time with their families. At home, mothers made various efforts to interact with their children. However, mothers and children differed in their perceptions, such as regarding the emergence of anxiety about conducting school events and the resolution of study-related concerns.

Conclusions: There were negative, neutral, and positive effects on both children with autism spectrum disorder and their mothers; specifically, they were striving to move forward to overcome the problems posed by the pandemic. Both parties tapped into their resilience by enhancing family interactions, such as cooking together or discussing children's interests.

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Implications: These findings have important implications for developing more creative solutions to the challenges of coping and resilience in future crises.

Keywords

COVID-19, school-age children, autism spectrum disorder, Japan, mixed methods research

The coronavirus disease 2019 (COVID-19) pandemic, caused by severe acute respiratory syndrome coronavirus 2, spread rapidly worldwide in early 2020. In Japan, where this study was conducted, the first case of COVID-19 was confirmed in January 2020, following which the pandemic gradually spread. To prevent the further spread of the infection, almost all elementary and junior high schools were temporarily closed from March to May, resulting in a drastic change in children's living environments. In April of the same year, the Japanese government declared the first state of emergency for the entire country, which was subsequently issued several times in areas with many patients with COVID-19. Although the government did not implement lockdowns as in other countries, it recommended the avoidance of the "Three Cs"—closed spaces, crowded places, and close-contact settings. Also recommended was staying home to limit the flow of people and reduce the spread of the virus. Although these measures had no legal force, they resulted in changes in work and school situations (e.g. wearing a mask, working from home, and taking online classes). These efforts to prevent infection have continued, and the number of patients has continued to vary. The infection situation was not very severe at the time of conducting this study.

Prior to the pandemic, there was limited research on the experiences of children with autism spectrum disorder (ASD) during disasters and other emergency events, and there was a need to determine the psychological effects and resiliency in this population in response to such events (Stough et al., 2017). However, after the pandemic, the COVID-19 experiences of children with ASD and their families have provided the opportunity to study the impact of changing environments (Simpson & Adams, 2022), and there is a growing body of research focused specifically on their experiences and adaptation to the "new normal" as preparation for the future (for a review, Dal Pai et al., 2022).

The findings of previous studies that involved interviews with parents of children with ASD revealed that the pandemic is not phase-independent and has negative, neutral, or positive effects on the interpersonal relationships, mental health, and education of children with ASD and their families. Further, most parents reported that they and their children demonstrated both negative and positive changes in various domains. For example, Fox et al. (2022) surveyed parents' perceptions of the impact of COVID-19 on the friendships of their children with ASD

during the transition to a new school in December 2020. COVID-19 has negatively impacted friendships by reducing contact with existing and new friends and their parents. Regardless of lockdown restrictions, some had neutral experiences, wherein nothing changed because they had had no contact with friends outside school before the pandemic. Others had positive experiences, such as children who had difficulty making friends without bringing their friends home to play, thus reducing their stress.

In broader domains, including social interactions and communication (e.g. Fox et al., 2022), negative aspects extend to the deterioration of mental health (Asbury et al., 2021; Daulay, 2021; Pellicano et al., 2022; Rogers et al., 2021), difficulties in adaptation to remote learning (Amirova et al., 2022; Bozkus-Genc & Sani-Bozkurt, 2022; Heyworth et al., 2021; Majoko & Dudu, 2020; Meral, 2021), disruption of family routines (Bozkus-Genc & Sani-Bozkurt, 2022; Meral, 2021), and increased problem behaviors of children (Amirova et al., 2022; Daulay, 2021; Latzer et al., 2021; Meral, 2021). Some of the factors contributing to these negative effects suggest that parents of children with ASD generally experience higher levels of parental stress than those of typically developing children (Hayes & Watson, 2013; Osborne & Reed, 2009), and it is highly plausible that their stress might be magnified during a pandemic (Corbett et al., 2021). Owing to the characteristics of ASD, such as resistance to changes in routine and sensory issues, children with ASD may have had difficulty adapting to the new normal (Ameis et al., 2020). Subsequently, regarding neutral aspects, a large-scale survey conducted by Corbett et al. (2021) reported no changes in the measures of mental health and stress among children with ASD during lockdown, although the domains and factors were not sufficiently identified in the interview studies. Finally, positive aspects include acquisition of new routines and skills (Amirova et al., 2022; Latzer et al., 2021; Majoko & Dudu, 2020; Meral, 2021), enhancement of home education (Daulay, 2021; Heyworth et al., 2021; Majoko & Dudu, 2020), improved mental health and well-being of children with ASD and their parents (Latzer et al., 2021; Pellicano et al., 2022; Rogers et al., 2021), and sharing more family time (Bozkus-Genc & Sani-Bozkurt, 2022; Meral, 2021; Rogers et al., 2021). As for these factors, Bolbocean et al. (2022) speculated that this was because the COVID-19

crisis encouraged the activation of parental resilience, which is the ability of families and their children to beat the odds under adverse conditions. The activation was influenced by parents' ability to accommodate their children's needs, in addition to their creativity, resourcefulness, and ability to maintain a positive outlook. A summary of the negative, neutral, and positive findings of previous studies is presented in Table 1.

Previous studies demonstrated both negative and positive effects, except for Asbury et al. (2021), who reported mainly negative effects and partially revealed the impact of the pandemic from the parents' perspective. However, these studies relied entirely on parental perceptions and did not involve children with ASD in the research process, except for Pellicano et al. (2022), who examined young people (aged 15 years) with autism. In addition, none of the interview studies sufficiently revealed neutral effects, and Pellicano et al. (2022) did not provide a detailed analysis of the commonalities and differences in the perceptions of parents and children. Identifying what remains the same during the pandemic helps further the understanding of ASD and, from both perspectives, provides valuable insights for supporting children with ASD and their parents, "making the world a more autism friendly place" (Spain et al., 2021, p. 9).

