Received: 19 May 2022 | Revised: 15 August 2022 | Accepted: 26 August 2022

DOI: 10.1111/ped.15344

PEDIATRICS INTERNATIONAL WILEY

ORIGINAL ARTICLE

Questionnaire survey on donor human milk programs targeting NICUs in Japan

Ayaka Oda | **Katsumi Mizuno**

Department of Pediatrics, Showa University School of Medicine, Tokyo, Japan

Correspondence
Katsumi Mizuno, Department of Pediatrics, Showa University School of Medicine, 1-5-8, Hatanodai, Shinagawa-ku, Tokyo 142-8666, Japan.
Email: katsuorobi@med.showa-u.ac.jp

Funding information
MHLW Program, Grant/Award Number: 20DA1008

Abstract

Background: Since 2019, neonatal intensive care units (NICUs) with access to human milk banks (HMBs) have increased in Japan. In this study, using a questionnaire survey, we explored an understanding of the purpose, status, and problems of donor human milk (DHM) use and the status of enteral nutrition (EN) in very-low-birthweight infants (VLBWIs) in NICUs with access to HMBs.

Methods: A questionnaire was sent to 47 NICUs that had access to HMBs. Participants were surveyed from the begining of January to the end of February 2022.

Results: In total, 37 of 47 (78.9%) NICUs responded to the questionnaire. The most common indications for DHM were gestational age of less than 28 weeks (78.3%) and birthweight of less than 1500 g (100%). Informed consent was obtained from the physicians and most parents accepted DHM. All NICUs responded that EN for VLBWIs should start ideally within 24 h of birth, but in reality, nine NICUs (25%) and 18 NICUs (50%) began EN within 12 and 24 h of birth, respectively. Additionally, seven of the nine NICUs that started EN within 12 h after birth routinely used DHM for VLBWIs. For infants with birthweights of 1000–1499 g, it was not uncommon to start EN within 24 h of birth with formula milk.

Conclusion: All NICUs responded that the indication for DHM was very-low birthweight and that such infants would receive health benefits from DHM. In Japan, there is a trend of starting EN early in VLBWIs. Accessibility to HMB may be important for starting EN within 24 h of birth.

KEYWORDS
donor human milk, enteral nutrition, human milk bank, infant, low birthweight

BACKGROUND

Breastfeeding plays a crucial "medicinal role" for preterm infants by reducing the incidence of necrotizing enterocolitis (NEC), severe infections, retinopathy of prematurity, and chronic lung disease.[1] In particular, the prevention of NEC in very preterm infants is of utmost importance because the survival rate of the disease is low. However, even if the infant survives their future quality of life is compromised.[2] Breast milk is the first choice for enteral nutrition (EN) in preterm infants, especially in very-low-birthweight (VLBWIs) or high-risk neonates with gastrointestinal or cardiac disease. However, depending on the mother's condition, it may not be possible to obtain or feed the mother's own milk (MOM) to the infant consistently. In such cases, pediatric societies recommend using donor human milk (DHM) which carries a lower risk of causing NEC than formula milk.[3–5] In addition, early use of DHM is known to shorten the duration of parenteral nutrition

and lead to better weight gain. Therefore, EN should be started immediately after birth during neonatal intensive care unit (NICU) admission to improve neonatal care.[6,7] The Japan Human Milk Bank Association was established in 2017, and the Japan Pediatric Society issued a policy statement on EN for preterm and VLBWIs in 2019,[5] leading to an increase in the number of NICUs using DHM. In 2021, DHM was used in 47 institutions for more than 360 infants.

However, only a quarter of the 192 NICUs that are members of the Neonatal Clinical Research Network have used DHM. In other words, it is assumed that the majority of VLBW infants are fed formula milk or unpasteurized breast milk (from other mothers) when their mothers' milk is unavailable or inaccessible.

A questionnaire survey conducted in 2020 by the Health and Labor Sciences Research Grants research group found that 91% of 154 NICUs acknowledged the need for human milk banks (HMB).[8] Additionally, nearly 70% of the facilities that did not currently use DHM indicated an interest in using it in future. The results of this survey also revealed that the reasons for not using the HMB were the time and effort required to obtain facility approval (e.g., ethics review) and the cost of DHM. Therefore, to clarify issues related to HMB use we conducted a questionnaire survey of facilities that already use the banks.

METHODS

A questionnaire survey was sent by email to 47 NICUs that used DHM under a contract with the Japan Human Milk Bank Association. The study was conducted as part of the Health and Labor Sciences Research Grants-in-Aid for Scientific Research initiative, titled "The Research to Develop Human Milk Banks that can Provide a Stable Supply of Donor Milk." The questionnaire is presented in Appendix A. To increase response rates, up to three email reminders were sent to participating institutions. For statistical analysis, we used GraphPad Prism (version 9.3.1) to evaluate the relationship between the belief in the health benefits of DHM for infants and the degree of prematurity using the chi-square test. To evaluate the relationship between the timing of EN initiation in VLBW infants and EN standardization we used the Mann–Whitney *U* test.

RESULTS

Of the 47 NICUs who received the questionnaire, 37 (78.9%) responded. According to the responses, 567 VLBW infants and 525 extremely-low- birthweight infants (ELBWIs) were admitted to these NICUs. Additionally, during the same year, 32 NICUs (86%) had treated infants with postoperative gastrointestinal tract disease and 15 (41%) had treated infants with complications of NEC.

