

Protecting, promoting and supporting breastfeeding

Edited by

Mary A. Uyoga, Seema Mahrshahi and Bindi Borg

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Protecting, promoting and supporting breastfeeding

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Birth and newborn care policies and practices limit breastfeeding at maternity facilities in Vietnam

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The prevalence of early and exclusive breastfeeding in Vietnam remains sub-optimal. The objective of this study was to determine factors associated with early initiation of breastfeeding (EIBF) and exclusive breastfeeding for the first 3 days after birth (EBF3D). We conducted a population-based, cross-sectional survey of 726 mothers with children aged 0–11 months in two provinces and one municipality from May to July 2020. Multinomial logistic regression was used to examine factors associated with EIBF and EBF3D. The prevalence of EIBF was 39.7% and EBF3D 18.0%. The EIBF prevalence is positively associated with immediate and uninterrupted skin-to-skin contact (SSC) for 10–29 min (aOR: 2.55; 95% CI: 1.49, 4.37), 30–59 min (aOR: 4.15; 95% CI: 2.08, 8.27), 60–80 min (aOR: 4.35; 95% CI: 1.50, 12.6), or ≥90 min (aOR: 5.87; 95% CI: 3.14, 10.98). EIBF was negatively associated with cesarean birth (aOR: 0.24; 95% CI: 0.11, 0.51), bringing infant formula to the birth facility (aOR: 0.49; 95% CI: 0.30, 0.78), purchased it after arrival (aOR: 0.37; 95% CI: 0.24, 0.60), or did both (aOR: 0.43; 95% CI: 0.21, 0.89). EBF3D was negatively associated with cesarean section birth (aOR: 0.15; 95% CI: 0.06, 0.39), vaginal birth with episiotomy (aOR: 0.40; 95% CI: 0.18, 0.88), bringing formula to the maternity facility (aOR: 0.03; 95% CI: 0.01, 0.07), purchased it after arrival (aOR: 0.02; 95% CI: 0.01, 0.06) or did both (aOR: 0.04; 95% CI: 0.02, 0.10). Receiving counseling from any source was not significantly associated with early breastfeeding practices. Policy and health service delivery interventions should be directed at eliminating infant formula from birthing environments, reducing unnecessary cesarean sections and episiotomies, providing immediate and uninterrupted SSC for all births, and improving breastfeeding counseling and support.

KEYWORDS

early essential newborn care, early initiation breastfeeding, exclusive breastfeeding, maternity facilities, newborn, policy, the Code, Vietnam

Introduction

Breastfeeding is nature's perfect food system and the biological norm for feeding human infants and young children (1). Early initiation of breastfeeding (EIBF) within the first hour of life and exclusive breastfeeding (EBF) up to 6 months are associated with reduced child morbidity and mortality and provide long-term benefits for both mother and child (2–4). Although almost all mothers are biologically capable of breastfeeding their children (5) and 95% of babies globally receive some breastmilk, breastfeeding practices remain sub-optimal (6). Countries in East Asia and the Pacific have lower prevalence rates of EIBF (38%), exclusive breastfeeding for the first 2 days after birth (57%), and EBF up to 6 months (31%) compared to corresponding global rates of 48, 65, and 44% (7, 8). In Vietnam, rates of EIBF fell nationally between 2011 and 2020 from 39.7 to 23.5% (9, 10); and bottle-feeding rates rose (from 38.7 to 54.3%) (9, 10). Further, the cesarean section rate rose from 20.0% nationally in 2011 to 33.4% in 2020, with rates in some cities above 50.0% (9–11), a trend that is likely to further reduce the likelihood of breastfeeding (12–15).

These declines have occurred in Vietnam despite efforts since the 1990s to put in place policies to protect, promote, and support breastfeeding (16, 17). A number of policies and regulations have been adopted, including: national legislation on the Code of Marketing of Breast milk Substitutes (“the Code”) (18–20); public and private hospital accreditation standards that promote the Ten Steps to Successful Breastfeeding (21); early essential newborn care practice standards for vaginal and cesarean births, a package of evidence-based interventions applied in the second stage of labor and early newborn period to improve maternal and newborn outcomes, including early and exclusive breastfeeding (22–25); policies promoting breastfeeding counseling and support from pregnancy through the first 2 years of life (25); and designation criteria and assessment mechanisms for Centers of Excellence for Breastfeeding (26).

Early initiation of breastfeeding and EBF for 6 months are associated with several individual factors including maternal education, type of work, parity, smoking, race, and ethnicity; as well as practices during and immediately following childbirth (27–29). Health service-related factors around childbirth known to influence breastfeeding include cesarean birth, episiotomy, immediate and uninterrupted skin-to-skin contact (SSC) of adequate duration, rooming-in of mother and newborn, and breastfeeding counseling (27–29). EIBF and EBF at hospital discharge are associated with EBF up to 6 months and continued breastfeeding (30–34). Aggressive marketing of commercial milk formula for infants, children, and pregnant women impedes breastfeeding and the provision of breastfeeding support by health workers (27–29, 35–38).