Based on prior findings, we investigated the long-term impact of the pandemic on daily life by conducting in-depth qualitative interviews with younger children with ASD compared to the participating children by Pellicano et al. (2022) and their mothers. The reason for assuming a "long-term" impact is that society is undergoing changes ranging from lockdowns to living with coronaviruses, and this situation warrants an analysis of the trends over time (Stadheim et al., 2022).

The research question in this study was how the long-lasting COVID-19 pandemic negatively, neutrally, and positively affected the psychological aspects of children

with ASD and their mothers' perceptions of their family functioning. In addressing this question, we hypothesized that mothers and their children with ASD could perceive both the negative and positive effects of the pandemic situation, and their perceptions could differ from each other depending on their individual perspectives. For example, we predicted that both the mother and her child would perceive the negative effects of the pandemic on their mental health and that the mother would perceive her child as having negative effects, while her child would feel positive for reasons such as being able to play video games at home.

Methods

Research design

A mixed-methods design—combining a quantitative approach using questionnaires with a qualitative approach using interviews—was used to reveal the common or different meanings based on individuals' experiences (Creswell & Creswell, 2017). Focusing on the perspectives of mothers and their children, we examined their core experiences and reactions during a period approximately one and a half years from the beginning of the pandemic.

Participants

Twenty-five participants (13 children with ASD and 12 mothers of children with ASD) were recruited from three university clinic centers and one child development center. One mother had two children with ASD. To investigate the impact of the pandemic on parents and children, mothers were targeted instead of fathers, as mothers typically spend more time with their children at home and have more frequent interactions with their children. Most participating children and their mothers lived in urban areas of Japan, and all the children regularly went to school at the time of the survey. The eligibility criteria were (1) women with at least one child, (2) children aged 10–15 years, (3) the child having received a clinical diagnosis of autism according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision or Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition criteria (APA, 2000, 2013), (4) a Full-Scale Intelligence Quotient ≥ 70 on the Wechsler Intelligence Scale for Children-Fourth Edition, and (5) mothers having spent time with the child at home. The reason behind choosing the lower age limit of 10 years was the need to convey pandemic-related in-depth personal experiences of this age group (Pellicano et al., 2022). Similarly, the reason for the upper age limit of 15 years was that the parent–child relationship in Japan generally changes substantially after high school age, such as children spending less time with their mothers.

Table 1. Findings of previous studies related to the impact of the COVID-19 pandemic on children with autism spectrum disorder (ASD) and their families.

Effects	Domains
1. Negative effects	Deterioration of mental health Difficulties in adaptation to remote learning Disruption of family routines Increased problem behaviors of children
2. Neutral effects	No changes in measures of mental health and stress
3. Positive effects	Acquisition of new routines and skills Enhancement of home education Improved mental health and well-being Sharing more family time

Procedure

A short introduction to the study's purpose was provided to the mothers and their children. Mothers also confirmed that the questionnaire and interview results could be recorded and stored and were informed that the anonymized data would be used only in publications. Importantly, participants were clearly informed that they had the right to withdraw from the study at any time. All the mothers signed an informed consent form. The survey was then conducted in the order of a series of questionnaires and interviews. All the procedures performed in this study were approved by the Department of Education Ethics Committee of Kochi University (no. 2021-08).

Instrument. We requested that the mothers send the completed questionnaires before the interview was conducted. The form included mothers' demographic details such as age, educational level, family status, total number of children, and current working situation (usual working pattern, changed working pattern, or homemaker). This form also included details of children with ASD, such as age, sex, diagnosis, educational system (regular or special-needs education), changes in children's bedtime and waking times throughout the pandemic (earlier, no change, or later), and the number of services currently in use after school and on weekends (e.g. basketball, judo, or extra tuition).

In addition, mothers completed the Japanese version (Wakabayashi et al., 2004, 2007) of the autism-spectrum quotient (AQ; Baron-Cohen et al., 2001) to measure the strength of ASD characteristics in mothers and their children with ASD. As mothers' characteristics were also considered relevant to the mother-child relationship, the AQ was implemented for mothers. The cut-off points for diagnosing ASD by AQ scores for adults and children were 33 and 25, respectively. Participants' demographic profiles are summarized in Table 2.

Interview. Online semi-structured interviews using Zoom were conducted between October and November 2021, depending upon participants' convenience and availability. All interviews were performed individually with the child with ASD and the mother for ~ 30 min each. The child and mother were asked a series of 16 and 20 open-ended questions, respectively, using a semi-structured interview guide developed specifically for this study.

To avoid misunderstandings, the interview guide for the child included attention to ensure confirmation as much as possible during the interview. The interviewer initially instructed, "I interviewed Ken (pseudonym) about COVID-19. Your school was closed when the pandemic occurred, right? Please think back carefully from that time to today and answer the questions." Subsequently, slides created using Microsoft PowerPoint for Mac were shared

on the screen. Questions pertaining to from the beginning of the pandemic until the study period were presented at the top of the screen. "The beginning of the pandemic" in this study was defined as around March 2020, when schools were closed countrywide in Japan. A space was provided below the question to enter what the child expressed. The interviewer asked the children to answer each of the questions in Table 3 and uttered the phrase, "From the beginning of the pandemic until now," in a loud voice at the beginning of each question. They typed the children's utterances in real time and asked additional questions as needed (e.g. "What does that mean?" or "What else?"). The reason for visually presenting the expressed content was to enhance accuracy and elicit in-depth personal experiences. Questions 2 and 3 were asked only when disruptions were indicated in question 1. In the second half of the interview, the children were asked about the current situation (October or November 2021). The questions were the same as those in the first half, with the sentences in Table 3 modified to the present tense. It was clarified that, "From now on, I will ask about the current situation. The questions are the same." Subsequently, "Now" was presented and emphasized with the question sentence on the screen. The other procedures were the same as in the first half of the interview.

