Original Research Article

Childbirth Experiences of Women Who Gave Birth during the COVID-19 Pandemic in the Tohoku Region of Japan

ABSTRACT

Aims: Perinatal women might have a negative experience with childbirth due to the coronavirus disease (COVID-19) pandemic, and their parenting attitudes or mental state may be affected. This research clarified the experiences of women who gave birth during the COVID-19 pandemic.
Study design: This was a quantitative descriptive research.
Place and Duration of Study: Four maternal and child health facilities at a prefecture of Tohoku region from August 14, 2021, to May 29, 2022.
Methodology: An internet-based questionnaire survey was sent to 1,000 prospective participants, and 103 mothers of children undergoing three- to four-month and 1.5-year checkups were included in our analysis. Descriptive statistics were obtained from the participants' basic information and free answers were compiled regarding their experiences with childbirth during COVID-19.
Results: The surveyed women believed that the pandemic's main effect was the inability of family members to be present during their health check-ups. Due to the pandemic, 42 women (40.8%) were severely stressed during their pregnancy as they could not see their families outside the prefecture or go out freely. Additionally, most women were denied or restricted family attendance and care during childbirth. Even after leaving the hospital, they could not seek consultation regarding their health and childcare, had to manage childcare and housework alone, refrained from going out due to the fear of infection, and were anxious and lonely. Some women appreciated the medical staff, stating that they were dependable and available to talk to, while others reported that the nurses were strict and overbearing. The participants demanded that nurses provide infection control measures and psychological care.
Conclusion: It is necessary to improve the medical care delivery system to provide adequate care by securing personnel and utilizing social network services. Furthermore, following discharge from the hospital, childcare support should be provided by healthcare professionals.

Keywords: childbirth, childcare, COVID-19, perinatal, pregnancy

1. INTRODUCTION

In December 2019, a novel coronavirus infection (COVID-19) was first reported in the People's Republic of China and quickly spread worldwide after the World Health Organization (WHO) declared it a pandemic in March 2020. Although vaccination has reached most people worldwide, mutant strains continue to emerge, and people's daily lives are still affected by COVID-19.

The Japan Society of Obstetrics and Gynecology (JSOG), Japan Association of Obstetricians and Gynecologists, and Japan Society for Infectious Diseases in Obstetrics and Gynecology developed and published joint guidelines for medical practitioners [1] due to COVID-19, presenting the first edition in March 2020 and the fifth on September 2, 2020. These guidelines comprise adherence to standard precautions by the Centers for Disease Control and Prevention [2], as follows: "In principle, Cesarean section is unavoidable depending on the spread of infection," "We recommend return home deliveries or attending deliveries," "We do not recommend online medical care or postponing routine pregnancy health

examinations," "Mother and child should be separated after delivery if the mother is infected with COVID-19," and "Newborns delivered by an infected mother should be managed in an incubator and given complete artificial nutrition."

The authors' survey results in 2020 on infection control measures and maternal nursing care at obstetric care facilities in the Tohoku region of Japan [3] showed that infection control measures generally complied with the abovementioned guidelines. In addition, the group guidance provided during pregnancy and postpartum was changed to individual guidance post the pandemic declaration, pregnant and nursing mothers were isolated to avoid information exchange among mothers, prohibit the witnessing of births, and restrict visitation. Numerous reports have indicated that healthcare providers are making efforts to help families participate in childbirth by focusing on "psychological care," suggesting "careful listening toward expectant mothers," "holding motherhood classes using videos," enabling "online visitation during hospitalization," and introducing "online witnessed birth" [4-8].

However, the experiences of expectant mothers have not yet been fully reported, including how they lived and felt during pregnancy, delivery, hospitalization, and afterward; how they coped with any difficulties they encountered; and what kind of support they received from their healthcare providers.

If expectant mothers perceive their experience of childbirth during the COVID-19 pandemic negatively, it may affect their attitudes toward childcare during the childrearing period and their children's growth and mental state. Therefore, analyzing the situation of pregnant and nursing mothers during this time is expected to minimize the medium- and long-term effects of the COVID-19 pandemic on mothers and children, while taking the necessary countermeasures. Additionally, our findings could assist in recommending nurses' responses to COVID-19 and future pandemics, from pregnancy through childbirth to childrearing. This study aimed to determine the childbearing experiences of women who gave birth under COVID-19 pandemic conditions in the Tohoku region of Japan through a questionnaire survey.