Questions about donor milk

In 2021, a median of 6 (interquartile range 17.5–2.5) individuals used DHM at each NICU. A total of 354 infants were provided with DHM. In addition, seven NICUs used DHM for more than 20 infants per year, and these seven NICUs provided DHM to 218 out of the 292 (74.6%) VLBWIs admitted to the NICUs in 2021.

Informed consent to use DHM was obtained by 34 participating facilities (three NICUs did not respond). Among these, 30 NICUs (88%) reported that the attending physician obtained consent from the parents for the use of DHM. Two NICUs had a specific physician in charge of DHM who obtained consent for the use of DHM. In the other two cases, the physician who explained the use of DHM at the time of hospitalization obtained parental consent. There were no NICUs in which nurses obtained consent.

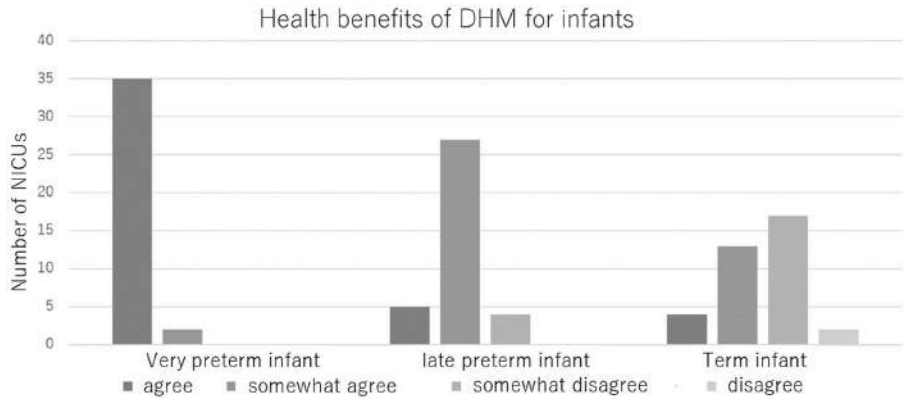

FIGURE 1 One hundred percent of neonatal intensive care units (NICUs) believe that there is a health benefit of donor human milk (DHM) for very preterm infants. For late preterm infants, 14% agreed, 75% somewhat agreed, and 11% somewhat disagreed. Meanwhile, for term infants, 11% agreed, 36% somewhat agreed, 47% somewhat disagreed, and 6% disagreed.

Health benefits of donor human milk for infants

All 37 NICUs reported health benefits of using DHM in very preterm infants (Figure 1). For late preterm infants, 5 of 36 (14%) responded with "agree", 27 of 36 (75%) with "somewhat agree", and 4 of 36 (11%) with "somewhat disagree". Conversely, for term infants 4 of 36 (11%) responded with "agree", 13 of 36 (36%) with "somewhat agree", 17 of 36 (47%) with "somewhat disagree", and 2 of 36 (6%) with "disagree". The "agree" or "somewhat agree" was significantly different from "disagree" or "somewhat disagree" according to the chi-square test, $p < 0.0001$. These results indicate that the participants belief in the health benefits of DHM for infants was determined by their degree of prematurity.

Indications for donor human milk

As shown in Figure 2, 27 NICUs responded to the item on gestational age as an indication for use of DHM, with 20 of 27 (74.1%) responding "less than 28 weeks," 6 of 27 (22.2%) responding "28–32 weeks," and 1 of 27 (3.7%) responding "33–36 weeks." In contrast, the 26 NICUs that responded to the question on birthweight as an indication for DHM, reported a birthweight of "less than 1500 g." In addition to gestation and weight, more than 15 NICUs responded that they used DHM NPO period after medical NEC abstinence, gastrointestinal surgery, and milk allergies.

Criteria for transitioning from donor human milk to formula milk

Seventeen out of 37 (45.9%) NICUs based the transition from DHM to formular milk (FM) on the time-lapse after birth, such as 28–30 weeks, 32 weeks, and 34 weeks post-menstrual age, or 7 days, 14 days, and 1 month after birth.

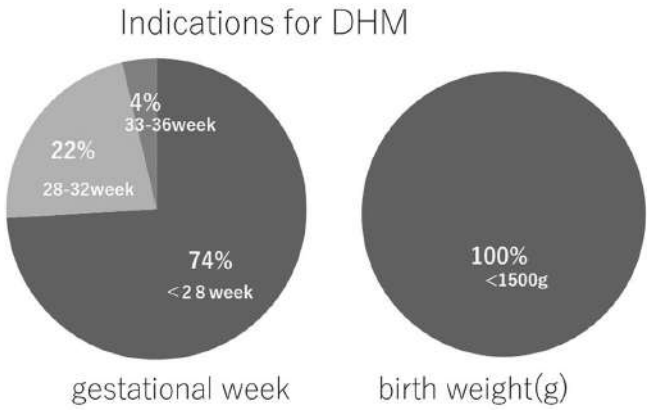

FIGURE 2 About 75% of the centers set the indication for using donor human milk (DHM) as gestational age less than 28 weeks; all centers set the birthweight as less than 1500 g.

Five of 37 (13.5%) NICUs set the transition from DHM to occur when weight reached 1500 g, while 3 of 37 (8.1%) set it at when the EN volume reached 100 or 160 ml/kg/day. As a result, nearly 25 of 37 (67.6%) NICUs decided the transition from DHM to FM based on post-menstrual age, time-lapse after birth, target weight, and target EN volume, while the other NICUs depended on the attending physician's judgment.

