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Mothers' Breastfeeding-Related Durations and Nursing Management During the Early Postpartum Period in a Mixed Hospital Ward with an Obstetrics Department: A Prospective Observational Study

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Purpose: This study aimed to quantify duration of in-hospital breastfeeding (BF)-related activities in mothers after childbirth in a mixed ward-type hospital with an obstetrics department in Japan (hereafter, mixed ward). Methods: Twenty-two postpartum mothers (primiparous and multiparous) who had vaginal delivery in a mixed ward were instructed to wear radio beacons. A smartphone was placed in the BF room and detected the presence of a nearby beacon, 24 hours daily, measuring the number of hours a mother spent in the nursing room (defined as BF time [hereafter, BF-related duration]). BF-related duration included time spent for BF, diaper changes before and after BF, bottle feeding, and support from nurses. BF-related total hours during postpartum hospitalization were calculated. The effects of parity and each postpartum day number (postpartum days 1–4) on Daily BF-related duration were determined. Results: Percentage of total postpartum hospitalization time spent for BF-related duration was 21.6% and 19.9% for primiparous and multiparous mothers, respectively, with no significant difference between groups. BF-related duration was significantly different between parity group and postpartum day, with peaks on postpartum day 4 (387.7 minutes) and day 2 (318.0 minutes) for primiparous and multiparous groups, respectively. ($F = 2.813$, $p = 0.048$). Conclusion: Mothers spent 20% of their postpartum hospitalization period for BF-related activities. Individual support is necessary, especially for primiparous mothers, who spent more time than multiparous mothers for BF-related activities on postpartum day 4. In a mixed ward, postpartum mothers need a comfortable hospital environment in which midwives can dedicate themselves to mother-child dyad care.

INTRODUCTION

Low birth rate coupled with an aging population is a current concern for Japan's society, and natural change in 2017 declined for the 11th consecutive year since 2007 (28). The total fertility rate (TFR) in Japan is 1.4, a value that is considerably less than the necessary rate for maintaining the population and is similar to that in South Korea (1.2), Italy (1.3), and Spain (1.3) (36). The Japanese Ministry of Health, Labor and Welfare predicts that 33.0 million persons in Japan will be aged ≥ 65 years in 2025, an aging rate of 30.3% (31). Corresponding to these demographic trends, an insufficiency of obstetricians and declining number of delivery facilities have been reported. A 2016 survey found that 1332 (18%) general hospitals (a decline of 7.5% over the previous two decades) had obstetrics departments (30). The introduction of Japan's diagnosis combination procedures/per diem payment system (DCP/PDPS) for medical fees, combined with a decline in obstetrics patients, has created a need to fill all empty hospital beds to cover operating costs, regardless of department. As a result, both obstetrics departments and other diagnostic and treatment specialties are mixed in many hospitals (hereinafter referred to as mixed wards). Today, 54.3% of Japanese women give birth in hospitals; of these, 77.4% are in mixed wards (21). While this issue of mixed wards has also been reported as a problem in rural areas of Australia (13), this nationwide characteristic is unique to Japan.

Japan has no legal or medical insurance standards for placement of midwives; however, midwives are included among the number of nurses, and currently placed at a ratio of seven nurses to one patient. The median percentage of midwives among nursing staff is 93.3% in exclusively obstetric ward this rate is 73.1% in mixed obstetrics and gynecology wards and 51.9% in mixed wards that include departments other than obstetrics and gynecology (20). Among midwives working in mixed wards in Japan, 43.7% are simultaneously caring for patients in both their obstetrics department and in other clinical departments (21). This implies that midwives are unable to dedicate themselves solely to midwifery-related work. Importantly, some studies indicate the danger of methicillin-resistant Staphylococcus aureus cross-infection when midwives care for general patients along with mother-child dyads. In addition, although postpartum mothers are recommended to stay with their infants

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immediately after childbirth to encourage exclusive breastfeeding (BF), the percentage of mothers in a separate room from their infants was reported to be 8.5% in exclusively obstetric wards and 12.8% in mixed wards with an obstetrics department (23).