2. METHODOLOGY

2.1 Research design

This study had a quantitative descriptive design using an Internet-based questionnaire survey ("web survey").

2.2 Survey period

The survey was conducted from August 14, 2021 to May 29, 2022.

2.3 Survey subjects

The participants included 103 mothers of children undergoing three- to four-month and 1.5-year checkups.

2.4 Survey procedure

First, we sought opportunities to explain the outline of the study to maternal and child health centers, maternal and child health departments of city halls, and facilities conducting infant health examinations in a Prefecture of Tohoku region. We explained the study's purpose, significance, and content; methods for protecting personal information; provided an explanatory document regarding the publication of the study results; and displayed a guide to recruiting subjects. At the four facilities that agreed to cooperate in the study, the staff distributed recruitment information forms to mothers during their infants' health checkups. Mothers who received the recruitment guide were asked to respond to the survey voluntarily.

2.5 Survey contents

2.5.1 Basic information of respondents

We recorded age, history of delivery, employment, infertility treatment, gestational age, abnormality during pregnancy, mode of delivery, labor induction, and birth weight of the infant.

2.5.2 Pregnancy experience

The following aspects of the pregnancy experience were assessed: whether the woman attended group guidance, whether there were changes in the method of group guidance and its contents, whether there were changes in the

technique of antenatal care and its contents, care received from the nursing staff and its contents, and items that had to be changed or were restricted during COVID-19, including participants' feelings toward them (free description).

2.5.3 Experiences during hospitalization

The following aspects of women's experiences during hospitalization were considered: methods (means) of hospitalization, presence at delivery, family attendance, presence/absence of visitors, care received from nursing staff and its contents, and items during hospitalization that had to be changed or were restricted owing to COVID-19 and the women's feelings about them (free answers).

2.5.4 Experiences since discharge from the facility to the present

The following information, on women's experiences since discharge from the facility to the present, was evaluated: discharge method; life after discharge; childcare situation; other support received from public health nurses, midwives, and other staff at the local health center; and any changes or restrictions imposed in relation to COVID-19, alongside the participants' feelings about them (free answers).

2.5.5 What care do you want from obstetric care facilities and nursing professionals in relation to COVID-19 (free answers)?

Responses for this aspect were sought in the form of options and open-ended statements.

2.6 Method of analysis

Descriptive statistics were compiled for participants' basic information. For free descriptions, similar content was compiled into themes.

2.7 Ethical considerations

The web-based survey screen included an option to confirm consent to participate in the study, which was obtained by clicking the "Submit" button. An answer to each question was mandatory to avoid forgetting to answer, but a "do not answer" option was also provided. The subjects participated voluntarily in this study, which was approved by the Iwate University of Health and Medical Sciences Research Ethics Committee (No.21-1).

3. RESULTS

Approximately 1,000 request letters were distributed and responses were received from 103 participants.

3.1 Participants' demographics

The women who responded to the survey gave birth between March 2020 and September 2021. The age range of the study participants was as follows: one respondent (1%) was 19 years old or younger, 19 (18.4%) were between 20 and 29 years old, 75 (72.8%) were between 30 and 39 years old, and eight (7.8%) were 40 years old or older (Table 1).

Among the respondents, 80 (77.7%) were employed (employment benefits included maternity leave), and 23 (22.3%) were not.

Additionally, 51 (49.5%) were primipara, 34 (33.0%) were second-time mothers, 16 (15.5%) were third-time mothers, and two (1.9%) were fourth-time mothers or more.

Regarding infertility treatment, 18 (17.5%) availed it. Ovulation induction and in vitro fertilization was the most common treatments sought, with six women for each treatment.

The number of women falling under each gestational age was six (5.8%) for premature delivery, 95 (92.2%) for full-term delivery, and two (1.9%) for delivery after 42 weeks.

There were 29 women (28.2%) with abnormalities during pregnancy, including 19 (18.4%) with impending premature abortion and six (5.8%) with gestational hypertension.

The methods of delivery included spontaneous delivery for 76 women (73.8%), vacuum extraction for five (4.9%) women, emergency C-sections for seven women (6.8%), and scheduled C-sections for 15 women (14.6%). A total of 81 women (78.6%) did not undergo labor induction at delivery, while 22 women (21.4%) did.