Given Vietnam's high institutional birth rate (96.3% in 2020) (10), health facility environments and health worker behaviors play important roles in influencing early and

exclusive breastfeeding around the time of birth. Adoption of early essential newborn care protocols in studies of maternity hospitals in Vietnam has been associated with improved early and exclusive breastfeeding practices prior to discharge (24, 34). However, there are limited data on how widely these protocols are being implemented. Additionally, the impact of factors around childbirth on post-discharge breastfeeding practices has not been documented in a population-based sample of women. Population-based data from a study investigating breastfeeding promotion, protection and support in Vietnam provided an opportunity to examine factors associated with early and exclusive breastfeeding in a representative sample of Vietnamese women (39). The primary objective of this study was to identify maternal and health system factors, including antenatal care and birth practices, which were associated with early and exclusive breastfeeding in the first 3 days after birth. The goal was to use these findings to identify policy and program interventions to address priority barriers to improve breastfeeding practices in Vietnam.

Materials and methods

Sample and data sources

Primary data collection was conducted for a population-based, cross-sectional study reviewing the content, implementation, and potential impact of policies to protect, promote, and support breastfeeding in Vietnam. The design was a population-based, cross-sectional observational survey using both quantitative and qualitative methods. Data were collected between May and July 2020. Details of study design, sampling and data collection tools ([Supplementary material](#)) were presented in a research protocol (39) published prior to the data analysis.

The sampling frame included two provinces and one municipality selected to be representative of the different socio-economic characteristics of Vietnam: Bac Ninh, a province that is transforming from a predominantly agricultural to a more industrialized province in Red River Delta Region (north), with an estimated population of 1,380,000 of which 28% is urban; Binh Duong, a predominantly industrial province in the Southeastern Region (south) with an estimated population of 2,460,000 of which 80% is urban; and Ho Chi Minh City (HCMC), the most populous city in Vietnam (south), with an estimated population of 9,040,000 of which 80% is urban (40). In 2019, there were about 34,200 live births in Bac Ninh, 43,200 in Binh Duong, and 127,400 in HCMC (40).

A stratified multiple-stage cluster sampling design was used to obtain an estimated minimum sample size of 620 mothers of children 0–11 months (38, 39). Within each study location, all sub-districts were divided into three categories: industrial zone, urban without an industrial zone, and rural without an

industrial zone; in each category, one district was randomly sampled. Within each sampled district all sub-districts were listed, and ten sub-districts randomly selected; and within each sub-district all mothers of infants aged 0–11 months were listed using immunization records provided by community health workers. Mothers of infants aged 0–11 months were then selected using systematic random sampling. Because the lists used for sampling were from immunization records, the sample included both permanent and temporary residents (i.e., migrant workers) of the selected sub-districts.

Health workers contacted selected mothers and invited them to participate. If the sampled woman was unable or unwilling to participate in the survey, she was replaced by another woman randomly selected from the sub-district list. The non-response rate was 14.6%. Those who agreed to participate were contacted by the research coordinators who arranged a time for a household visit (38, 39). Evaluators visited sampled households in pairs and obtained written consent from all participants. All interviews were conducted using a structured questionnaire in Vietnamese by a team of two trained supervisors in a private and quiet place with the mother of the child alone (i.e., without the presence of father, grandmother, or other caregivers). Quantitative data from mothers were collected electronically using tablets and uploaded daily to a secure cloud-based server. A data manager downloaded the data from the cloud-based server and conducted frequent data quality checks (39).

Definition of variables

Dependent variables

The main outcome variables for this analysis were EIBF and exclusive breastfeeding during the first 3 days after birth (EBF3D) (41, 42) among infants <12 months, which can be affected by early practices and facility support around birth. EIBF was defined as infants who were put to the breast for the first time within 1 h of birth (41, 42). The mother was asked “How soon after birth did you put (NAME) to the breast for the first time?” and if she responded with a time less than 1 h, was defined as practicing EIBF.

Exclusive breastfeeding during the first 3 days after birth was defined as infants who were fed exclusively with breast milk for the first 3 days after birth. The interviewers asked the mothers whether their infant had received any of the following in the first 3 days of birth: breastmilk, breastmilk from another woman, infant formula/other infant milk, plain water, honey, sugar or glucose water, lemon juice/herbal tea (e.g., licorice root), and any other food or drink. A mother who responded yes to human milk and no to any other food or drink was defined as practicing EBF3D.

Independent variables

Independent variables for analysis were selected if they were collected by the survey data collection tools and had been

associated or potentially associated with breastfeeding outcomes in the World Health Organization (WHO) data synthesis reviews developed using the Grading of Recommendations Assessment, Development and Evaluation methodology (32, 43), namely: antenatal care (ANC) contacts, mode of birth (cesarean section, vaginal with or without episiotomy), SSC, breastfeeding before separation, rooming-in of mother and newborn, intention to use infant formula in the perinatal period, distribution of infant formula samples during the facility stay, and several sociodemographic characteristics.

Birth mode was defined by using two questions: “Did you have a cesarean section when you gave birth to (NAME)?” and for those who had vaginal birth “Did you have an episiotomy when you gave birth to (NAME)?” Respondents were then grouped into one of three mutually exclusive categories based on their responses: (1) Vaginal birth without episiotomy, (2) Vaginal birth with episiotomy, and (3) Cesarean birth.