Japanese women spend longer time at the hospital after childbirth than women in other developed nations, with an average hospital stay after normal vaginal delivery of 5.8 days (32). According to the Organization for Economic Cooperation and Development (OECD), postpartum hospital stays in OECD member countries range from one to five days (35). Japan's national health insurance system enables this prolonged postpartum hospitalization, during which most postpartum care is performed. A seamless transition from hospital to the local community is essential for postpartum mother-child dyad support. Olds et al. demonstrated that long-term dyad support by nurses was linked not only with reduced child abuse, but also with favorable child development outcomes (37). In Japan, as part of the Comprehensive Model Support Program for Pregnant Women and Childbirth, the postpartum care business began full-fledged implementation in 2015 (29). However, current postpartum care programs in Japan have user limitations, and are performed at the discretion of each government administrative unit (city, town, and village); hence, rate of usage is low (19), with many programs still under consideration or development.

The most important part of in-hospital postpartum dyad support is adequate provision for BF, the health benefits of which have been shown for both mothers and their infants (47). Wiegers reported that providing support for the acquisition of effective BF techniques is an essential part of dyad support (46). In Japanese research, BF support by nurses or midwives is the most frequently provided care for mothers during postpartum hospitalization (48). A study performed in Canada reported that BF techniques and breast care are primarily provided during one-to-one teachings (12). However, parity influences the uptake and continuation of BF: primiparous mothers are more physically and psychologically fragile than multiparous mothers due to their lack of practical skills and experience (11)(24), and compared with multiparous women, they are at high risk of discontinuing BF (15).

The Japanese Nursing Association has expressed concern that the increase in mixed wards could result in a lower priority for postpartum care, as postpartum mothers have less urgent medical care needs than other patients, such as elderly patients or pregnant women in active labor (30). Furthermore, research indicates that mothers who delivered by cesarean section had a higher degree of satisfaction with their in-hospital postpartum care than did mothers with vaginal delivery, suggesting that nurses and midwives are spending less time with mothers after vaginal delivery due to a lower perceived need for care, thus leading to feelings of dissatisfaction among mothers (49). Therefore, there is a concern that mothers in mixed wards may be receiving insufficient care and support, especially mothers who delivered vaginally.

Research on how best to provide effective, sustainable mother-child dyad support is urgently needed. The first step towards that is to understand the status of BF immediately postpartum. Previous international studies have been limited to the measurement of self-reported times spent BF (i.e., time of suckling the infant) (14)(18)(40). The aim of this study was to clarify the ideal duration adequate for in-hospital postpartum mothers to learn nursing techniques. Thus, fundamental data can be obtained regarding proper personnel placement according to the status of the mother-child dyad. Specific goals of this study are to 1) clarify for each parity group the BF-related duration spent during postpartum hospitalization, and 2) determine the effects that parity group and number of days after delivery have on BF-related duration. The overall goal was to obtain data that can be used for determining the appropriate number of nursing personnel for postpartum care in mixed wards.

MATERIALS AND METHODS

Design

This study was a prospective observational study.

Participants

Women who met all of the following criteria were recruited to participate in this study: (a) had the desire, at time of hospitalization for delivery, to BF their infants, (b) had singleton vaginal delivery, (c) at time of delivery, were in their 37th week or longer of pregnancy, (d) had a healthy newborn, (e) were in a separate room from their infant, (f) speak Japanese language.

Setting

This study was performed for 45 days, beginning February 1, 2017, within a BF room in the mixed ward of a private hospital with 323 beds. The hospital was located in a satellite city of a large Japanese city with a population of 144,083 persons, an aging population (i.e., persons aged 65 years or older) rate of 27.7–28.6%, 998 live childbirths, 1559 deaths in 2017, and a TFR of 1.30–1.43 (6)(27)(33).

In the ward surveyed in the present study, there were 214 and 211 deliveries in 2016 and 2017, respectively. The ward consisted of the obstetrics department and 11 other departments. The number of beds in the ward was 42 beds; although the ward was mixed, only female patients could be admitted to any of the beds. A survey by the Japanese Nursing Association on the status of mixed wards in hospitals reported that the obstetrics department co-existed with an average of 3 (range, 1–12) other clinical departments (22). Thus, as 11 other departments co-existed with the obstetrics department in the surveyed ward, the facility included in this study was one of the most complicated mixed ward types in Japan. The location of the surveyed facility had a higher aging population and lower childbirth rates than the national average. Therefore, the facility reflects the projected reality of future population trends in Japan and the type of obstetric delivery environment that will become increasingly common in Japan.