Percentage of refusals from families to using donor human milk at each NICU

Twenty-six of 35 (74%) NICUs reported "no refusals," 4 of 35 (11%) reported "less than 5% refusals," 2 of 35 (6%) reported "5%–10% refusals," and 3 of 35 (9%) reported "more than 10% refusals".

Donor human milk payment

Twenty-four of 37 (64.9%) NICUs indicated that the hospital pays for DHM, (4 of 37 (10.8%)) indicated that the pediatric department pays for DHM, and 2 of 37 (5.4%) indicated that the patient's family pays for DHM. Seven of 37 (19%) NICUs responded "other."

Donor human milk user fee (annual contract fee)

Of the NICUs, 29 out of 36 (80.6%) responded that the DHM user fee was "adequate" or "somewhat adequate" 1 of 36 (2.78%) answered, "not adequate."

Time from order to receipt of donor human milk

Thirty-five out of 36 (97.2%) NICUs stated that the time from the order to receipt of DHM was adequate, while 1 of 36 (2.78%) said that it was inadequate. However, this case was unavoidable because the facility was in Okinawa and the delivery took 3 days.

When asked if they thought the DHM provided by the HMB was safe, all NICUs answered "yes" or "somewhat agree." When asked whether parents, nurses, and neonatologists were receptive to DHM, all but one facility answered "yes" or "somewhat agree" to each question. Initiation of EN was standardized at half of the NICUs and at the discretion of the attending physician at the other half.

We compared the actual timing of EN initiation in VLBWIs in NICUs where EN initiation was standardized and in NICUs where it was left to the attending physician. The median time of EN initiation in standardized NICUs was 12–24 h after birth, whereas the median time in physician-directed NICUs was 24–48 h after birth. We asked if the actual timing of EN initiation depended on the

presence of EN standardization. The actual EN initiation was divided into (1) <12 h, (2) 12–24 h, (3) 24–48 h, (4) >48 h, and using the Mann–Whitney *U* test the result showed no significant difference ($p = 0.064$), but NICUs where EN initiation was standardized tended to start EN earlier.

The ideal and actual start time and type of initial enteral nutrition

The queries about the timing of initial EN and the kinds of initial EN were sought from 36 NICUs. These queries were divided into four categories: ELBWIs (appropriate for gestational age [AGA]), ELBWIs (small for gestational age [SGA]), VLBWIs (AGA), and VLBWIs (SGA).

Extremely-low-birthweight infants – appropriate for gestational age

The ideal starting time for EN in AGA ELBWIs was within 6 h at 6 out of 36 (16.7%) NICUs, 6–12 h at 15 of 36 (41.6%) NICUs, and 12–24 h at 15 of 36 (41.6%) NICUs. In contrast, the actual start times were within 12 h and 12–24 h at 9 of 36 (25%) NICUs each, 24–48 h at 8 of 36 (22%) NICUs, and 48–72 h at 10 of 36 (28%) NICUs (Figure 3).

All NICUs used MOM or DHM for EN initiation. Two NICUs started with FM if MOM was unavailable. All nine NICUs that initiated EN within 12 h of birth used DHM. They all believed that DHM was beneficial for extremely preterm infants and stated that both neonatologists and nurses were receptive to DHM. (Figure 3b).

Extremely-low-birthweight infants – small for gestational age

The ideal starting time for EN for SGA ELBWIs was similar to those who were AGA, with 6 of 36 (16.7%) NICUs starting within 6 h, 15 of 36 (41.7%) within 6–12 h, and 15 of 36 (41.7%) within 12–24 h. In contrast, the actual starting times were within 12 h for 9 of 38 (23.7%) NICUs, 12–24 h for 10 of 38 (26.3%), 24–48 h for 7of 38 (18.4%), and 48–72 h for 12 of 38 (31.6%) (Figure 4). Most