Skin-to-skin contact was defined by using three questions: “After giving birth, was (NAME) placed on your chest skin to skin?,” “How long did it take from (NAME)’s first cry until (he/she) was put onto your chest?,” and “For how long was (NAME) kept skin to skin on your chest with you with no break or separation?” Respondents were then grouped into one of six mutually exclusive categories based on their responses: (1) Not applied or applied after 1 min and (2) applied within 1 min and uninterrupted for (a) <10 min, (b) 10–29 min, (c) 30–59 min, (d) 60–89 min, and (e) at least 90 min (29, 32).

Intention to use infant formula during the perinatal period was indirectly defined by using two questions: “Did you or your family member bring any infant formula to the health facility when you gave birth to (NAME)?” and “Did you or your family member purchase any infant formula at or near the health facility shortly after you gave birth to (NAME)?” Respondents were then grouped into one of four mutually exclusive categories based on their responses: (1) Did not bring or purchase, (2) Brought, (3) Purchased, and (4) Brought and purchased (38).

Antenatal care received was defined by both type of provider and number of care visits received during pregnancy. Women were asked whether they visited public or private facilities for each ANC visit and the type of facility categorized into public health facilities only, both public and private health facilities, and private health facilities only. The number ANC visits made between the beginning of pregnancy and birth was categorized into 0–3, 4–7, and at least 8 times (25, 44).

Birthweight was reported by the mother, and newborns weighing less than 2,500 g were classified as low birth weight.

Gestational age was defined as the number of weeks of pregnancy reported by the mother at the time of the birth of their baby; babies born at less than 37 weeks of gestation were defined as preterm (45). The number of previous child(ren) was identified by subtracting one from the total number of child(ren) the mother had. It was then categorized into zero (first child),

one and two or more. In addition, we included the sex of the child (male or female) in the analysis.

Advice received on breastfeeding during pregnancy and in the first 3 days after birth by a health worker or lay person was defined as any verbal information, counseling, observation and breastfeeding assessment with feedback or any other information received, as reported by the mother.

Socio-economic characteristics of participating women included age (years), ethnicity (Kinh, the ethnic majority group in Vietnam, and other ethnicities), marital status (married or unmarried), education (never attended school, primary school, junior secondary school, secondary school, diploma or postgraduate), and employment status (farmer, blue-collar, white-collar, small trader or self-employed, and unemployed, homemaker, student or other) (38).

Data analysis

Data analysis was performed using Stata 15.1 (Stata Inc., College Station, TX, USA). For descriptive analysis, we analyzed general characteristics, experience during ANC and feeding practices in the first 3 days after birth. We conducted multinomial logistic regression to examine associations between exposure variables and EIBF and EBF3D controlled for potential confounding factors and adjusted for clustering [e.g., province or municipality and the 30 primary sampling units (PSUs) within each province] by using the robust option. We neither estimated sampling weights nor used them in the analysis because our primary focus was on the assessment of association rather than the estimation of prevalence (39). For EBF3D, in addition to variables included in the regression model for EIBF, we included the following variables: EIBF, completion of the first breastfeed before separation, rooming-in, and receipt of a free infant formula sample during hospital stay.

Results

A total of 726 interviews with mothers with infants aged 0–11 months (infants) were completed. Of the 726 mothers, 95.3% were of Kinh ethnicity; and the remaining ethnicities were Hoa (1.1%), Khmer (1.1%), Muong (0.8%), Nung (0.7%), Tay (0.6%), Cham (0.1%), Tho (0.1%), and Xtieng (0.1%) (Table 1). Ninety-nine percent (98.9%) of mothers were married, 62.8% had a secondary diploma or higher, and 23.1% had a white-collar job (Table 1).

While most mothers in our sample (98.9%) report breastfeeding their newborns during the first 3 days of life, only 39.7% initiated breastfeeding in the first hour after birth (Table 2). Mothers from HCMC were more likely to report EIBF (53.1%) while those from Bac Ninh were least likely (30.2%) (Table 2). During the first 3 days of life, 90.8% of mothers fed

their newborns with their own breastmilk, 1.1% with breastmilk from other mothers (either donor human milk from a milk bank or wet nursing), and 3.3% from both (Table 2).

Less than one fifth (18.0%) of mothers reported EBF3D: the prevalence was higher in Binh Duong and HCMC at 23.7 and 23.5%, respectively, than in Bac Ninh (7.0%) (Table 2). Infant formula was the most common supplement provided to newborns in the first 3 days of life, with 79.3% of mothers across the three provinces (72.0% in HCMC, 73.4% in Binh Duong, and 92.6% in Bac Ninh) reporting that they provided infant formula to their newborns during this period. Provision of plain water (16.4%) was the second most common supplement, which was given on its own in 2.1% of cases and used to mix formula for the remainder (Table 2). Provision of honey (3.3), sugar water (0.7%), and lemon juice (0.1%) was far less common (Table 2).

Sampled women were more likely to seek antenatal care ANC in a private health facility (35.5%) and a mix of public and private facilities (35.5%) than public facilities (24.2%); and 71.3% of mothers reported four or more ANC visits (Table 3). Nearly three quarters of respondents (72.6%) reported consuming commercial milk formula for pregnant women at least once during their pregnancy (Table 3), with a similar prevalence across provinces. About two thirds of respondents received breastfeeding guidance from a health worker in a health facility, with the highest prevalence in HCMC followed by Binh Duong, and lowest in Bac Ninh (Table 3). Nearly two thirds (59.1%) received breastfeeding advice from another person, mainly mothers or mothers-in-law, husband, other family members, neighbors, friends, and co-workers (Table 3). In our sample, 28.5% of mothers were first-time mothers (Table 3).