The birth weight of infants was 2499 g or less for 10 patients (9.7%), 2500 g to 3499 g for 79 patients (76.7%), and 3500 g or more for 14 patients (13.6%).

Table 1. Mother and baby demographics **(N=103)**

		Total		Primipara		Multipara	
		n (103)	%	n (51)	%	n (52)	%
Age (years)							
	≤19	1	1	1	2.0	0	0.0
	20-29	19	18.4	16	31.4	3	5.8
	30-39	75	72.8	31	60.8	44	84.6
	≥40	8	7.8	3	5.9	5	9.6
Employment							
	Employed	80	77.7	39	76.5	41	78.8
	Unemployed	23	22.3	12	23.5	11	21.2
Infertility Treatment							
	Yes	18	17.5	10	19.6	8	15.4
	No	85	82.5	41	80.4	44	84.6
Gestational age (weeks)							
	< 32	4	3.9	2	3.9	2	3.8
	32-36	2	1.9	2	3.9	0	0.0
	37-41	95	92.2	45	88.2	50	96.2
	≥42	2	1.9	2	3.9	0	0.0
Abnormal during pregnancy							
	Yes	29	28.2	14	27.5	15	28.8
	No	74	71.8	37	72.5	37	71.2
Mode of birth							
	Spontaneous vaginal birth	76	73.8	33	64.7	43	82.7
	Vacuum extraction	5	4.9	5	9.8	0	0.0
	Planned caesarean	15	14.6	6	11.8	9	17.3
	Emergency caesarean	7	6.8	7	13.7	0	0.0
Labor induction							
	Yes	22	21.4	18	35.3	4	7.7
	No	81	78.6	33	64.7	48	92.3
Birth weight (g)							
	≤ 2499	10	9.7	7	13.7	3	5.8
	2500-3499	79	76.7	35	68.6	44	84.6
	≥ 3500	14	13.6	9	17.6	5	9.6

3.2 Women's experiences during pregnancy

3.2.1 About the antenatal checkups

Regarding whether COVID-19 had an influence on the method and date of medical examinations, 34 women (33.0%) said yes and 69 (67.0%) said no (Table 2).

The primary reasons for "yes" included the prohibition of attendants during checkups, limited people in the waiting room, and longer intervals between checkups; for multiparas, they stated that could not go to checkups with their older children. Moreover, if women had planned to give birth in their hometown, they were unable to see a doctor for two weeks after going back home to avoid infections, and because they had transferred to a different hospital, they could not have checkups through midwife care.

Table 2. Women's experiences during pregnancy **(N=103)**

		Total		Primipara		Multipara	
		n (103)	%	n (51)	%	n (52)	%
Negative impact on pregnancy checkups							
	Yes	34	33.0	19	37.3	15	28.8
	No	69	67.0	32	62.7	37	71.2
Attending motherhood classes							
	Yes	32	31.1	22	43.1	10	19.2
	No	71	68.9	29	56.9	42	80.8
Attending parent classes							
	Yes	25	24.3	24	47.1	1	1.9
	No	78	75.7	27	52.9	51	98.1
Impact on pregnancy class attended							
	Yes	22	21.4	13	25.5	9	17.3
	No	77	74.8	37	72.5	40	76.9
	No answer	4	3.9	1	2.0	3	5.8
Restricted by COVID-19 during pregnancy							
	Yes	42	40.8	25	49.0	17	32.7
	No	59	57.3	24	47.1	35	67.3
	No answer	2	1.9	2	3.9	0	0.0

Main experiences the women wrote about in the free comment section (n=42; 40.8%):

-I had to stay in the hospital for a long time because the baby might have been born prematurely. I felt very lonely because I was not allowed any visitors.

-I could not go anywhere, so I needed a change of scenery.

-I could not visit my parents because there was a cluster COVID-19 outbreak nearby.

-I was disappointed that I could not participate in yoga or maternity programs during my pregnancy.

-I felt anxious because I had not been able to visit the shrine to pray for the safe delivery of my baby until late in my pregnancy.

-I felt lonely because I could not see my friends or relatives.

-I felt nervous about interacting with others because I was afraid of getting COVID-19.