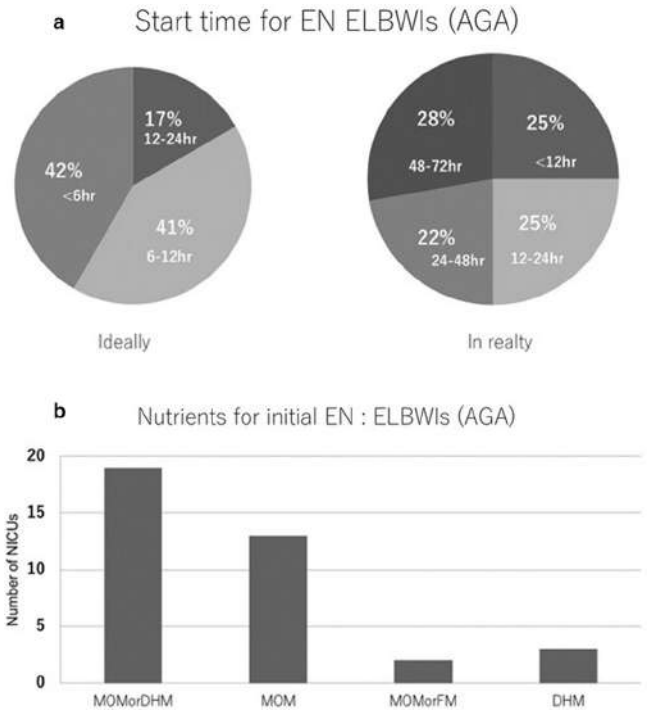

FIGURE 3 (a) The ideal starting time for enteral nutrition (EN) in appropriate for gestational age (AGA) extremely-low-birthweight infants (ELBWIs) was within 6 h at six centers (16.7%), 6–12 h at 15 centers (41.6%), and 12–24 h at 15 centers (41.6%). In contrast, nine of the centers (25%) reported actual start times of 12 h or less and nine (25%) 12–24 h, eight centers (22%) 24–48 h, and 10 centers (28%) 48–72 h. (b) Most of the centers (19) used breast milk or donor human milk (DHM) to initiate EN. In cases where breast milk was not available, two centers started EN with formula milk (FM). In fact, all nine centers that started EN within 12 h of birth used DHM. MOM: mother's own milk.

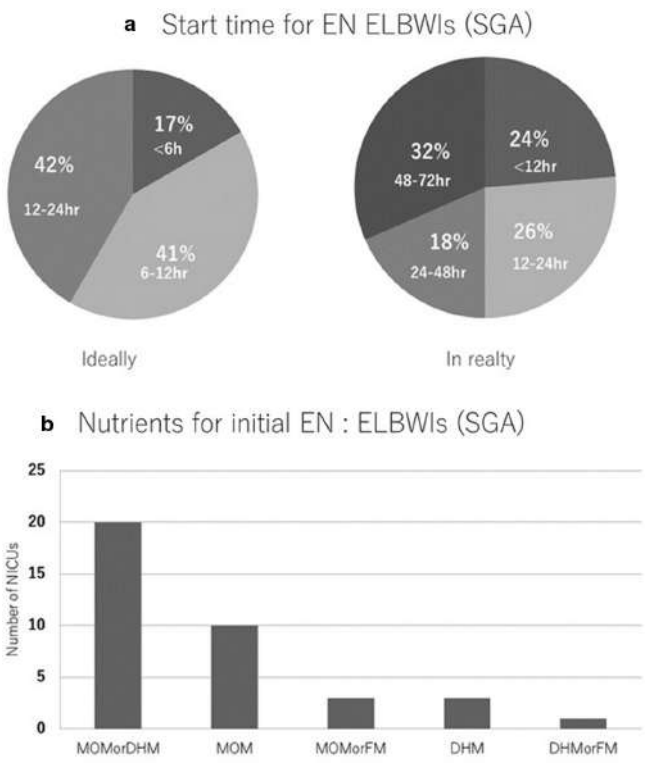

FIGURE 4 (a) The ideal start time for enteral nutrition (EN) in small for gestational age (SGA) extremely-low-birthweight infants (ELBWIs) was similar to those born appropriate for gestational age (AGA): 17% within 6 h, 41% within 6–12 h, and 42% within 12–24 h. In contrast, actual starting times were 24% within 12 h, 26% within 12–24 h, 18% within 24–48 h, and 32% within 48–72 h. (b) An overwhelming majority of neonatal intensive care units (NICUs) used breast milk or donor human milk (DHM) to initiate EN. Four NICUs started with formula milk (FM). MOM, mother's own milk.

NICUs reported using MOM or DHM to initiate EN. Four NICUs started EN using FM (Figure 4b).

Very-low-birthweight infants – appropriate for gestational age

The ideal start time for EN in AGA VLBWIs was 6 h for 4 of 36 (11.1%) NICUs, 6–12 h for 18 of 36 (50%), and 12–24 h for 14 of 36 (38.9%). The actual start time for EN was within 12 h for 9 of 36 (25%) NICUs, 12–24 h for 11 of 36 (30.6%), 24–48 h for 9 of 36 (25%), and 48–72 h for 7 of 36 (19.4%) (Figure 5). Most NICUs reported using MOM or DHM to initiate EN. However, the number of NICUs that started with FM increased to 12 from 2–4 for the ELBWIs (Figure 5b).

Very-low-birthweight infants – small for gestational age

The ideal start time for EN in SGA VLBWIs was within 6 h in 4 of 36 (11.1%) NICUs, 6–12 h in 19 of 36 (52.8%), and 12–24 h in 13 of 36; (36.1%; Figure 6). Most NICUs use breast milk or DHM to initiate EN therapy. Twelve NICUs initiated EN by FM (Figure 6b).

DISCUSSION

At the end of 2021, 47 out of 192 NICUs (24.4%), who were members of the Neonatal Clinical Research network, had access to HMB. According to a recent report the DHM utilization rate in Germany, Austria, and Switzerland is 35%.[9] In the United States, the percentage of NICUs with donor milk programs is 66% and 73% in Level 3 and Level 4 NICUs, respectively.[10]

The NICUs, which responded to the questionnaire, took care of a total of 1046 VLBWIs in 2021, which was approximately 1/6th of the 6228 VLBW infants born in Japan in 2020. In Japan, 97% of the parents provided written consent and 3% gave verbal consent. In contrast, in the United States, 78.7% of parents gave written consent and 18.9% provided verbal consent.[11] This result indicates that written consent is a common method adopted in Japan. In terms of the healthcare providers who obtained consent from parents, in the United States 43.3% were physicians or nurse practitioners, 21.3% were registered nurses, 32.9% were physicians, nurse practitioners, or registered nurses, and 1.6% of parents did not provide consent.[11] In contrast, 100% of respondents in Japan were physicians. Perhaps because of the differences in the medical system, there were no cases in which nurses performed the procedure without consent.