Eighty-nine percent of women gave birth in public health facilities (59.2% in a public hospital; 29.5% in a public polyclinic) (Table 4). A high proportion of newborns were born at term (94.2%), heavier than 2,500 g (95.3%), and birthed by cesarean (44.6%) or vaginally with an episiotomy (46.1%); 9.2% were birthed vaginally without an episiotomy. Birth practices were similar across provinces. Overall, 49.3% of mothers reported immediate (within 1 min after birth) SSC, with 27.8 receiving uninterrupted SSC for less than 30 min and 11.6% receiving uninterrupted SSC for the recommended 90 min (Table 4). The prevalence of immediate and prolonged SSC for 90 min was highest in HCMC (18.1%), then Binh Duong (16.2%) and lowest in Bac Ninh (0.4%) (Table 4).

The prevalence of EIBF showed an increased trend with the duration of SSC, rising from 23.4% among newborns who did not receive immediate SSC to around 70% among those who received immediate and uninterrupted SSC for at least 90 min (Figure 1). The prevalence of EBF3D also showed an increased trend with the duration of SSC, rising from 12.5% among newborns who did not receive immediate SSC to 42.9% among those receiving 60–89 min of uninterrupted SSC, and 34.5% of those receiving over 90 min (Figure 1).

A third (29.9%) of newborns completed their first breastfeed before being separated from their mothers and 66.0% stayed with their mothers from birth (rooming-in) (Table 4). Many mothers (87.9%) reported bringing infant formula or buying it near the maternity facility; and 5.9% reported receiving an infant formula sample during their stay at the facility (Table 4). Just over half (55.2%) of mothers reported receiving breastfeeding counseling and support from a health worker during their hospital stay. More mothers in HCMC received breastfeeding support by a health worker during the hospital stay (70.0%) than Binh Duong (59.3%), and Bac Ninh (36.4%) (Table 4). About one in four mothers (27.0%) received breastfeeding advice from another person, mainly from mothers or mothers-in-law during the first 3 days after birth (Table 4).

Multinomial logistic regression showed that women who received ANC from a mix of both public and private facilities were significantly less likely (aOR: 0.59; 95% CI: 0.40, 0.87) to initiate breastfeeding within the first hour than those who received ANC at public health facilities only (Table 5). The likelihood of EIBF was significantly lower among those who gave birth via cesarean (aOR: 0.24; 95% CI: 0.11, 0.51), brought infant formula to the maternity facility (aOR: 0.49; 95% CI: 0.30, 0.78), purchased it after arrival (aOR: 0.37; 95% CI: 0.24, 0.60), or did both (aOR: 0.43; 95% CI: 0.21, 0.89) (Table 5). Mothers were less likely to practice EIBF in Binh Duong (aOR: 0.42; 95% CI: 0.22, 0.83) and Bac Ninh (aOR: 0.44; 95% CI: 0.21, 0.94) than those from HCMC. EIBF was significantly more likely if immediate and uninterrupted SSC was applied for 10–29 min (aOR: 2.55; 95% CI: 1.49, 4.37), 30–59 min (aOR: 4.15; 95% CI: 2.08, 8.27),

TABLE 1 Socio-economic characteristics of mothers of infants 0–11 months, three provinces, Vietnam 2020¹.

	HCMC (n = 243)	Binh Duong (n = 241)	Bac Ninh (n = 242)	Total (n = 726)
Kinh ethnicity	95.1	95.4	95.5	95.3
Age (Mean ± SD; median, p25–p75)	30.7 ± 5.7 31 (27–35)	29.5 ± 5.3 30 (26–33)	29 ± 5.3 29 (25–33)	29.7 ± 5.5 29 (26–34)
Marital status, Married	97.9	99.2	99.6	98.9
Highest level of education:				
Primary school or less	18.9	18.3	8.7	15.3
Junior secondary school	26.3	24.5	14.9	21.9
Secondary school	25.5	24.1	30.2	26.6
Diploma, bachelor, or higher	29.2	33.2	46.3	36.2
Main occupation:				
Blue-collar or farmer	28.4	35.7	30.6	31.5
White-collar	18.5	22.0	28.9	23.1
Small trader, self-employed, small self-owned business, services	30.5	18.7	32.6	27.3
Unemployed, homemaker, student	22.6	23.7	7.9	18.3

¹ Data presented as % except for age presented as mean ± Standard Deviation (SD) and median and interquartile range. HCMC, Ho Chi Minh City.

TABLE 2 Feeding practices in the first 3 days after birth reported by mothers of infants 0–11 months, three provinces, Vietnam, 2020¹.