The ratio of nursing personnel to patients was 7:1, with 22 nurses and 8 midwives (of these, two nurses and three midwives were not full-time workers). Four nurses worked during the night shift, including an average of one midwife. The neonatal room was designated as the BF room for postpartum mothers, and one or more nurses or midwives were always present in the neonatal room. These nurses and midwives were responsible for caring for infants and instructing mothers in BF skills. A postpartum mother could choose to stay in the same room with her infant or in a different room. Women who participated in this study stayed in a different room than their infants, but were assured that their babies would be given to them for BF whenever the newborn needed to be fed. To nurse their infants, mothers entered the BF room and BF while sitting in a chair placed before their infant's cot. Only postpartum mothers were allowed in the neonatal room to BF; family members other than the mother could spend time with the infant in a separate area outside of the neonatal room, thereby protecting the privacy of mothers during BF. The facility protocol for postpartum hospitalization days for primiparous and multiparous mothers were six and five days, respectively.

Data collection

To measure BF duration automatically, radio beacons and smartphones were used. One Bluetooth Low Energy communications standard radio beacon unit (Stick-N-Find, StickNFind Technologies) was placed on the slipper of participating mothers. Beacon radio transmission intervals were set at 5 seconds. On the wall near the entrance/exit in the BF room, a smartphone (ZenFoneGo ZB551KL, ASUSTeK Computer Inc.) connected to a charger unit was placed. The smartphone or beacon radio waves detected the entrance and exit of a mother into the BF room, while a pairing of the individual IDs of detected beacons and the detection times were sent and stored within a cloud server. Thus, the time spent by each mother within the BF room was measured. To exclude the time when a mother was in the BF room for reasons other than BF, collation was made using nursing records with BF start time written (Figure 1). To prevent interruption of data collection measurements due to communication failure or measurement equipment breakdown, daily checks were made of the communication status, throughout the surveillance period. No interruption occurred due to failure during this period; however, due to beacon battery depletion or loss, if there was missing measurement data, data for such participants were excluded from analysis.

BF duration included not only time for BF, but also for bottle feeding performed directly thereafter, for diaper changes before and after BF, and for support from nurses during BF (specialist advice and care). Such actions are naturally part of the learning required for BF mothers during postpartum hospitalization. Bottle feeding was performed after BF in cases of insufficient breastmilk secretion or when the infant failed to consume a sufficient quantity. Information collected from participants' electronic charts included age, infant birth weight, gestation in weeks at delivery, delivery time, BF rates, time exited from delivery room, and time of hospital discharge. From the nursing management journal, the number of patients hospitalized in the ward and the number from each clinical department were collected. Table I shows the operational definitions of terms used in this study.

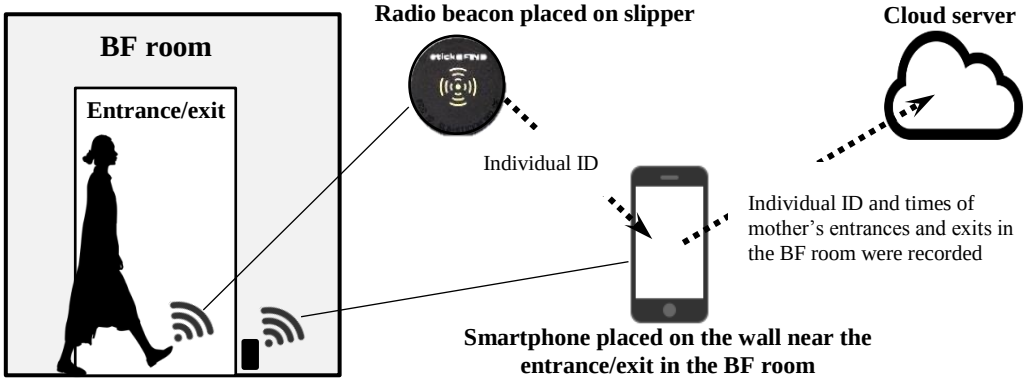

Figure 1. Method used to measure the time spent by each mother in the BF room

Table I. Operational definitions

Breastfeeding (BF): The direct feeding of breastmilk to an infant from the mother's breasts.
Length of postpartum hospital stay: Number of minutes after the delivery and entry of the mother into her postpartum hospital room, to the time of the mother's discharge from the hospital.
Postpartum day number: The number of days elapsed, with day of delivery as 0, and an additional 1 added for each midnight that passes.
BF-related duration: The time, from the mother's entry into the BF room to nurse the infant, to the time the mother exits from the nursing room (including BF, diaper change, bottle feeding performed directly after BF (to provide the infant with formula or breastmilk), and support and advice provided from nursing staff).
BF-related duration for each postpartum day: Number of minutes within a 24-hour period, daily from midnight, during postpartum hospitalization.
Total BF-related duration: All BF-related duration spent during postpartum hospitalization. The total number of minutes, calculated by adding the daily BF-related duration for the total number of hospitalization days.