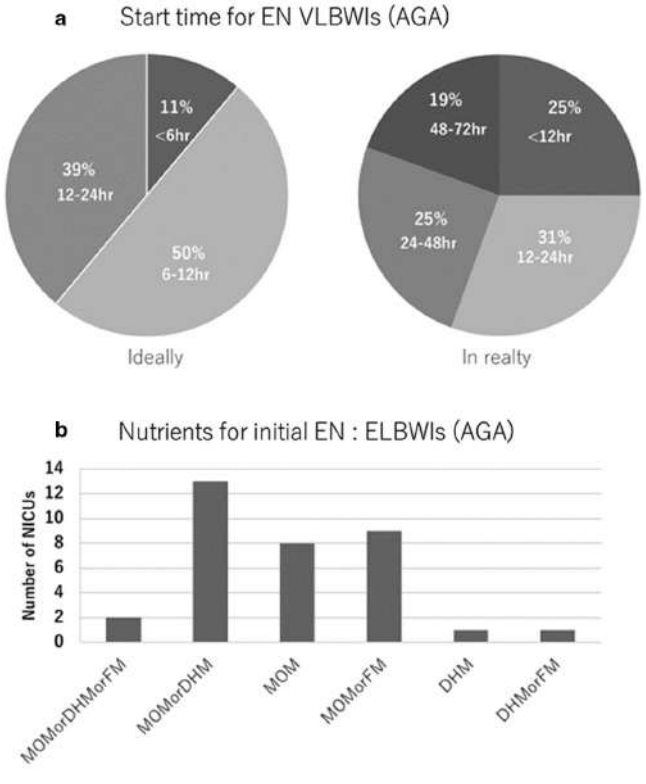

FIGURE 5 (a) The ideal starting time for enteral nutrition (EN) in appropriate for gestational age (AGA) very-low-birthweight infants (VLBWIs) was within 6 h (6%), 50% within 6–12 h, and 44% within 12–24 h. (b) Most of the centers used breast milk or donor human milk (DHM) to start EN. However, the number of neonatal intensive care units (NICUS) starting with FM increased to 12. MOM, mother's own milk.

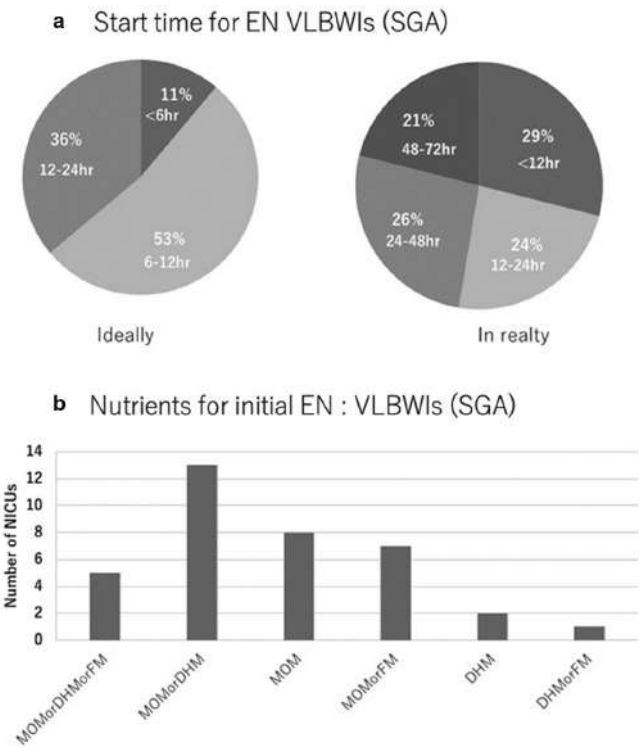

FIGURE 6 (a) The ideal starting time for enteral nutrition (EN) in small for gestational age (SGA) very-low-birthweight infants (VLBWIs) was within 6 h in 11%, of neonatal intensive care units (NICUs) 6–12 h in 53%, and 12–24 h in 36%. (b) Most NICUs use breast milk or donor human milk (DHM) to initiate EN. Twelve NICUs started with formula milk (FM). MOM, mother's own milk.

In the United States, 86.3% of the participants established that the refusal rate of using DHM was less than 10%, while 10% of the NICUs established a refusal rate of 10%–25%.[11] In contrast, in Japan, the percentage of no refusal was 74%, while 11% of NICUs responded that the refusal rate was less than 5%. Although there is a long history of HMB use in the United States, there is little concern about DHM use. Interestingly, 91% of families in Japan refused to use DHM less than 10% of the time, which is not a large number compared to the United States. This is possibly because many women in Japan have always desired to breastfeed their children.[12] In the three NICUs, more than 10% refused to use DHM, and the annual number of DHM users was less than five. Conversely, the median annual number of DHM uses was 7 (25th and 75th percentile: 2.5 and 13.75) at 26 NICUs that had never refused DHM, suggesting that DHM refusal may be less likely to occur at NICUs that are relatively familiar with DHM use.

In the United States, 86% of the cost of DHM was covered by the hospitals and 13.8% by insurance.[11] Further, five US states have legislated insurance to cover the actual costs of using DHM for preterm infants. In this survey, two hospitals reported that they charged the patient's family for DHM as an inpatient meal fee, which is covered by medical care for preterm babies.