	HCMC (n = 243)	Binh Duong (n = 241)	Bac Ninh (n = 242)	Total (n = 726)
Early initiation of breastfeeding	53.1	35.7	30.2	39.7
Exclusive breastfeeding for the first 3 days after birth	23.5	23.7	7.0	18.0
Food and drink given in the first 3 days after birth:				
Human milk:				
Any	93.4	92.5	89.7	91.9
Mothers' own milk	93.0	90.5	88.8	90.8
Milk from another mother	3.3	3.3	6.6	4.4
Infant formula/other infant milk	72.0	73.4	92.6	79.3
Plain water	20.6	21.2	7.4	16.4
Honey	4.9	4.6	0.4	3.3
Sugar or glucose water	0.8	1.2	0.0	0.7
Lemon juice/herbal tea (e.g., licorice root)	0.0	0.4	0.0	0.1

¹ Data presented as %. HCMC, Ho Chi Minh City.

TABLE 3 Experience during pregnancy reported by the mothers of infants 0–11 months, three provinces, Vietnam, 2020¹.

	HCMC (<i>n</i> = 243)	Binh Duong (<i>n</i> = 241)	Bac Ninh (<i>n</i> = 242)	Total (<i>n</i> = 726)
Places of antenatal care visits:				
Public hospital only	37.4	28.2	7.0	24.2
Both public and private hospital or clinic	25.5	29.5	51.7	35.5
Private hospital or clinic only	37.0	42.3	41.3	40.2
The number of antenatal care visits				
0–3 times	6.2	7.5	56.6	23.4
4–7 times	21.4	17.8	25.2	21.5
≥8 times	72.4	74.7	18.2	55.1
Used commercial milk formula for pregnant women	68.7	79.7	69.4	72.6
Received breastfeeding advice by a health worker from a health facility	81.1	67.2	50.4	66.3
Received breastfeeding advice by another person:				
Mother or mother-in-law	65.8	62.2	49.2	59.1
Husband	56.0	53.5	39.3	49.6
Other family members	22.6	21.6	9.9	18.0
Neighbors, friends, or co-workers	24.3	37.3	19.4	27.0
Nutrition collaborator	23.0	24.9	21.1	23.0
Hamlet health worker	0.8	0.0	0.0	0.3
Women union staff	0.4	0.0	2.9	1.1
Number of the previous child(ren)				
Zero (this was the first child)	0.4	0.0	0.0	0.1
1	30.5	32.4	22.7	28.5
≥2	52.3	47.7	39.7	46.6
	17.3	19.9	37.6	24.9

¹ Data presented as %. HCMC, Ho Chi Minh City.

60–80 min (aOR: 4.35; 95% CI: 1.50, 12.6), or ≥90 min (aOR: 5.87; 95% CI: 3.14, 10.98). In addition, women who had one child (aOR: 1.96; 95% CI: 1.26, 3.04) or two or more children (aOR: 2.41; 95% CI: 1.26, 4.61) were significantly more likely to practice EIBF than mothers giving birth to their first child (Table 5). No other variables showed significant relationships with EIBF.

Exclusive breastfeeding during the first 3 days after birth was less likely among mothers who gave birth by cesarean section (aOR: 0.15; 95% CI: 0.06, 0.39), had a vaginal birth with episiotomy (aOR: 0.40; 95% CI: 0.18, 0.88), brought infant formula to the maternity facility (aOR: 0.03; 95% CI: 0.01, 0.07), purchased it after arrival (aOR: 0.02; 95% CI: 0.01, 0.06) or did both (aOR: 0.04; 95% CI: 0.02, 0.10) (Table 5). Women who had a primary school or less education were less likely to practice EBF3D (aOR: 0.22; 95% CI: 0.09, 0.56), as were those who received a free infant formula sample during their hospital stay (aOR: 0.12; 95% CI: 0.02, 0.55) (Table 5). No other variables showed significant relationships with the prevalence of EBF3D.

Discussion

This study of 726 mothers with infants aged 0–11 months from provinces representative of the socio-economic

characteristics of Vietnam found a low prevalence of EIBF (39.7%) and EBF3D (18.0%), and high prevalence of infant formula use (79.3%). Rates of cesarean birth (44.6%) and vaginal births with episiotomy (46.1%) were high. Forty-nine percent of mothers received immediate SSC after birth and 11.6% uninterrupted SSC for the recommended duration of 90 min or more.

In univariate analysis both EIBF and EBF3D showed an increased trend with the duration of SSC, with prolonged SSC of 90 min associated with an EIBF prevalence of 70% and EBF3D of 34%. Eighty-eight percent of mothers brought formula to the birth hospital or purchased it after arrival. All women in this population received ANC, with 55% receiving at least eight contacts and most gave birth at public health facilities. Most babies were normal birthweight and term. We found that EIBF was significantly less likely among women who received ANC at both public and private facilities, gave birth by cesarean, brought formula to the birth facility, or purchased it after arrival, or lived in Binh Duong province. EIBF was 2.49–5.66 times more likely if immediate and uninterrupted SSC was applied 10–90 min after birth; and among women with one or more children. EBF3D was significantly less likely among mothers who gave birth by cesarean section, had a vaginal birth with episiotomy, brought formula to the birth facility

TABLE 4 Experience during the perinatal period reported by mothers of infants 0–11 months, three provinces, Vietnam 2020¹.