3.2.2 Health guidance

Regarding group motherhood classes, 32 women (31.1%) attended these classes. As for group parenting classes, 25 (24.3%) women attended them. 22 women (21.4%) reported that COVID-19 affected their health guidance during pregnancy.

The following factors were problematic for the participants: cancellation of motherhood classes, prohibition of husbands' presence, lack of direct instruction (only booklets), individual instruction instead of group instruction, and inability to attend the classes due to the restricted number of participants.

3.2.3 Experiences due to COVID-19-related restrictions during pregnancy

A total of 42 women (40.8%; 25 primiparas and 17 multiparas) reported that they had experienced changes or restrictions related to COVID-19.

They could not have a change of pace due to requests to refrain from going out. Women felt uneasy during their pregnancy as they were unable to see their family (parents), they were unable to witness the birth, it was difficult to ask for childcare for their older child at each antenatal checkup, and they were worried about infection when they interacted with other people.

3.2.4 Care received from nurses during pregnancy

Four women (3.9%; two primiparas and two multiparas) answered that they received care related to COVID-19 from the nursing staff during their pregnancy. These included communication regarding the approximate date of their post-delivery visit, hand sanitizer, and consultation regarding their return home.

3.3 Women's experiences during childbirth and postnatal period (hospitalization)

3.3.1 Means of hospitalization

A total of 87 women (84.5%) were brought to the hospital in a private car, 13 (12.6%) in a cab, and three (2.9%) in an ambulance (Table 3).

Table 3. Women's experiences during childbirth and postnatal period (hospitalization) (N=103)

		Total		Primipara		Multipara	
		n (103)	%	n (51)	%	n (52)	%
Companionship during labor							
	Yes	31	30.1	15	29.4	16	30.8
	No	72	69.9	36	70.6	36	69.2
Companionship during childbirth							
	Yes	21	20.4	7	13.7	14	26.9
	No	82	79.6	44	86.3	38	73.1
Postnatal visitation							
	Yes	60	58.3	25	49.0	35	67.3
	No	43	41.7	26	51.0	17	32.7
Restricted by COVID-19 during postnatal period (hospitalization)							
	Yes	90	87.4	46	90.2	44	84.6
	No	13	12.6	5	9.8	8	15.4

Main experiences the women wrote about in the free comment section (n=90; 87.4%):

-I felt lonely because my family could not be there during delivery and could not visit or stay long when I was in the hospital.

-I felt lonely and depressed while in the hospital.

-I had wanted my partner to be able to hold our baby right after birth.

-I was lonely, but I felt good that I could focus on my baby when I gave birth.

-I had to wear a mask during the delivery, which was very uncomfortable and hard.

3.3.2 About attendants

Around 64 patients (62.1%) had an escort at the time of admission. Of these patients, 43 (67.2%) were accompanied by their husbands.

Of the companions, 31 (30.0%) were present during labor. These included 26 (83.9%) husbands, two (6.5%) their mothers, two (6.5%) midwives, and one (3.2%) family member online.

A total of 21 companions (20.4%) were present at birth, including 17 (81.0%) husbands only, two husbands with children (9.5%), one online family member (4.8%), and one midwife (4.8%).

Around 60 (58.3%) participants had a visitor immediately after the birth. These visitors included 46 (76.7%) husbands only, four (6.7%) biological mothers, three (5.0%) husbands and children, five (8.3%) husbands and biological mothers, and two (3.3%) others.

3.3.3 Experiences with and feelings about COVID-19-related restrictions during childbirth and postpartum hospitalization

Ninety (87.4%; 46 primiparas and 44 multiparas) women reported matters regarding COVID-19-related changes or restrictions.

They reported feeling disappointed, shocked, stressed, anxious, lonely, inconsolable, and hurt due to the prohibition of family visitation, witnessing the birth, and brief visitation. Some of them also reported feeling depressed during hospitalization. However, there were positive comments such as "It was good that I could concentrate on the delivery alone" and "It was good that I could spend time with the baby alone." Additional comments included the inconvenience of wearing masks during delivery, not being able to go to the pharmacy, and other infection control measures, as well as not being able to interact with other women during delivery.

3.3.4 Care received from nursing during delivery and postpartum hospitalization

Eleven (10.7%; three primiparas and eight multiparas) participants reported receiving care related to COVID-19 from nurses during delivery and postpartum hospitalization.