Regarding the cost of DHM, the United States provides it at $4 per ounce (30 ml). A study investigating the approximate cost of DHM reported that the average cost was $27 per infant when the mother produced breast milk adequately and $154 per infant when the mother had an inadequate milk supply.[13] The annual contracted cost for DHM in Japan is also based on $4 per ounce, which is 15 000 yen/L (calculated at 120 yen/dollar; the cost would be 15 840 yen/L). Although the contract cost is set at 300 000 yen per year for a facility that plans to use 20 L per year, it has been found that NICUs use more than the contracted amount. The total annual contracted amount was 285 L, but the actual amount delivered to the NICU was 778 L. Although most NICUs view the annual contract fee as adequate, when considering sustainability in terms of HMB activities, they are required to pay appropriately, according to the volume of deliveries. As some NICUs use research funds to pay for the contract, raising the annual contract fee (in case of increased demand) may be an issue in the future.

Owing to the excellent Japanese distribution system, all NICUs (except for one facility in Okinawa) judged the time required to receive the order of DHM as adequate. However, in the future, it may be necessary to establish small-scale HMBs in several locations in Japan to enhance delivery. Regarding the safety of DHM and acceptance from NICUs and families, it is assumed that NICUs that have used HMBs in the past have a sense of security regarding using DHM from HMBs. As a result, doctors and nurses may be more likely to accept DHM.

Half of the respondents reported that EN initiation was standardized at their NICUs, while the other half reported that EN was initiated at the discretion of the attending physician. In a previous survey, 35% of the respondents answered that EN was standardized; therefore, NICUs that have access to HMBs may have a higher rate of standardization.[14] The benefits of standardizing EN, as discussed previously, are expected to spread in Japan, considering that the use of DHM has increased over the years.[15]

Regarding the age indications for DHM, 74.1% of the respondents stated less than 28 weeks' gestational age, 22.2% 28–32 weeks, and 3.7% said 33–36 weeks. In contrast, in the United States 49.9% of the NICUs stated less than 32 weeks and 42.0% indicated 33–36 weeks.[11] Regarding birthweight, 100% of the NICUs in this study set DHM indication to less than 1500 g. In the United States, 18.3% of the NICUs set DHM indication at less than 1500 g, 55.3% to 1500 g, and 26.4% did not specify it by weight.[11] In terms of indications for DHM, insufficient MOM was the highest in the United States.[11] Conversely, in Japan, the most common indications for DHM were medical NEC (40.5%), gastrointestinal surgery (43.2%), and milk allergy (40.5%). Therefore, DHM is used to treat higher weight and/or more mature preterm infants in the united States than in Japan. In other countries, parental requests are one of the reasons for the use of DHM.[10,11]

All the NICUs in the study reported that DHM had health benefits for very preterm infants. Nearly 90% of the NICUs favored DHM for late preterm infants, responding with "strongly agree" and "somewhat agree." For term infants, 47% of the NICUs answered "strongly agree" or "somewhat agree." It can be inferred that the demand for DHM is not limited to very preterm infants in NICUs with HMB programs. However, Japanese neonatologists believe that the health benefits of DHM depend on the degree of prematurity of the infants.

The most common criteria for transitioning from DHM to FM in the United States were specific postmenstrual age (PMA; 76.9%) and target weight (44.3%).[11] In contrast, the highest percentage of Japanese respondents used the 32 weeks PMA for the transition (19%), but each facility often set its own standards.

Forty-one percent of NICUs treated infants with NEC, but among the seven NICUs that used DHM routinely (>20 infants per year), only two treated infants with NEC. One infant was born at 22 weeks' gestation and used only MOM. At another facility, two cases of NEC occurred: one was artificially fed before the use of DHM, and the other infant developed NEC under DHM use because of significant ductus arteriosus. Therefore, there was only one case of NEC in these seven NICUs which took care of a total of 292 VLBW infants in 2021 (NEC incidence rate: 1/292, 0.34%).

In 2020, we conducted a questionnaire survey of all the NICUs that are members of the Japanese Neonatologist Association. The results showed that the ideal starting time for EN for ELBW infants was within 12 and 24 h

after the birth of 18% and 58% NICUs, respectively.[8] In this current study, the NICUs that had access to HMB replied that the ideal starting time for EN for ELBW infants was within 12 (58.3%) and 24 h (41.7%) after birth. The percentage of NICUs that start EN within 24 h was 30% in all NICUs[8] on the 2020 study and 50% in this study. In other words, NICUs that have access to HMB not only plan to start EN but also start EN as they desire. Regarding the use of FM, a previous survey found that 24% of NICUs used FM for the first EN; however, only two of 37 NICUs (5%) used FM if MOM was unavailable.

Regarding VLBWIs, the ideal starting times for EN were within 12 h (25%) and 24 h (62%) after birth. For the NICUs that had access to HMB the ideal starting time was within 12 h (56%) and 24 h (44%) after birth. The percentage of NICUs that started EN within 24 h was 62% in all NICUs and 56% in NICUs with HMB access. A previous survey found that 56% of NICUs used FM for the first EN; however, in the NICUs with access to HMB, 12 of 37 NICUs (32.4%) used FM. In other words, more NICUs start EN for VLBWIs within 24 h after birth, partly because they are not reluctant to use FM as the first enteral feed. It would be desirable for NICUs with access to HMB to start EN for VLBWIs with DHM. Klotz et al. found that more than half of the NICUs that have access to HMB start EN with DHM immediately after birth.