The interview procedures for the mother were modified from those for the child in the following ways. First, two questions were added regarding the changes in the mother-child relationship by increasing or decreasing the time spent with the child (questions 9 and 10 in Table 3). Only the mother was asked this question because describing the changes in the relationship was considered difficult for the child. Second, the interviewer asked about both the mother and her children (questions 1-3, 7, and 8). Finally, the interviewer did not type the mother's utterances and only verbally interacted with her. The other procedures were the same as those for the interviews with children.

Data analysis

Thematic analysis was performed, and the two themes of negative and positive effects indicated by Meral (2021) were expanded to three themes with the addition of neutral effects. The utterances of children with ASD and their mothers were distributed among these themes. Thereafter, the similarities and differences in children's and mothers' perceptions were compared.

Further, the interview data were imported into NVivo (Release 1.6.2)—a qualitative data management software that helps organize and structure the data. Data were processed using thematic analysis in five stages: (1) data organization, (2) data coding, (3) creating themes, (4) editing codes and themes, and (5) explaining and writing themes (Alase, 2017; Braun & Clarke, 2006; Creswell & Creswell, 2017). Before data analysis, the interview

Table 2. Participants' demographic profiles (N = 25).

Information on mothers				Information on children															
Mother	Age (years)	Educational level	Family status	Number of children	Working situation	AQ	Child	Age	Sex	Diagnosis	WISC-IV					Changes in bed/waking times	Number of services in use		
											FSIQ	VCI	PI	WMI	PSI			PSI	AQ
M ₁	39	Bachelor's degree	Married	2	Homemaker	24	C ₁	10	M	ASD	85	88	100	79	83	Special-needs	No change/later	2	33
M ₂	40	Bachelor's degree	Married	2	Usual	32	C ₂	10	M	ASD	128	117	141	136	86	Regular	Later/later	2	35
M ₃	47	High school	Married	1	Usual	10	C ₃	10	F	ASD	97	111	93	91	91	Regular	No change/no change	4	30
M ₄	35	Bachelor's degree	Married	1	Usual	9	C ₄	11	M	ASD	78	93	72	68	94	Special-needs	Later/later	1	25
M ₅	38	Vocational school	Married	1	Usual	9	C ₅	11	M	ASD	97	105	93	91	99	Special-needs	No change/no change	2	28
M ₁	39	Bachelor's degree	Married	2	Homemaker	24	C ₆	11	F	ASD/ADHD	95	115	98	79	83	Special-needs	No change/no change	2	32
M ₆	44	Vocational school	Married	2	Homemaker	13	C ₇	11	F	ASD	95	113	91	88	86	Regular	No change/no change	5	22
M ₇	42	Bachelor's degree	Married	1	Usual	12	C ₈	12	M	ASD/ADHD	97	101	91	94	102	Regular	No change/no change	2	37
M ₈	42	High school	Married	5	Usual	17	C ₉	12	M	ASD	93	111	93	94	76	Special-needs	Later/later	1	29
M ₉	45	Associate degree	Single mother	1	Usual	6	C ₁₀	12	F	ASD	80	97	71	88	81	Special-needs	Later/later	1	26
M ₁₀	46	Vocational school	Married	3	Usual	8	C ₁₁	12	M	ASD	78	93	87	57	86	Special-needs	No change/no change	0	40
M ₁₁	50	Bachelor's degree	Married	1	Usual	14	C ₁₂	12	M	ASD	76	80	78	76	88	Special-needs	No change/no change	3	25
M ₁₂	54	Master's degree	Married	1	Usual	4	C ₁₃	13	M	ASD/ADHD	106	123	113	94	78	Regular	No change/no change	4	28

M_i: mother; C: child; AQ: autism-spectrum quotient; WISC-IV: Wechsler Intelligence Scale for Children-Fourth Edition; FSIQ: Full Scale Intelligence Quotient; VCI: verbal comprehension index; PRI: perceptual reasoning index; WMI: working memory index; PSI: processing speed index; ASD: autism spectrum disorder; ADHD: attention-deficit/hyperactivity disorder. M1 had two children: C₁ and C₆.

Table 3. Questions about the COVID-19 pandemic.

Questions to mothers	Questions to children
1. How disruptive was the pandemic to your and Ken's (child's name's) daily life?	1. How disruptive was the pandemic to your daily life?
2. What was disruptive to you and Ken?	2. What was disruptive to you?
3. How did you and Ken cope with these disruptions?	3. How did you cope with these disruptions?
4. What did you spend your time doing with Ken?	4. What did you spend your time doing with your mother?
5. How did Ken seem when he was with you?	5. How did you feel about spending time with your mother?
6. Can you tell me the reason behind your answer?	6. Can you tell me the reason behind your answer?
7. Did you and Ken feel stressed, such as frustrated or sad?	7. Did you feel stressed, such as frustrated or sad?
8. Can you tell me the reason behind your answer?	8. Can you tell me the reason behind your answer?
9. Compared to before the pandemic, have you spent more time with Ken?	
10. Has the mother-child relationship changed as you spent more or less time with Ken?	