These included nurses caring about their feelings and physical condition, listening to their feelings and cuddling with them, accompanying them, shopping for them, disinfecting them, and giving them plenty support.

3.4 Women's experiences after leaving the hospital

3.4.1 Means of returning home

At the time of discharge, 99 (96.1%) women returned home by private car, three (2.9%) by cab, and one (1.0%) on foot (Table 4).

Table 4. Women's experiences after leaving the hospital **(N=103)**

	Total		Primipara		Multipara	
	n (103)	%	n (51)	%	n (52)	%
Postpartum discharge location						
Own house	62	60.2	20	39.2	42	80.8
Parent's house	41	39.8	31	60.8	10	19.2
Postpartum supporters						
Yes	98	95.1	51	100.0	47	90.4
No	5	4.9	0	0.0	5	9.6
Restricted by COVID-19 during child care						
Yes	52	50.5	27	52.9	25	48.1
No	49	47.6	24	47.1	25	48.1
No answer	2	1.9	0	0.0	2	3.8

Main experiences the women wrote about in the free comment section (n=52; 50.5%):

-I was lonely because I was not allowed to see my partner or mother due to the two-week visitation restrictions, etc.

-I was frustrated because I was left alone at home with my baby and felt I could not go out due to COVID.

-I was afraid of getting COVID-19, so I could not go out easily.

-I could not attend various events because they had been canceled due to COVID-19.

-I did not have a chance to meet other mothers to talk about my childcare worries.

-It was not able to rely on anyone for help.

-I was concerned about my baby's development as there was a lack of stimulation, such as contact with other people.

-Even though I was not told to push myself too hard, I had no choice but to do so.

3.4.2 Accompanying patients at discharge from the hospital

A total of 102 patients (97.1%) had an escort at the time of discharge from the hospital. These included 67 (65.0%) husbands only, 13 (12.6%) husbands and other family members, and 22 (21.4%) family members.

3.4.3 Places participants spent time at after discharge

Around 62 (60.2%) women spent time at home and 41 (39.8%) spent time at their parents' or husband's home. Among primiparas, 20 (39.2%) spent time at home and 31 (60.8%) at their parents' or in-law's home. Among multiparas, 42 (80.8%) were at home and 10 (19.2%) were at their parents' or in-law's family home.

3.4.4 Help after discharge from the hospital (support)

A total of 98 (95.1%) participants had family members who helped them, and five (4.9%) did not. The family members who helped included 16 husbands only (15.5%), 49 husbands and other family members (47.6%), and 33 family members (32.0%). All respondents who answered that they received no help were multiparas.

Regarding the period during which participants received supporters' help, 22 (22.4%) women said that they received help for less than one month, 35 (35.7%) received help for one month, 14 (14.3%) received help for one to two months, six (6.1%) received help for two to three months, six (6.1%) received help for three to six months, 11 (11.2%) lived together with their supporters, and four (4.1%) gave no response.

3.4.5 Experience with COVID-19-related restrictions after discharge from the hospital

A total of 52 women (50.5%; 27 primiparas and 25 multiparas) reported that they had experienced changes or restrictions related to COVID-19 after discharge.

Participants experienced loneliness because they could not see their husbands or mothers outside the prefecture due to the two-week visitation restrictions and could not show their babies to their friends. They felt frustrated because they were home alone with their children; they felt anxious and isolated because parenting events were canceled. They felt depressed because they refrained from going out due to a fear of infection.

From multiparas had to take care of their newborn and older child without help, they were worried about their physical condition, and they were afraid to use daycare centers for their older child, so they did not use them.

3.4.6 Care received from the Community care program personnel after discharge from the hospital

Ten respondents (9.7%; six primiparas and four multiparas) reported receiving care related to COVID-19 from the Community care program after discharge from the hospital.

These included the following points: "The public health nurse gave me detailed information about agencies I could call for advice, listened to me", "I obtained methyl alcohol or finger sanitizer and benefits," "I received postpartum care and midwife visits so I could talk to someone other than my family," "Newborn visits were handled over the phone," and "I am multipara, but if I were primipara, I would have felt uneasy about everything."

3.5 Care that perinatal women require from health workers (nurses) and healthcare providers

This item comprised a free answer, and 48 women responded. The free comments were grouped into six topics (Table 5).