Limitations

Most NICUs replied to all the questions; however, some questions were not answered. However, the number of unanswered items was limited, therefore, the findings did not significantly change. Although we asked NICUs that have access to a HMB to answer this questionnaire, not all the VLBW infants admitted to these NICUs received DHM. In the near future, we would like to have a better understanding of the differences in clinical outcomes of VLBW infants who do or do not receive DHM.

CONCLUSIONS

The HMB system is becoming familiar in NICUs in Japan. Most NICU staff and parents of the recipients are receptive to DHM. As expected, NICUs with access to HMB start enteral feeding with DHM earlier.

AUTHOR CONTRIBUTIONS

Katsumi Mizuno and Ayaka Oda conceptualized the study and designed the questionnaire. Ayaka Oda contributed to the data collection and analysis. Both authors participated in drafting, reviewing, and contributing to the manuscript and approved the final version.

ACKNOWLEDGMENTS

This work was supported by the Ministry of Health, Labour and Welfare Program (Grant Number 20DA1008).

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

ORCID

Katsumi Mizuno https://orcid.org/0000-0002-6983-8851

REFERENCES

1. Miller J, Tonkin E, Damarell RA, McPhee A, Suganuma M, Suganuma H, et al. A systematic review and meta-analysis of human milk feeding and morbidity in very low birth weight infants. Nutrients. 2018;10(6):707.
2. Bazacliu C, Neu J. Necrotizing enterocolitis: Long term complications. Curr Pediatr Rev. 2019;15(2):115–24.
3. ESPGHAN Committee on Nutrition, Arslanoglu S, Corpeleijn W, Moro G, Braegger C, Campoy C, et al. Donor human milk for preterm infants: Current evidence and research directions. J Pediatr Gastroenterol Nutr. 2013;57:535–42. https://doi.org/10.1097/MPG.0b013e3182a3af0a
4. Daniels S, Corkins M, de Ferranti S, Golden NH, Kim JH, Magge SN, et al. Donor human milk for the high-risk infant: Preparation, safety, and usage options in the United States. Pediatrics. 2017;139(1):e20163440. https://doi.org/10.1542/peds.2016-3440
5. Mizuno K, Shimizu T, Ida S, Ito S, Inokuchi M, Ohura T, et al. Policy statement of enteral nutrition for preterm and very low birthweight infants. Pediatr Int. 2020;62:124–7.
6. Butler TJ, Szekely LJ, Grow JL. A standardized nutrition approach for very low birth weight neonates improves outcomes, reduces cost and is not associated with increased rates of necrotizing enterocolitis, sepsis or mortality. J Perinatol. 2013;33:851–7. https://doi.org/10.1038/jp.2013.66
7. Oikawa K, Nakano Y, Miyazawa T, Hasebe Y, Kuwabara H, Terada T, et al. Experience using donor human milk: A single-center cohort study in Japan. Pediatr Int. 2021;64:e15071. https://doi.org/10.1111/ped.15071
8. Wada Y. *The state of breast milk banks, breastfeeding, and enteral feeding: A questionnaire survey Research for the establishment of human milk bank*. Health and Labor Sciences Research Grant report; 2021.
9. Klotz D, Jansen S, Glanzmann R, Haiden N, Fuchs H, Gebauer C. Donor human milk programs in German, Austraian and Swiss neonatal units - Findings from an international survey. BMC Pediatr. 2020;20:235. https://doi.org/10.1186/s12887-020-02137-2
10. Perrin MT. Donor human milk and fortifier use in United States level 2, 3, and 4 neonatal care hospitals. J Pediatr Gastroenterol Nutr. 2018;66:664–9.
11. Parker MG, Burnham LA, Kerr S, Belfort MB, Perrin M, Corwin M, et al. Prevalence and predictors of donor milk programs among U.S. advanced neonatal care facilities. J Perinatol. 2020;40:672–80. https://doi.org/10.1038/s41372-020-0620-6
12. Inano H, Kameya M, Sasano K, Matsumura K, Tsuchida A, Hamazaki K, et al. Factors influencing exclusive breastfeeding rates until 6 months postpartum: The Japan environment and children's study. Sci Rep. 2021;11:6841.
13. Carroll K, Herrmann KR. The cost of using donor human milk in the NICU to achieve exclusively human milk feeding through 32 weeks postmenstrual age. Breastfeed. Med. 2013;8:286–90. https://doi.org/10.1089/bfm.2012.0068

14. Oikawa K, Sakurai M, Murakawa T, Kidokoro R, Nakano Y, Asai H, et al. Survey of a nutrition management method for very low birthweight infants: status before wide use of human milk banks in Japan. Pediatr Int. 2020;62:180–8. https://doi.org/10.1111/ped.14074
15. Jasani B, Patole S. Standardized feeding regimen for reducing necrotizing enterocolitis in preterm infants: An updated systematic review. J Perinatol. 2017;37:827–33. https://doi.org/10.1038/jp.2017.37

How to cite this article: Oda A, Mizuno K. Questionnaire survey on donor human milk programs targeting NICUs in Japan. Pediatr Int. 2022;64:e15344. doi:10.1111/ped.15344

APPENDIX A

QUESTIONNAIRE FORM

Appendix 1: Questionnaire Form

Number of NICU beds (beds)

Number of GCU beds (beds)