recordings (audio records) were converted into textual data for each participant. The first author then read each of the interview transcripts several times to obtain a general meaning and analyzed them using six themes, consisting of three each for the mother and child, generated in accordance with the qualitative research questions (Braun & Clarke, 2013). All the data related to these themes were coded using a line-by-line approach. Each new code was compared to discern whether the code represented a new code or should be a part of an existing code, following which a preliminary codebook was created. To ensure the appropriate coding of all transcripts and to discern if any additional codes should be added using the codebook, an iterative consensus-building process used by Latzer et al. (2021) was implemented. The first and second authors re-read each interview separately and then discussed the codes that emerged, verifying that they faithfully reflected the content of the transcripts and not their own impressions. When there was a disagreement with the coding, the authors re-read the entire transcript and discussed it again to reach a consensus.

Results

Through analysis of the codes and concepts drawn from the interviews, the categories related to the effects of the COVID-19 pandemic in Japan on mothers and children with ASD emerged. We classified the categories that had the same effects on both mothers and children as “common” and those with different effects as “specific” (Table 4).

Effects of the pandemic on mothers

As seen on the left side of Table 4, the “negative effects on mothers” category comprised five codes. Mothers emphasized that they felt confusion, stress, and anxiety owing to the pandemic, that the pandemic disrupted their daily

rhythm, and that they did more household chores. The number of mentions of these things decreased in “now” compared to “until now.” Notable quotations for each code are presented in Table 5.

The theme of neutral effects for mothers comprised two codes. The mentions indicated that they were not affected by the pandemic, such as the mothers maintaining their mental health (e.g. not feeling stressed) and embracing normalcy (i.e. spending every day in the same manner as before the pandemic).

The theme of positive effects on mothers consisted of five codes. The category “devise how to interact with the child” included eight sub-categories. When mothers mentioned common positive effects, they highlighted infection prevention (e.g. washing hands and gargling) and reduced interpersonal stress owing to behavioral restrictions. Specific effects on mothers included devising ways to interact with the child, going outside, and obtaining cooperation from the school. In particular, the number of mothers who mentioned “provide support according to the infection situation (e.g. suggesting that the child talk to friends on the phone during periods of behavioral restrictions)” as change from “until now” to “now” decreased from six to two. The number of “go outside and engage in activities” mentions increased from zero to three.

Effects of the pandemic on children with ASD

The negative effects for children with ASD mentioned by mothers and children with ASD themselves comprised seven codes, shown on the right side of Table 4. The number of references to confusion caused by the pandemic and feeling stressed owing to behavioral restrictions decreased, and interpersonal stress increased for both mothers and children. Moreover, only mothers emphasized that their children felt anxious about the reopening of schools and were confused by the implementation of

Table 4. Quantitative and qualitative appraisals of mothers and children with autism spectrum disorder (ASD) (N = 25).

Themes and definitions	Categories/sub-categories		Until now		Themes and definitions	Categories		Until now		Now	
	Common	Specific	Now	Until now		Common	Specific	Mother	Child	Mother	Child
1. Negative effects on mothers evaluate the negative effect of the pandemic on themselves	Common	Confused by the pandemic	5	1	4. Negative effects on children with ASD Mothers and children with ASD evaluate the negative effect of the pandemic on their children and themselves, respectively	Common	Confused by the pandemic	6	3	2	1
		Feel stressed about behavioral restrictions	3	1		Common	Feel stress about behavioral restrictions	5	6	3	3
		Feel anxious about the reopening of school	1	0		Specific	Experience study-related concerns	2	8	3	4
	Specific	Disturbed daily life rhythm	4	0			Feel more interpersonal stress	2	3	5	6
		Do more household chores	3	0			Confused by the implementation of school events	0	0	3	0
2. Neutral effects on mothers evaluate the neutral effect of the pandemic on themselves	Common	Maintain mental health	5	8	5. Neutral effects on children with ASD Mothers and children with ASD evaluate the neutral effect of the pandemic on their children and themselves, respectively	Common	Maintain mental health	1	2	1	8
		Embrace normalcy	5	1		Specific	Embrace normalcy	2	0	1	2
		Prevent infection	1	2			Maintain mother-child relationship	4	1	3	2
3. Positive effects on mothers evaluate the positive effect of the pandemic on themselves	Common	Prevent infection	1	2	6. Positive effects on children with ASD Mothers and children evaluate the positive effect of the pandemic on their children and themselves, respectively	Common	Prevent infection	7	4	2	2
		Feel less interpersonal stress	1	0		Specific	Feel less interpersonal stress	4	1	0	0
	Specific	Devise how to interact with the child	1	1			Have a good time with family	13	13	11	13
		Support the child	6	8			Resolve study-related concerns	0	6	0	7
		Provide support	6	2			Spend time on your	0	4	4	4

(continued)

Table 4. Continued.

Themes and definitions	Categories/sub-categories	Until now		Themes and definitions		Categories		Until now		Now	
		1	2	Now	Until now	Themes and definitions	Categories	Mother	Child	Mother	Child
	according to the infection situation										
	Identify growth and characteristics	1	3					6	0	2	1
	Consult with the teacher and doctor	2	1					5	0	1	0
	Maintain a moderate psychological distance	2	1					0	1	0	5
	Promote independence	2	0					0	0	4	0
	Self-monitor interactions	0	2					0	0	4	0
	Change jobs to take care of the child	0	1					0	0	0	4
	Go outside and engage in activities	0	3					0	0	0	4
	Obtain cooperation from school	1	0					0	0	0	4

“Until now” means “from the beginning of the pandemic to now,” “Now” means October or November 2021, when the interviews were conducted. In the columns for categories and subcategories, participants such as the mother or child are omitted. The category “devise how to interact with the child” has eight sub-categories.