Statistical analysis

Ratio of obstetrics-department inpatients to the number of inpatients in each of the other clinical department classifications was calculated to determine the status of the mixed ward. Next, the ratio of each parity group, as a percentage of the total BF-related duration during the postpartum hospitalization period, was compared. Parity status was categorized into two groups: primiparous and multiparous groups. For the comparative analysis, data of study participants with no missing postpartum in-hospital BF-related duration were included. Using data from all participants with exclusion of delivery and hospital-discharge days for the primiparous (from days 1–5) and multiparous (from days 1–4) groups, the mean BF-related duration for each day was calculated. A linear mixed model was used to clarify the effects of two factors, parity and postpartum day number, on BF-related duration for each postpartum day. Parity and postpartum day number were used for fixed effects of the linear mixed model, with two levels of parity group (primiparous and multiparous) and four levels of postpartum day number (day 1–4). BF-related duration for each postpartum day was repeatedly measured for each participant. All participants were hospitalized for 24 hours per day from days 1–4. As women were in the hospital for different amounts of time on day 0 and on day of discharge, these days were excluded from analysis.

For differences among means in the two parity groups, the Shapiro-Wilk test was used to determine normality, and the t-test was performed for normally distributed data. With non-normal distributions, comparisons were made using the Mann-Whitney U test. For determination of differences in between-group (intergroup) ratios, Fisher's exact test was used. We used the SPSS software package (SPSS Statistics for Windows, Version 24) for all statistical analyses. The level of statistical significance was set at 5%.

Ethical approval

A researcher explained the purpose of the study to participants, using a written document, and written informed consent was obtained from each participant. This study was conducted with the approval of the Kobe University Graduate School of Health Sciences Ethics Review Committee (Clearance No. 546).

RESULTS

Hospital ward status

The number of obstetrics department inpatients accounted for 17.1% of all inpatients. Mean number of patients per day was 29.4 persons; of these, mean number of postpartum mothers was 3.8 persons. Table II shows the cumulative number of inpatients by clinical department during the surveillance period.

Participants

There were 22 study participants; of these, two joined the study from postpartum day 3, and one from postpartum day 1. All other mothers agreed to participate in the study prior to delivery. There were 11 participants each in the primiparous and multiparous groups, while the mean ages in these groups were 30.8 and 34.1 years, respectively. Three of 11 mothers in the multiparous group delivered their third child. Included in the primiparous group were two late (aged ≥ 35 years) first-child bearing women.

No significant differences were found between the two groups in age (in years of mothers), gestation (in weeks), infant birth weight, peak of infant postnatal weight loss (in days), and delivery times (daytime versus nighttime). BF rates were equivalent between the two parity groups, and differences between groups were not determined (Table III).

Table II. The cumulative total number of inpatients by clinical department during the 45-day surveillance period

Clinical Department	Inpatients	
	N	%
Gynecology	376	33.3
Obstetrics	193	17.1
Gastroenterology	178	15.8
General Surgery	119	10.5
Department of General Medicine	90	8.0
Orthopedic Surgery	75	6.6
Ophthalmology	38	3.4
Cardiology	27	2.4
Hematology	22	1.9
Pediatrics	10	0.9
Respiratory Medicine	1	0.1
Total	1129	100

N: number

Table III. Demographic comparison of postpartum mothers and infants, by parity groups

	Primiparous N=11	Multiparous N=11	*p* value
Age in years (Mean ± SD)	30.8 ± 3.8	34.1 ± 6.7	0.20
Gestation in weeks (Median (IQR))	39.1 (2)	39.4 (0)	0.36
Infant birth weight (g) (Mean ± SD)	3120.0 ± 218.9	3103.6 ± 335.7	0.89
Peak of infant postnatal weight loss (days) (Mean ± SD)	2.3 ± 0.9	2.5 ± 1.1	0.68
Delivery time			
9:00-19:00	4	5	1.00
19:00-9:00	7	6	
Feeding method at discharge day			
Breastmilk only	6	6	-
Breastmilk and formula	5	5	