The six topics are as follows; Reduced restrictions on visitation during delivery;;Considerations during delivery during restricted visitation;Psychological care for restricted visitation during hospitalization
;Stricter infection control;
No care is needed
; and Appreciation for health workers (nurses) and healthcare providers.

Table 5. Care that perinatal women require from health workers (nurses) and health care providers (n=48)

Reduced restrictions on visitation during delivery
-I wanted my partner or other family members to be allowed to visit, even if they had to take the PCR (polymerase chain reaction) test.
-I wanted to show my family my baby, even if it was just from looking out the window.
Considerations during delivery during restricted visitation
-I wanted a back massage during labor because I was left alone due to visiting restrictions.
-I should have asked for more help, but the medical staff or midwives seemed busy, so I did not ask.
Psychological care for restricted visitation during hospitalization
-I should have asked for help, but I needed kinder support from the health workers and nurses.
Stricter infection control
-The waiting room was always crowded during check-ups, so I was worried about getting infected.
-I was in a large room, but I wanted to make sure I had a private room.
No care is needed
-I could get information from the Internet.
-I felt the staff was busy, so I did not need more exceptional care.
Appreciation for health workers (nurses) and healthcare providers
-I am grateful to the staff for being there for me and helping me.

4. DISCUSSION

The participants consisted of women of childbearing age who used cell phones and were from the Tohoku region of Japan; therefore, it is difficult to imagine any bias in the results due to the rate of Internet use. The delivery method and birth weight were consistent with Japan's average distribution.

The women's experiences during childbirth were considered to have three major themes throughout the entire period: anxiety, loneliness, and isolation due to restrictions on accompanying the mother during medical visits, childbirth, and hospitalization; anxiety about their own and their children's health and infection risks; and social isolation due to restrictions on going out. The following section represents a discussion of each theme.

4.1 Anxiety, loneliness, and isolation due to restrictions on chaperoning

Many women felt "anxious," "lonely," and "isolated" due to restrictions on chaperoning during antenatal care and delivery; "chaperoning during delivery" has been recommended since before the COVID-19 pandemic, both as prenatal care for a positive birth experience and as care provided throughout the delivery [9]. Despite this recommendation [9], only 20.4% of participants had an escort during childbirth, and 21.4% had an escort during antenatal checkups.The participantswanted to check the growth of the fetus with their husbands during pregnancy check-ups. The WHO [9] reported that many expectant mothers were anxious regarding how to get through labor and when to go to the hospital. Therefore, the need for a chaperone during delivery is important. The rationale is that since chaperones help expectant mothers maintain control by recognizing and reinforcing their efforts, which increases their self-confidence and self-esteem. The presence or absence of a chaperone may also affect the delivery mode (increased cesarean section rates) and decrease negative birth experiences [9]. Expectant mothers' anxiety increased due to the infectious nature of COVID-19. Family attendance during delivery and antenatal care should not be neglected. Furthermore, it is necessary to reconsider the meaning of

such attendance and examine how the presence of family members can be realized with infection control measures in place, alongside what conditions should be met to make such attendance possible.

4.1 Concerns about their own and their children's health and the risk of infection

The women were afraid to go out, especially when the actual situation of infection and specific measures were not yet known, and they refrained from going out. Saccone et al. [10] found that the number of women with anxiety during pregnancy increased due to COVID-19 and that a major cause of concern was vertical transmission to the fetus. Hartz et al. [11] reported that women are increasingly receptive to home births and births in midwifery centers (midwifery in the community) because of the fear of going to the hospital. In Japan, where home birth and community midwifery systems are declining, this is an opportunity to rethink home birth, but the choice is not easy. First, appropriate knowledge must be imparted so that the mother will not be too anxious about infection control. Second, consistent infection control measures are required to enable the environmental improvement of hospital facilities, ensure close avoidance, give consideration, and allow expectant and nursing mothers to receive medical examinations with peace of mind.

However, the lack of access to motherhood classes, and childcare circles, among other factors, has reduced the opportunities for women to feel secure in checking whether the fetus and child are progressing well, resulting in a loss of opportunities to receive education on the knowledge necessary for pregnancy and childbirth. It is thus necessary to devise ways to ensure that there are sufficient opportunities to compensate for this through online medical care, online motherhood classes, etc.