	HCMC (<i>n</i> = 243)	Binh Duong (<i>n</i> = 241)	Bac Ninh (<i>n</i> = 242)	Total (<i>n</i> = 726)
Birthplace:				
Public hospital (provincial and central levels)	61.7	65.1	50.8	59.2
Public polyclinic, district health center	26.3	18.7	43.4	29.5
Private hospital	11.9	16.2	5.8	11.3
Sex of newborn				
Female	51.0	47.7	43.0	47.2
Male	49.0	52.3	57.0	52.8
Birthweight:				
Birthweight of 2,500 g or heavier	95.9	93.8	96.3	95.3
Birthweight (g)Mean ± SD, median (p25–p75)	3,185 ± 428 3,200 (2,900–3,450)	3,163 ± 446 3,200 (2,900–3,450)	3,250 ± 418 3,200 (3,000–3,500)	3,199 ± 432 3,200 (2,900–3,500)
Gestational age:				
Gestational age of 37 weeks or longer	92.2	95.4	95.0	94.2
Gestational age (weeks)Mean ± SD, median (p25–p75)	38.6 ± 1.4 39 (38–40)	38.8 ± 1.6 39 (38–40)	38.9 ± 1.3 39 (38–40)	38.7 ± 1.4 39 (38–40)
Birth mode:				
Vaginal birth without episiotomy	11.5	5.8	10.3	9.2
Vaginal birth with episiotomy	42.8	50.6	45.0	46.1
Cesarean birth	45.7	43.6	44.6	44.6
Skin-to-skin contact:				
None or later than 1 min	48.1	47.7	56.2	50.7
Within 1 min any duration	51.9	52.3	43.8	49.3
<10 min	8.6	8.7	21.9	13.1
10–29 min	14.0	14.1	16.1	14.7
30–59 min	7.0	9.1	5.0	7.0
60–89 min	4.1	4.1	0.4	2.9
≥90 min	18.1	16.2	0.4	11.6
Completed first breastfeed before being separated from mothers	46.5	30.3	12.8	29.9
Rooming-in	54.7	57.7	85.5	66.0
Brought or purchased infant formula by the health facility of birth:				
Did not bring or purchase	17.3	14.9	4.1	12.1
Brought	45.3	24.9	64.5	44.9
Purchased	31.3	55.6	19.4	35.4
Brought and purchased	6.2	4.6	12.0	7.6
Received free infant formula sample during the hospital stay	7.0	7.5	3.3	5.9
Received breastfeeding advice by a health worker during the hospital stay	70.0	59.3	36.4	55.2
Received breastfeeding advice by another person during the hospital stay:				
Mother or mother-in-law	25.1	17.4	26.9	23.1
Husband	0.8	0.4	0.8	0.7
Other family members	9.1	2.5	6.6	6.1
Neighbors, friends, or co-workers	2.1	1.2	1.2	1.5
Nutrition collaborator	0.4	0.0	0.0	0.1
Hamlet health worker	0.4	0.0	0.0	0.1
Women union staff	0	0	0	0

¹ Data presented as % except for birthweight and gestational age presented as mean ± SD.

or purchased it after arrival, and who received a free infant formula sample during their hospital stay. Mothers who had a primary school or less education were significantly less likely to practice EBF3D.

The association of cesarean birth and episiotomy with reduced likelihood of early and exclusive breastfeeding is consistent with previous studies (12, 13, 33, 46, 47). Cesarean births are well recognized as a barrier to successful breastfeeding

TABLE 5 Multinomial logistic regression analysis of the relationship between key variables and breastfeeding practices reported by mothers of infants 0–11 months, three provinces, Vietnam 2020^a.