N: number; IQR: interquartile range; SD: standard deviation

Percentage of total BF-related duration to postpartum hospital stay

Mean postpartum hospital stay for the primiparous group was 8487.9 minutes (141 hours, 27 minutes), and 7311 minutes (122 hours, 1 minute) for the multiparous group. Mean total BF-related duration was 1830.8 minutes (30 hours, 30 minutes) for the primiparous group, and 1432.63 minutes (23 hours, 52 minutes) for the multiparous group. Mean percentage of total BF-related duration during postpartum hospital stay was 21.5% and 19.7% for the primiparous and multiparous groups, respectively; there were no significant differences between the two groups. Regardless of parity, women spent approximately 20% of their time in the hospital engaged in BF-related activities (Table IV).

Table IV. Percentage of total BF-related duration to postpartum hospital stay

	Primiparous N=10	Multiparous N=8	*p* value[a)]
	Mean ± SD	Mean ± SD	
Total time of BF-related duration (min) (A)	1830.8 ±235.1	1432.6 ± 198.3	
Length of postpartum hospital stay (min) (B)	8487.9 ± 506.0	7311.0 ± 240.3	
Percentage of A to B	21.5 ± 2.2	19.7 ± 3.1	0.15

[a)] Results of independent samples t-test BF: breastfeeding; N: number; min: minutes; SD: standard deviation

BF-related duration by parity groups for each postpartum day

Table V shows BF frequency and BF-related duration by parity group for each postpartum day. No significant differences were found between parity groups for day-to-day BF frequency. The postpartum day with the longest BF-related duration at one time was day 4 for both the primiparous group (48.0 minutes) and multiparous group (43.2 minutes). The postpartum day with the longest total BF-related duration was day 4 for

the primiparous group (383.7 minutes), and day 2 for the multiparous group (318.0 minutes). In the primiparous group, by day 5, there was a 70-minute reduction in total BF-related duration compared to day 4; the time on day 5 of the primiparous group corresponded approximately to day 3 BF-related duration in the multiparous group.

In the analysis, using the linear mixed model, significant differences were found for postpartum day ($F=12.473$, $p=0.000$) and for interaction between parity group and postpartum day ($F=2.813$, $p=0.048$).

Table V. Mean BF frequency, One BF-related duration, and total BF-related duration by parity groups and postpartum days

	Primiparous (N=11)			Multiparous (N=11)		
	Frequency Mean ± SD	One time (Min) Mean ± SD	Total time (Min) Mean ± SD	Frequency Mean ± SD	One time (Min) Mean ± SD	Total time (Min) Mean ± SD
Day 1[a)]	5.3 ± 1.2	43.1 ± 15.8	233.1 ± 55.7	6.3 ± 1.2	40.9 ± 12.1	255.5 ± 63.0
Day 2[b)]	8.1 ± 1.0	44.9 ± 17.2	354.7 ± 87.5	7.9 ± 1.1	39.8 ± 9.0	318.0 ± 47.2
Day 3[b)]	7.5 ± 0.7	46.4 ± 14.4	354.6 ± 67.7	7.7 ± 0.7	41.0 ±11.2	314.7 ± 38.2
Day 4	7.9 ± 0.7	48.0 ± 14.0	383.7 ± 82.9	7.1 ± 0.5	43.2 ±14.1	302.0 ± 60.5
Day 5	7.0 ± 1.2	45.8 ± 13.0	313.0 ± 105.4	-	-	-

BF: breastfeeding; N: number; Min: minutes; SD: standard deviation

Number of missing values: a) 1 primipara, 2 multiparous b) 2 multiparous

DISCUSSION

Percentage of total BF-related duration during the postpartum hospitalization period