Table 5. Codes for the effects on mothers and citations.

Effect	Code	Sample coded text	
		Until now	Now
Negative	Confused by the pandemic	“My part-time job was at a train station, so I was afraid of getting infected by people coming from Tokyo who were infected with the coronavirus. In the beginning, I did not know what to do and many of the responses to the pandemic changed one after another... (M ₁₀).”	“I am concerned that being careful about infection in daily life is not enough to be effective against the sixth wave (M ₆).”
	Feel stressed about behavioral restrictions	“I always looked forward to going on trips with my family, but not being able to do so was extremely stressful (M ₁₂).”	“I am a person who wants to meet people very much ... but I cannot meet people easily. Even at the office, I cannot talk to my coworkers because of the staggered lunch schedule (M ₁₁).”
	Feel anxious about the reopening of school	“I wondered how I would spend time with my son when school was closed. Because of his experience of chronic absence from school, I was worried about whether he would be able to return when school reopened (M ₁₁).”	N/A
	Disturbed daily life rhythm	“Due to school closure, my daughter is home all the time, my work schedule has changed a bit, and I am home all the time. I no longer have time to be alone (M ₆).”	N/A
	Do more household chores	“I have to do all the housework. No school lunches, so I have to cook breakfast, lunch, and dinner. I have too many things to do (M ₂).”	N/A
Neutral	Maintain mental health	“Hmm, not so much ... I was not so confused (M ₄).”	“I think I am relieved from stress because I do not have to take time off work (M ₈).”
	Embrace normalcy	“I did not feel any drastic changes in my daily life, as I did not change my job (M ₅).”	“I live an unchanged life with C ₂ from before the pandemic (M ₂).”
Positive	Prevent infection	“There was no point in feeling stressed, so I tried to think of telework as being lucky to be able to work from home (M ₉).”	“I am getting used to the life of wearing a mask and disinfecting with some degree of self-acceptance. It is becoming a standard and no longer considered as stress (M ₁₀).”
	Feel less interpersonal stress	“I am not sociable, so I was less stressed because I met fewer people (M ₁).”	N/A
	Support the child	“I was sitting next to my daughter during the online class and would remind her to listen carefully, depending on her attitude (M ₃).”	“When my son is depressed or angry, I let him cool down because parental intervention only pours oil on the fire (M ₇).”
	Provide support according to the infection situation	“C ₁ likes to eat out, but I reduced the frequency. It was impossible for him not to eat out at all, so we made sure to disinfect and went once every few days (M ₁).”	“When she wanted to go somewhere, I told her to be patient a little longer. We have had two doses of the vaccine and are looking forward to going there during spring break (M ₉).”
	Identify growth and characteristics	“We would smile at each other when we were playing, so I think she was glad to see me laughing (M ₃).”	“I have come to understand that he can state his own opinion. I do not like to be ignored by him, but I realize that is just how he feels about me (M ₈).”
	Consult with the teacher and doctor	“When the school was closed, C ₅ was at a day service and had a lot of homework that needed to be done there. So I consulted with his school teacher about the minimum homework he should do (M ₅).”	“C ₁ had difficulty copying what the teacher wrote on the blackboard in his notebook and I used to consult the doctor every month about it. Now I asked the teacher to reduce

(continued)

Table 5. Continued.

Effect	Code	Sample coded text	
		Until now	Now
	Maintain a moderate psychological distance	“As he is an adolescent, it has been difficult for him to understand and agree with his parents’ opinions, so I have asked people around C ₄ to advise him. I think the biggest thing is to request a third party (M ₄).”	the amount of note-taking and he does not cry (M ₁).” “The distance between our hearts is not great, nor has it ever been. It is largely because I am working. I think my son’s stress is excessive attention from his parents. So I wonder if the stress his parents give him is moderate and balanced (M ₇).”
Positive	Promote independence	“As for lunch, I cooked rice and I prepared something that Ken could easily cook in the microwave every day. I told him he could also leave the dishes in the sink. I also told him he could check the intercom and answer it if it was the delivery person who always came to the house (M ₁₀).”	N/A
	Self-monitor interactions	N/A	“As he has calmed down a lot, I am now able to treat him with a more relaxed attitude. I stopped nagging like I did before (M ₂).”
	Change jobs to take care of the child	N/A	“I have changed to a nighttime job. I stay home during the day because the teacher calls me when the child’s temperature is 37.5 degrees and I need to take care of the child for a while (M ₈).”
	Go outside and engage in activities	N/A	“I could see my friends and go home to see my parents. I frequently contact my friends on SNS and I meet them outside with a small group (M ₁₁).”
	Obtain support from school	“The teacher came to our house about once each in April and May 2020. The teacher talked to my son and played with toys. Thanks to this support, my fears about whether he would be able to attend school again were allayed (M ₁₁).”	N/A

N/A (not applicable) indicates that none of the participants mentioned the code. SNS: social networking services.

school events. Only the children emphasized that they felt stressed about performing new daily routines.

The theme of neutral effects for children with ASD consisted of three codes. Both mothers and children highlighted that they maintained mental health, lived the same daily life as before the pandemic, and maintained the mother–child relationship. Specifically, the number of children who expressed that they maintained their mental health increased considerably in “now.”