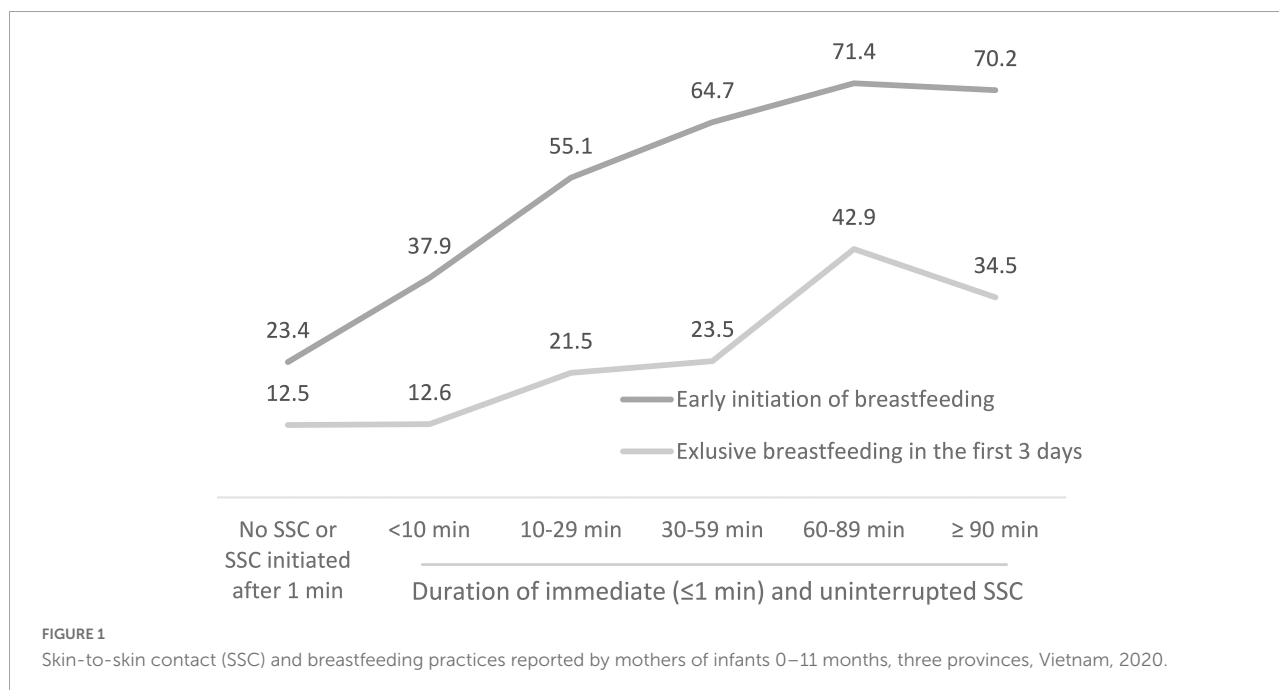
	Early initiation of breastfeeding (<i>n</i> = 726)		Exclusive breastfeeding for the first 3 days after birth (<i>n</i> = 726)	
	aOR	95% CI	aOR	95% CI
Place of antenatal care visits:				
Public hospital only	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Both public and private hospital/clinic	0.59**	(0.40, 0.87)	0.89	(0.45, 1.74)
Private hospital only	0.68	(0.44, 1.05)	1.23	(0.69, 2.17)
The number of antenatal care visits				
0–3 times	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
4–7 times	1.03	(0.61, 1.74)	0.74	(0.38, 1.42)
≥8 times	1.79	(0.86, 3.72)	1.27	(0.46, 3.53)
Received breastfeeding advice during antenatal visits from a facility-based health worker	1.36	(0.95, 1.95)	1.30	(0.63, 2.69)
Newborn characteristics				
Sex of newborn				
Female	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Male	1.30	(0.92, 1.83)	1.00	(0.58, 1.73)
Birthweight of 2,500 g or heavier	2.40	(0.73, 7.87)	1.04	(0.26, 4.17)
Gestation age of 37 weeks or longer	1.15	(0.53, 2.48)	1.23	(0.62, 2.46)
Birth mode:				
Vaginal birth without episiotomy	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Vaginal birth with episiotomy	0.75	(0.39, 1.46)	0.40*	(0.18, 0.88)
Cesarean birth	0.24***	(0.11, 0.51)	0.15***	(0.06, 0.39)
Skin-to-skin contact:				
None or later than 1 min	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
<10 min	1.42	(0.75, 2.67)	0.61	(0.20, 1.85)
10–29 min	2.55***	(1.49, 4.37)	0.69	(0.29, 1.63)
30–59 min	4.15***	(2.08, 8.27)	1.19	(0.48, 3.00)
60–89 min	4.35**	(1.50, 12.60)	1.04	(0.28, 3.88)
≥90 min	5.87***	(3.14, 10.98)	1.35	(0.43, 4.23)
Brought or purchased infant formula at the health facility at the time of birth:				
Did not bring or purchase	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Brought	0.49**	(0.30, 0.78)	0.03***	(0.01, 0.07)
Purchased	0.37***	(0.24, 0.60)	0.02***	(0.01, 0.06)
Brought and purchased	0.43*	(0.21, 0.89)	0.04***	(0.02, 0.10)
Received breastfeeding advice after birth from a facility-based health worker	1.47	(0.92, 2.34)	1.39	(0.75, 2.59)
Number of the previous child(ren)				
Zero (this was the first child)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
1	1.96**	(1.26, 3.04)	1.48	(0.71, 3.08)
≥2	2.41**	(1.26, 4.61)	1.80	(0.60, 5.33)
Highest level of education:				
Primary school or less	0.69	(0.36, 1.32)	0.22**	(0.09, 0.56)
Junior secondary school	0.87	(0.45, 1.69)	1.51	(0.57, 3.95)
Secondary school	1.31	(0.78, 2.20)	1.08	(0.52, 2.27)
Diploma, bachelors or higher	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)

(Continued)

TABLE 5 (Continued)

	Early initiation of breastfeeding (<i>n</i> = 726)		Exclusive breastfeeding for the first 3 days after birth (<i>n</i> = 726)	
	aOR	95% CI	aOR	95% CI
Place of residence:				
Ho Chi Minh City	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Binh Duong	0.42*	(0.22, 0.83)	1.43	(0.81, 2.51)
Bac Ninh	0.44*	(0.21, 0.94)	0.48	(0.20, 1.15)
Early initiation of breastfeeding			1.47	(0.76, 2.85)
Completed first breastfeed before being separated from mothers			1.26	(0.66, 2.43)
Rooming-in			1.12	(0.62, 2.00)
Received free commercial milk formula sample during the hospital stay			0.12**	(0.02, 0.55)

^aData from the Code impact study in Vietnam in 2020. Values are adjusted odds ratios (aOR) and 95% Confidence Intervals (95% CI) from Multinomial logistic regression, controlled for use of commercial milk formula for pregnant women, received breastfeeding advice from lay person during antenatal visits, type of birthplace (public/private health facility), received breastfeeding advice from a lay person after birth, mothers' ethnicity, age, and main occupation. We used robust option to account for clustering. Significantly different from the null value (aOR = 1; two-sided *t*-tests): **p* < 0.05, ***p* < 0.01, ****p* < 0.001.