1. Number of NICU admissions in 2021 Babies

2. Very low birth weight infants (1000–1499g) and extremely low birth weight infants admitted in 2021.

Very low birth weight infant:

Extremely low birth weight infants:

3. Did you treat children with postoperative gastrointestinal diseases in 2021?

☐ Yes ☐ No

4. Did you treat children with necrotizing enterocolitis (NEC) in 2021?

☐ Yes ☐ No

5. Number of people using donor milk (DHM) in 2021: persons

6. Do you consent to use DHM?

☐ Written consent ☐ Verbal consent ☐ Other

7. Who takes the consent?

☐ Determined DHM physician ☐ Principal physician ☐ Nurse ☐ Other ( )

8. Percentage of family members refusing to use DHM

☐ None ☐ <5% ☐ 5–10% ☐ 10% or more

9. DHM is paid for by

☐ Hospital ☐ Pediatric (neonatology) ☐ Billed to the patient's family ☐ Other ( )

10. Criteria for using DHM (check all that apply)

☐ The mother is unable to produce enough milk

Weeks of conception: ☐ <28 weeks ☐ 28–32 weeks ☐ 33–36 weeks

Birth weight of the child: ☐ <1500g ☐ <2000g ☐ <2500g

☐ The post-NPO period after medical NEC

☐ After gastrointestinal surgery

☐ After surgery for cardiac disease

☐ After hypothermia in neonates with severe asphyxia

☐ Milk allergy

☐ Family Preference

☐ Other

11. Criteria for transition from DHM to formula milk if mother's breast milk is not available.

☐ When the baby reaches 32 weeks

☐ When the baby reaches 34 weeks

☐ When the baby reaches a weight of 1500 g

☐ Other

12. Please answer the following items with 1. agree, 2. somewhat agree, 3. somewhat disagree, or 4. disagree.

(1) DHM has health benefits for very preterm infants ( )

(2) DHM has health benefits for late preterm infants ( )

(3) DHM has health benefits for term babies ( )

(4) DHM is appropriate for preterm growth with reinforcement ( )

(5) DHM price (annual fee) is appropriate ( )

(6) Time from order to receipt of DHM is adequate ( )

(7) DHM provided by a human milk bank is safe ( )

(8) Families of affected children are receptive to DHM ( )

(9) Nurses are receptive to DHM ( )

(10) Neonatologists are receptive to DHM ( )

13. enteral feeding initiation

☐ Standardized

☐ Depends on the discretion of the attending physician

Extremely low birth weight infants (AGA only):.

14. How many hours after birth do you think enteral feeding should ideally be started ( )

hours

15. How soon after birth do you actually start enteral feeding?

(In the case of a mother's breast milk, the time to determine that it has been started is:

(1) it arrives every 3 h, or (2) the amount indicated to be administered arrives (e.g., if 1

mL ×8 times, at least 1 mL arrives).

☐ within 12 hours ☐ 12–24 hours ☐ 24–48 hours ☐ 48–72 hours ☐ Other

16. What do you use to initiate enteral feedings:?

☐ Mother's breast milk

☐ DHM

☐ Received milk (without pasteurized milk)

☐ Formula milk

☐ Tube feeding (multiple choice)

For those who have checked other than the mother's breast milk or DHM, please tell us

why.

Extremely low birth weight infants (SGA only):

17. How many hours after birth do you think enteral feeding should ideally be started ( )

hours

18. How soon after birth do you actually start enteral feeding?

(In the case of a mother's breast milk, the time to determine that it has been started is:

(1) it arrives every 3 h, or (2) the amount indicated to be administered arrives (e.g., if 1

mL ×8 times, at least 1 mL arrives).

☐ within 12 hours ☐ 12–24 hours ☐ 24–48 hours ☐ 48–72 hours ☐ Other

19. What do you use to initiate enteral feedings?

☐ Mother's breast milk

☐ DHM

☐ Received milk (without pasteurization)

☐ Formula milk

☐ Tube feeding (multiple choice)

Very low birth weight infants (AGA only):

20. How many hours after birth do you think enteral feeding should ideally be started? ( )

hours

21. How soon after birth do you actually start enteral feeding?

(In the case of a mother's breast milk, the time to determine that it has been started is:

(1) it arrives every 3 h, or (2) the amount indicated to be administered arrives (e.g., if 1

mL × 8 times, at least 1 mL arrives).

☐ within 12 hours ☐ 12–24 hours ☐ 24–48 hours ☐ 48–72 hours ☐ Other

22. What do you use to initiate enteral feedings:?

☐ Mother's breast milk

☐ DHM

☐ Received milk (without pasteurized milk)

☐ Formula milk

☐ Tube feeding (multiple choice)

For those who have checked other than mother's breast milk or DHM, please tell us why.

Very low birth weight infants (SGA only):

23. How many hours after birth do you think enteral feeding should ideally be started? ( ) hours

24. How soon after birth do you actually start enteral feeding?

(In the case of a mother's breast milk, the time to determine that it has been started is: (1) it arrives every 3 h, or (2) the amount indicated to be administered arrives (e.g., if 1 mL ×8 times, at least 1 mL arrives).

☐ within 12 hours ☐ 12–24 hours ☐ 24–48 hours ☐ 48–72 hours ☐ Other

25. What do you use to initiate enteral feedings?

☐ Mother's breast milk

☐ DHM

☐ Formula milk