The theme of positive effects for children consisted of 12 codes. The number of references to infection prevention and interpersonal stress decreased over time for both mothers and children. Most participants also reported having a good time with their family members throughout the pandemic. Contrastingly, only mothers emphasized that their children behaved spontaneously, adapted to school life, and felt relieved about the canceling or

shortening of school events in “until now” and/or “now.” In addition, only children highlighted that they had resolved study-related concerns (e.g. difficulties understanding studies), had a good time with friends, felt less anxious about the pandemic, and coped with interpersonal problems. Prominent examples of each code are presented in Table 6.

Discussion

In this study, we explored how children with ASD and their mothers experienced the COVID-19 pandemic in Japan. The findings corroborate and expand upon previous qualitative studies on the impact of the pandemic on children with ASD and their families, and they confirm the following important results. Specifically, the findings reinforce those of studies highlighting that the pandemic had both negative

Table 6. Codes for the effects on children with autism spectrum disorder (ASD) and citations.

Sample coded text		Now	
Effect	Code	Mother	Child with ASD
Negative	Confused by the pandemic	<p>“C₄ was not convinced that he had to wear a mask. He went into the restaurant without the mask when we went out to eat. The waiter told him, ‘You cannot enter without the mask,’ and he said to me, ‘Why do I have to wear the mask? I do not want to wear it.’ He is very averse to being restricted in any way (M₄).”</p> <p>“My daughter was stressed because she could not go to my husband’s parents’ house or eat out (M₃).”</p>	<p>“I was irritated by government policies. A typical example was the state of emergency. I thought they declared too much. Even though they declared, the number of infected people only increased. I thought they should have learned from it (C₉).”</p>
	Feel stress about behavioral restrictions	<p>“When school reopened, he complained to me that he was very anxious (C₁₃).”</p> <p>“There were no online classes and he was doing printouts sent from school at home. He could not keep up with what he was learning in 5th grade, which seemed painful (M₁₀).”</p> <p>“C₁ sometimes complained to me that his classmates said harsh things to him and were not kind to him (M₁).”</p>	<p>“I got irritated because I could not go outside much, run, and play with everyone (C₆).”</p>
	Feel anxious about the reopening of school	<p>“I think there is some stress because he endures things like being unable to go where he wants to go (M₁₀).”</p>	<p>“Even though the pandemic has calmed down, I am slightly worried that someone else might get infected (C₆).”</p>
	Experience study-related concerns	<p>“He looked confused when he was taking classes in a special-needs class. Because of this, he started attending a tutoring school, but he seems to have difficulty studying (M₅).”</p> <p>“She sometimes spends her recess alone on some days, as she has originally had difficulty getting along with her friends (M₆).”</p> <p>“Her anxiety seemed very high just before school reopened, a sports day, and a field trip (M₆).”</p>	<p>“I play with my friends less often when a new variant of coronavirus appears (C₈).”</p>
	Feel more interpersonal stress	<p>“I had a friend in 4th grade who would not wear a mask. I warned him, but he just would not wear it. So I forced him to wear it, and we had an argument (C₂).”</p>	<p>“My classmate is annoying and distracting to me. He talks about things that were popular in the past, things that everyone is not interested in, and something only adults know about (C₁₂).”</p>
	Confused by the implementation of school events	N/A	N/A
	Feel stress about performing new daily routines	<p>“I hated my grandmother’s compulsory walks. My grandmother often forced me to go for walks because I was home a lot and did not get enough</p>	N/A

(continued)

Table 6. Continued.

		Sample coded text	
Effect	Code	Until now	Now
		Mother	Mother
		Child with ASD	Child with ASD
Neutral	Maintain mental health	<p>"I do not think C₂ was confused because he likes staying at home (M₂)."</p>	<p>exercise. I almost got lost once and hated it (C₁₀)."</p> <p>"I did not have any trouble. I spent my time laughing and having fun (C₅)."</p>
	Embrace normalcy	<p>"After C₁₁ was chronically absent from school, we drastically changed our thoughts and interactions with him. As we have continued to do these things, we have been able to spend time with him regardless of the pandemic (M₁₁)."</p> <p>"The pandemic has arrived, but the bond between parent and child has remained unshaken (M₁₁)."</p>	<p>N/A</p> <p>"He is calm and spends his days in a straightforward manner. He does not have many ups and downs, and he does not laugh a lot or get angry (M₂)."</p> <p>"Now that the pandemic is calming down, we go to a dodgeball circle three times a week, watch soccer games, and go shopping (M₇)."</p> <p>"I am not in trouble at all. There used to be people who used to bully me at school, but now we are in separate classes, and it has become peaceful (C₁)."</p> <p>"Now I spend time the same way I did before the pandemic. I wake up in the morning, go to elementary school, go to day service, eat dinner, take a bath, and go to bed with my parents (C₆)."</p>
Positive	Maintain mother-child relationship	<p>"I was playing with my mom, just like before the pandemic. There were not many changes at home (C₈)."</p> <p>"The pandemic has arrived, but the bond between parent and child has remained unshaken (M₁₁)."</p>	<p>"It would take a detailed explanation for my son to tell the parents about school and himself, but he does. It may be that this is not COVID-related, but rather that he does not have any close friends with whom he can talk about anything (M₁₁)."</p> <p>"I talk with my mom about the school, the news, and TV programs, and I spend time daily as usual (C₁₁)."</p>
	Prevent infection	<p>"Ken had been warned by various people about wearing masks. At first, he rebelled against wearing one, but now he has given in a little (M₄)."</p>	<p>"I was in charge of promoting washing hands, gargling, and bringing handkerchiefs to everyone in the class. I created a graph of the number of people who forgot to do these things and wrote down specifically what I could read from the graph (C₁₀)."</p> <p>"I never got irritated because I did not talk much to anyone (C₁₂)."</p> <p>"I play with a mask on during recess to avoid infection (C₆)."</p>
	Feel less interpersonal stress	<p>"C₄ relaxed at home because he was an only child and could do what he wanted. However, before the pandemic, he was expected to interact with others,</p>	<p>N/A</p> <p>N/A</p>

(continued)

Table 6. Continued.