Our survey results verified that regardless of parity, participants spent approximately 20% of their in-hospital time performing BF-related activities. This time included BF, bottle feeding, diaper changes, and professional advice and support provided by the nursing staff, which was the actual time required by mothers to learn child-rearing techniques related to BF during their postpartum hospitalization. However, our survey results showed only the actual time of BF-related activities of postpartum mothers, and further studies are needed to clarify the effects of different durations of BF activities of postpartum mothers, especially from the perspective of fatigue and sleeping status. Tiredness, lack of sleep due to high BF frequency, and insufficient free time for mothers have been found to be related to BF discontinuation; lack of sleep is also related to postpartum depression (8)(42). Ideally, midwives and nurses should carefully observe the amount of time that each mother spends for BF. When a mother spends more or less than 20% of her time on BF, it may be a sign that she likely needs additional support. Although nurses and midwives should elucidate the cause of the problem, determining the mothers' total BF-related durations in the real-world setting is necessary, with assessments of daily handwritten records of time being a realistic method. Determining the percentage of mothers' BF-related duration during postpartum hospital stay should result in minimal operation load. Therefore, a future possibility could be introducing an electronic information system that could measure and display each mother's BF-related duration during hospitalization in real time. Specifically, we propose that the system developed should automatically measure the duration of each mother's stay in the BF room or the duration of time for which the infant leaves the cot. For example, the time spent by mothers in the BF room could be measured automatically by an access management system using radio frequency identification or proximity sensor, such as an Internet of Things (IoT) sensor. Alternatively, BF time could be measured by placing a sensor in the infant cot. Future research should explore these possibilities.

Postpartum mothers, while at the hospital, require an environment that ensures adequate sleep. BF has been promoted as a means of recovery from fatigue for mothers. The effects of hormone processes enable BF mothers to have a remarkably high quality of sleep compared with mothers who use only formula (i.e., completely non-BF) (4). Mothers who exclusively BF slept longer than mothers who bottle feed, at 48 hours postpartum and also at one month after birth (9) (17). Thus, ensuring adequate sleep for postpartum mothers should be part of the in-hospital support provided to the mother-child dyad, especially for those who aim to exclusively BF. However, exclusively-BF mothers must have a higher frequency of BF (exceeding 8 times daily) than mothers who use other methods (mixed type, or only formula) (7). Midwives and nurses must therefore provide the necessary observation and support to ensure that BF is performed effectively.

Postpartum sleep can also be interrupted by the hospital environment (25). There are frequent visitors to a mother's room in the hospital, including medical personnel, housekeeping, and visitors; therefore, professionals need to keep a close watch to ensure that privacy and relaxation are not frequently interrupted (34). Other causes of sleep disturbances are noise, lights (3), and patient-care activities (41). The waking cycle of postpartum mothers occurs every three to four hours; therefore, their daily life patterns differ from those of patients in other clinical departments. Mutual negative effects can thus be predicted for all patients in a mixed ward (those in

obstetrics and other clinical departments). It is therefore desirable that specialized unique spaces be set within the wards that will ensure maintenance of a comfortable environment for every patient (20).

Daily changes in BF-related duration

The BF-related duration of each postpartum day in this study, regardless of parity group, was longer than times measured for BF in prior studies (14)(18)(40). This is likely due to the inclusion in this study of time spent bottle feeding, diaper changing, and receiving support from nurses, in addition to time spent BF. Further, neonatal BF rooms in our surveyed facilities were constantly staffed by one or more nurses and/or midwives. Thus, during each BF activity, mothers were in contact with and received instructions from professionals on infant care and health-related guidance. This might account for the longer time measured.

Mothers in the primiparous group spent their longest BF-related duration on day 4, with subsequent reduction in the one-time and total daily BF-related duration on day 5. Similarly, mothers in the multiparous group spent their longest one-time BF-related duration on day 4, but total BF-related duration was shorter on all postpartum days except for day 1. This infers that most multiparous mothers have existing BF skills and steadily improve each day. This confirms the results of previous studies that report it is necessary to give more support to first-time mothers (15)(26)(38).

One consideration was that primiparous mothers might have experienced some kind of challenge and/or required more concentrated support from the health professionals on that day. Providing a backdrop for this is a report by Yamagishi et al. reporting an increase in the time taken to offer care to postpartum women on the day before hospital discharge (48).