4.2 Social isolation due to restrictions on going out

Around 98% of the women reported having a postpartum supporter, but 87.4% felt restricted during their postpartum hospital stay and half of the women (50.5%) felt restricted by childcare. These women felt restricted not in terms of whether they could receive support from their families or others around them but because of the limitation of their activities. Not being able to participate in childcare circles and other events after childbirth and not being able to meet friends were also thought to contribute to feelings of isolation. Tsuno et al. [12] reported that approximately 30% of the mothers who gave birth and raised children during COVID-19 had postpartum depression, which was a substantially higher rate than that before the COVID-19 pandemic (14.4%); there was also an association between social restrictions and loss of support resources and postpartum depression. This indicates a link between a lack of social outings or having less contact with others and psychological depression.

Currently, online childcare circles and information dissemination using social network services (SNS) are becoming more widespread as a countermeasure against infection, and it is hoped that these systems will improve in terms of convenience and effectiveness in reducing feelings of loneliness. Postnatal care, which has become popular in recent years, is useful for women to receive personal care after childbirth, but many women are anxious from the time of pregnancy. Eleftheriades et al. [13] reported that the COVID-19-related curtailment of outings increased the amount of time pregnant women spent on television and social media. However, uncertainty and ambiguity about the future of COVID-19 in these information sources caused additional stress for pregnant women. In other words, reliable and correct knowledge provided by the national government, local governments, and hospitals for antenatal checkups is necessary.

The lack of support, such as help with childcare, was also a major problem for postpartum women. Kamo et al. [14] noted that women wanted to ask for help but were reluctant to do so because of concerns about infection. Additionally, mothers could not meet their loved ones. This is an important period when parents and other family members want to interact with the newborn. Postpartum women want to nurture and care for their children by discussing the baby's characteristics with family members and loved ones [15]. It is thus necessary to consider what medical personnel can do to prevent social isolation while taking measures against infection, and to consider ways for women to spend time with their significant others.

As for the care that the patient requires from the medical staff, many participants mentioned infection control measures and routine care, such as easing the restrictions on visitation and consideration on behalf of the family members and psychological care. This is because when family members cannot be present, they have to rely on medical personnel. In this survey, there were many descriptions of gratitude to the medical personnel who were courteous. Nakamoto [16] noted that for women whose childbirth experiences were positive, even with COVID-19, satisfactory care at the hospital where they gave birth and other factors might have served as the basis for their ability to view childbirth and childcare positively. The care provided by healthcare professionals is a factor that contributes to a positive birth experience.

However, a survey conducted on medical personnel during COVID-19 [3] revealed that the number of medical personnel was insufficient due to staff absences from work owing to infection, which caused some distress. In the future, increasing

the number of medical staff is necessary because pregnancy support requires friendly care, such as cordial and attentive staff. it is necessary to consider support, including other measures, for a satisfactory delivery that does not make expectant and nursing mothers anxious nor isolated while taking infection control measures, from pregnancy to childcare.

4.3 Limitations of this study and future issues

This study was conducted as a web-based questionnaire survey to obtain an early overview of the COVID-19 situation. The survey was conducted over a period of 10 months among mothers with children aged from 3–4 months to 1.5 years after delivery. Depending on the infection status at the time, the survey may have influenced women's perceptions, such as being wary during the COVID-19 pandemic and having a positive view when the pandemic was easing. In the future, it will be necessary to clarify the detailed experiences of the mothers and their nursing needs by combining the results of the interview survey conducted in parallel with a study on mothers raising children.

4. CONCLUSION

Women who gave birth during the COVID-19 pandemic were highly anxious about their own COVID-19 infection and were isolated during pregnancy and postpartum due to behavioral restrictions, such as limited visitation and refraining from going out. Additionally, the women demanded that nurses provide not only infection control measures but also psychological care. Therefore, it is necessary to improve the medical care delivery system to provide adequate care by securing personnel and utilizing the internet. Furthermore, after discharge from the hospital, human support and support by healthcare professionals should be provided for childcare.

CONSENT (WHEREEVER APPLICABLE)

Participants provided their informed consent as part of the overall process of the online questionnaire survey.

ETHICAL APPROVAL

This study was approved by the Iwate University of Health and Medical Sciences Research Ethics Committee (No.21-1).

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