		Sample coded text			
		Until now	Now		
Effect	Code	Mother	Child with ASD	Mother	
Have a good time with family		so he had a tense look on his face when he opened the house's front door (M ₄). "We made sweets together, listened to C ₂ 's descriptions of her favorite cartoon characters, bought DVDs to watch, and talked about common topics (M ₉)." N/A	"For about the first six months, I cooked breakfast with my mom and learned school studies from her. I also went to the temple with my dad and mom. I had never done many things with them before, and it was surprisingly fun to be with them (C ₇)." "I asked my mom to help me when I did not understand something in my homework. I also asked her how to use an app for online classes because it was the same one my mom uses for telework (C ₁₀)." N/A	"He has been giving me his opinion and indulging me more often. We cook together, talk about history, and so on. I do not remember as much about history in as much detail as he does, haha. We usually laugh when we are together (M ₈)." N/A	Child with ASD "I enjoy showing my mom the game I created in Game Programming for Beginners and playing it together (C ₂)." "When I solve problems in math and Japanese classes, I review them and correct them myself if they are wrong. Then, if I still cannot understand, I ask the teacher (C ₁)." "I play Minecraft alone. It is fun because I can play games even if I cannot go out (C ₅)." "I used to get lonely without my mom because it was the first time I stayed home alone, but I gradually got used to it (C ₄)." N/A
Spend time on your own interests or other activities		N/A	"I did not do much of anything with my mom, but I played games and did my homework alone (C ₁)." N/A	"In the past six months, C ₆ has become very fond of Hey! Say! JUMP (a Japanese idol group) and likes to watch dramas and variety shows in which they appear on TV (M ₆)." "Piano recitals are held in small groups and without an audience. Also, school events are sometimes canceled, but I feel like he has already gotten used to that environment (M ₁₂)." "He spontaneously consults his family and friends about his worries (M ₆)." N/A	"When I solve problems in math and Japanese classes, I review them and correct them myself if they are wrong. Then, if I still cannot understand, I ask the teacher (C ₁)." "I play Minecraft alone. It is fun because I can play games even if I cannot go out (C ₅)." "I used to get lonely without my mom because it was the first time I stayed home alone, but I gradually got used to it (C ₄)." N/A
Adapt to the "new normal"		"At the time of the first state of emergency, the teacher brought the tasks home. Ken set his own timetable and seemed to enjoy doing them (M ₈)."	N/A	N/A	N/A
Behave spontaneously		"C ₁₀ used to wake up at about 4:00 AM and make breakfast for his family, saying, 'I made you fried eggs' or something like that.	N/A	N/A	N/A

(continued)

Table 6. Continued.

Effect	Code	Sample coded text		
		Until now	Now	
		Mother	Child with ASD	Mother
		Although he sometimes used a whole pack of eggs, haha (M ₁₀)."		
Have a good time with friends	N/A	N/A	"I played with friends for a short time from 3:30 to 4:30 at a park or other places (C ₁₁)."	N/A
Adapt to school life	N/A	N/A	N/A	"I heard from C ₁ that he voluntarily talked to new friends, so he seems to be thinking about what to do alone without relying on the teacher (M ₁)."
Feel relieved to cancel or shorten school events	N/A	N/A	N/A	"He said I am lucky that the school trip was canceled and the field day was shortened. Because he is not good at building relationships with friends and reading the mood of the place... (M ₇)."
Feel less anxiety about the pandemic	N/A	N/A	N/A	N/A
Cope with interpersonal problems	N/A	N/A	N/A	N/A
				"I am getting used to this COVID (the pandemic) and it is becoming normal. I am no longer stressed (C ₈)."
				"I try to control my irritability, but sometimes I get violent. So when I get irritated, I leave my room and go to the hallway to calm myself down (C ₉)."

N/A (not applicable) indicates that none of the participants mentioned the code.

and positive effects on parents and children with ASD (e.g. Bozkus-Genc & Sani-Bozkurt, 2022; Latzer et al., 2021).

This study further revealed some aspects of phase-dependent changes, such as the emergence of effects (e.g. coping with interpersonal problems) in the new normal that was not seen in the pandemic, based on a comparison of “until now” and “now.” Further, in contrast to Meral (2021), who identified the specifics of negative and positive influences, this study has the advantage of identifying the specifics of neutral effects (e.g. maintaining mother–child relationships); that is, those that remain the same even in the specific circumstances of the pandemic.

In addition, in response to Pellicano et al. (2022), who interviewed both children with ASD and their parents, we compared the perceptions of both mothers and children and found the importance of the mother’s focus on the child’s positive aspects in challenging situations, which could have a positive impact on both the mother and child. Thus, the current findings play an important role in suggesting more creative solutions to the challenges of coping with and resilience to future crises. As noted by Bolbocean et al. (2022) and Daulay (2021), maternal resilience could have prompted the children’s adaptation to their daily lives during the pandemic. Furthermore, this study suggests the presence of children’s coping and resilience abilities, as they demonstrated efforts to cope with and overcome the constraints in their lives. A key factor that could help in the face of future potential crises is to draw upon the resilience of both children with ASD and their mothers. It is thus essential to enhance family interactions, such as cooking together or discussing children’s interests.