We found from our study, even within the limited period, that from postpartum day 1–4, a difference existed in the daily postpartum BF-related duration that was dependent on parity. As with previous studies (2) (43), peak infant body weight decline occurred on postpartum day 2–3 in the present study. The multiparous group spent their longest BF-related duration on postpartum day 2, or prior to the peak body weight decline, while the primiparous group spent theirs on day 4, or after the said peak, with a difference of about 1 hour longer for primiparous mothers. This is considered to be related to the special care needed by primiparous mothers, with longer support times by nursing professionals than that provided for multiparous mothers. Primiparous mothers often experience BF-related problems during postpartum hospitalization (15). Ninety-two percent of primiparous mothers experience some difficulty on postpartum day 3, which heightens the risk of BF interruption (44). Kronborg et al. reported that primiparous mothers' experience during the first stage of the mother-child dyad relationship includes anxiety, difficulty, tiredness, nipple and general pain, and confusion about contradictory advice provided by medical care professionals (24). Razurel et al. similarly suggested that interaction with caregivers and BF are causes of stress in primiparous mothers (38). It is well-known that many primiparous mothers experience worries, anxieties, pain, and confusion during their in-hospital postpartum BF. Thus, as nurses and midwives interact more closely with postpartum mothers than do other medical specialists, they must be aware that negative experiences can affect the mental health and the BF of primiparous mothers, and they must provide professional support and care. Such support, which must be open and non-directive informative support, should be sensitive to the emotions and self-esteem of first-time mothers (38) during this extremely sensitive process. In contrast, due to their previous experiences, multiparous mothers have much higher feelings of self-efficacy in terms of BF and are better able to handle BF problems that occur during the early postpartum period (11). Differences in daily changes in BF-related duration between the two groups in the present study reinforce prior research demonstrating the importance of focusing on primiparous BF mothers. Furthermore, as the positive effects of midwife intervention on BF have been confirmed (1)(10)(26)(39)(45), it is critical to establish hospital environments where midwives with specialist knowledge can fully dedicate themselves to dyad care.

Study significance and suggestions

In the present study, 24-hour measurements of time spent by hospitalized postpartum mothers in a BF room were prospectively recorded. Due to the inclusion of aspects that are naturally related to BF, including bottle feeding, diaper changes, and nursing support, we clarified the time required for mothers to learn about BF during the early postpartum period, a period of major significance to the health of mothers and infants. Compared with prior research, based on self-reporting of time required for BF alone, the present research results may more accurate reflect the realities of BF postpartum mothers.

Our study clarified that postpartum mothers spent approximately 20% of their total time in the hospital for BF-related activities, and primiparous mothers had their longest BF-related duration on postpartum day 4. It should be noted that these results were generated in a rather chaotic environment: in a mixed ward with an obstetrics department. With the aim of bolstering dyad care, hospitals must make a distinction between the management of postpartum mothers and management of general patients, because dyad care involves a

completely different schedule with completely different tasks. If the current Japanese style of postpartum hospital stay of approximately one week continues into the future, it is important that mothers be placed in an environment in which they can be provided with individualized and specialized care, with support from midwives. For that purpose, it is desirable that at least one midwife who can concentrate solely on breastfeeding care should be placed on each shift. Future studies are needed to better understand the optimum number of midwives to provide appropriate support and improved care for mothers and infants, especially in mixed wards.

Medical resources are limited in an aging society, and the number of hospital beds allotted to elderly patients will increase, implying a related decrease in beds available for obstetrics departments. Thus, it is likely that there will be shorter postpartum hospital stays in Japan in the future, consistent with countries in Europe and North America. Towards the ultra-aging society of 2025, the Japanese government is promoting community-based integrated care systems, and certain effects have been reported in model communities for such systems. These include a decline in the number of bedridden elderly, a slowdown in the rise of medical care costs, and an increase in the rate of persons undergoing health examinations (16). The authors propose the establishment of community care systems not only for older adults, but also for mother-child dyads directly after hospital discharge.

Future surveys are required to compare mixed hospital wards with hospital wards solely dedicated for obstetrics departments, in terms of nursing quality and outcomes of hospitalized postpartum mothers (e.g., mother satisfaction rates, BF rates, and postpartum depression rates). There is an urgent need for the establishment of comprehensive care systems, through government involvement as well as perinatal health care providers, towards maternal and child health reform.

LIMITATIONS OF THE STUDY

The sample size of the present study was only 22 mothers, which is insufficient to represent all Japanese postpartum women or generalize the study results. Therefore, there is a need for large-scale future surveys that can provide support for the findings of the present study. Moreover, as this study was limited to time measurements alone, we did not clarify the effects of individual factors related to the nurses and midwives who were involved with study participants.

CONCLUSION

Mothers spent 20% of their postpartum hospitalization time engaged in BF-related activities. However, daily patterns in BF-related duration differed by parity group. Individual support is important for primiparous mothers in particular. In Japan, due to the growing number of hospitals with mixed wards, it is important that a comfortable hospital environment and an environment within which midwives can dedicate themselves to mother-child dyad care be ensured for postpartum mothers.

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