The research question was answered by discussing the effects of the pandemic on mothers and children. Regarding the effects on the mothers themselves, first, negative effects (e.g. disturbed daily life rhythm) decreased overall from “until now” to “now.” This could be owing to the progress of coexistence with coronaviruses in Japan, the loosening of behavioral restrictions, and returning to the pre-pandemic working situation.

Second, concerning neutral effects, some mothers reported that their jobs and lives did not change, thus implying that they were not significantly affected. Third, regarding positive effects, the mothers reported that they worked out how to interact with the child, such as “provide support according to the infection situation” and “maintain a moderate psychological distance.” These results are consistent with those of Daulay (2021), who showed that mothers use coping strategies in their efforts to minimize the stress and difficulties they encounter and support the resilience model proposed by Bolbocean et al. (2022). Notably, the participating mothers had a history of receiving consultations and support in clinic centers and other sources prior to the pandemic, which could have facilitated their spontaneous use of coping strategies. Incidentally, mothers in Daulay’s (2021) study used

religious coping methods such as prayer and patience. Daulay (2021), who conducted a study in Indonesia, argued that Asian parents tend to use collectivistic problem-focused coping strategies; hence, religious coping, which is positioned as one of them, was used more often. However, none of the participating mothers used this strategy. A possible reason could be that Japan’s percentage of non-religious people is higher than that of other Asian countries (Inglehart et al., 2014).

Subsequently, the impact of the pandemic on children with ASD was discussed from the perspectives of both mothers and children with ASD. First, concerning negative effects, there was a trend of both mothers and children with ASD reporting that the stress resulting from disruption and behavioral restrictions decreased over time, while interpersonal stress increased. These decreases in disruption and stress suggest that children adapted better to their environment, based on the statements of M_{12} and C_4 about their acclimation to the pandemic (see the category “adapt to the new normal” in Table 6). Contrastingly, increased interpersonal stress owing to increased contact with friends could be related to autistic traits of difficulty with social interaction, as indicated by C_{12} ’s statement: “My classmate is annoying and distracting to me” (see the category “feel more interpersonal stress” in Table 6). In addition, an increase in the number of children with ASD who said they enjoyed spending time with friends was a child-specific aspect, suggesting that some children experienced a decrease in interpersonal stress. This result was similar to the finding of Pellicano et al. (2022)—that people with autism felt a profound need for social contact during the lockdown. This seemingly contradictory result could be because children who could adjust to school before the pandemic perceived social contact positively, whereas those who had difficulty adjusting viewed it negatively. Only mothers reported that their children appeared anxious or confused about the reopening of schools and conducting school events, and none of the children with ASD reported these things. Presumably, one factor that explains this is the difficulty in monitoring changes in anxiety and confusion associated with the approach to school versus that associated with events owing to self-monitoring impairments in autism (Russell & Jarrold, 1998).

Second, regarding neutral effects, as stated by M_2 , “I do not think C_2 was confused because he likes staying at home” (see the category “maintain mental health” in Table 6), and similar to the findings of Asbury et al. (2022), the lack of social contact prior to the pandemic left it unaffected. Children were not affected because their lives had not changed significantly, as indicated by C_6 : “Now I spend the day in the same way as I did before the pandemic” (see the category “embrace normalcy” in Table 6). The increase in the number of children who reported maintaining their mental health in “now” compared to “until now” could be owing to the pandemic

becoming more normalized and less perceived as a “special” event.

Third, concerning the positive effects, many mothers and children consistently reported that the latter spent more time with their families. This is consistent with the results of Meral (2021), who reported that the highest number of parents indicated “more shared family time and improved family interaction.” The mother could have perceived it as an opportunity to get to know her child better or increase intimacy. In addition, only children reported resolving study-related concerns, having a good time with friends, and coping with interpersonal problems, presumably because children had more opportunities to go out alone in their community as behavioral restrictions were eased and their mothers were unaware of what was happening outside the home.

Limitations and implications for future research

This study is limited by the following points, which are challenges to be addressed in future research. First, participants were intentionally recruited, and the possibility that different profiles of participants could yield different results must be considered. To prepare for future crises, studies could be designed with a non-random selection of participants, including mothers with strong ASD characteristics. Second, we did not assess the actual situation of communication between mothers and children prior to the pandemic. In addition to using a psychological scale to evaluate parent-child relationships, an assessment of the actual situation could help clarify the relationship between communication and the impact of the pandemic. Third, all the families were from a single country. Results could have differed in other cultural contexts, such as differences in the use of religious coping demonstrated in Indonesia (Daulay, 2021) and Japan. To overcome this limitation, further studies should be conducted in other cultural contexts. Fourth, we simultaneously inquired about “until now” and “now,” which made participants rely on their memories for their responses for “until now.” Future studies need to conduct interviews separately at different periods to ensure accuracy.

Conclusion

This study demonstrated the influence of the COVID-19 pandemic on children with ASD and their mothers in Japan. Meral (2021) emphasized that there were overall positive effects, and we observed similar results. The factors that led to said effects included mothers’ focus on the positive aspects of their children and their attempts to elicit constructive behaviors in their children (e.g. prevent infection) and draw upon their own and their children’s resilience. Further, neutral effects, such as maintaining

mental health and continuing regular daily life, were observed in both mothers and children. These findings contribute to a deeper understanding of the pandemic’s impact on families with children who have ASD and provide valuable insights for supporting them during future crises.

Acknowledgements

We are grateful to all mothers and children with ASD for their participation in sharing their experiences during a challenging period.


Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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