for a number of reasons including: early separation of newborns to neonatal intensive care units (NICUs) or nurseries for observation (24), staff concerns that immediate SSC or breastfeeding will compromise the procedure, reduce the safety of mothers and babies, or add to their work burden; physical organization of the operating room; lack of coordination and communication between anesthesiology and obstetrics staff; and the belief that maternal pain after the procedure makes breastfeeding difficult (48, 49). However, data from Vietnam and

elsewhere show that SSC can be introduced successfully with cesarean section, is safe for both mothers and newborns, and can decrease NICU admissions, improve newborn outcomes, increase maternal satisfaction and exclusive breastfeeding rates (31, 50–52). Similarly, pain following episiotomy may limit the comfort of the mother and contribute to reported breastfeeding difficulties (46).

The significant association between EIBF and the duration of immediate and uninterrupted SSC is consistent with a

previous study of in eight countries in Asia and the Pacific, including Vietnam (29). This association remains significant even in the presence of remarkably high rates of cesarean birth, episiotomy, and formula availability at birth facilities and after controlling for low birthweight and preterm birth. Readiness to breastfeed is highly variable between newborns, with the mean time of the first breastfeed around 50 min postpartum. Because a high proportion of mothers require well over 1 h to complete feeding, longer periods of uninterrupted SSC allow this process to be completed (50). SSC promotes thermoregulation, early and exclusive breastfeeding, bonding, reduced stress, earlier expulsion of the placenta and reduced risk of bleeding in the mother among other benefits (31, 50, 51). By preventing separation, newborns are further protected from the negative consequences of harmful procedures including early cord clamping, routine suction, and early bathing, which may slow down the readiness to breastfeed and have other negative health impacts (53). SSC is often interrupted for routine care, including weighing and administration of vitamin K and vaccines, procedures that can be delayed until after 90 min, and which may further interfere with early breastfeeding (50). During the COVID-19 pandemic, provision of SSC has been further negatively impacted by inappropriate national and international guidance recommending the separation of mothers and newborns to prevent disease transmission (54). We found that mothers in HCMC were more likely to practice EIBF. This may suggest better implementation of early essential newborn care standards in facilities in this province and therefore better facility staff preparation, supportive environments, and counseling practices. Since Tu Du Hospital, an early implementer of early essential newborn care is present in HCMC and led hospital coaching in the South of Vietnam, including in Binh Duong province, this association may explain improved breastfeeding practice at birth in southern hospitals (34).

We did not find a statistically significant association between EBF3D and either EIBF or early and uninterrupted SSC. It has been noted previously in population studies in Vietnam that EIBF may not lead to EBF3D (33, 47). However, this finding is not consistent with data from several studies that have demonstrated SSC to be associated with increased likelihood of exclusive breastfeeding from hospital discharge up to 6 months post birth (31). Data from early essential newborn care implementing hospitals in Vietnam have shown that SSC is associated with increased likelihood of exclusive breastfeeding at discharge in hospitals that have conducted staff clinical coaching and upgraded environments to support SSC and early breastfeeding using quality processes (24, 29, 52). It seems therefore that provider behaviors (e.g., unnecessary medical procedures and separation of mothers and newborns), caregiver behaviors (e.g., intention to use formula milk), and lack of an enabling environment for breastfeeding mitigate

the expected effect of prolonged SSC on EBF3D, even when breastfeeding is initiated early.

The high proportion of mothers who intended to provide infant formula to their newborns in the first few days of life (52.5% brought infant formula to maternity facilities at birth, 35.4% bought infant formula at and nearby the hospital) is consistent with previous findings that social norms both within and outside of the health facility encourage artificial feeding and low self-efficacy toward breastfeeding (32). Intention to breastfeed may be influenced by a number of factors, including family and social norms, work status, availability of childcare, planned cesarean birth, aggressive marketing of commercial milk formula; and by a lack of effective breastfeeding counseling particularly during ANC (55–57). This study found that women with previous children were more likely to provide EIBF, suggesting that previous experience may play a role in establishing breastfeeding as a norm and for gaining confidence in breastfeeding techniques as has been reported in other studies (58, 59). The data showed that women with primary school education or less were less likely to practice EBF3D because these women feed the newborns both infant formula (i.e., a practice allowed by a non-supportive environment) and other fluids (i.e., as a traditional practice). This is a concerning finding given that children of mothers with lower educational attainment are often at higher risk of poor infant health and require additional support (33, 60, 61). We found that no other associations between breastfeeding and education or occupation, with prevalence of formula use similar across women of all education levels and occupations. These findings suggest that social norms discouraging intention to breastfeed have spread widely across geographical regions and socioeconomic groups (27, 61–63).

The finding that 35.4% of mothers bought infant formula at or nearby the birth hospital and 5.9% received a free infant formula sample during their hospital stay suggests that breastfeeding is not being adequately protected or supported in maternity facilities. The association between the availability of infant formula in hospital (brought or purchased) and provision of free samples with reduced likelihood of EBF3D is consistent with previous findings that commercial milk formula advertising, promotional materials and formula availability can limit breastfeeding (32, 64). Commercial milk formula industry representatives often use tactics that circumvent hospital regulations to promote formula milk to pregnant women and new mothers, including collecting contact information and promoting products like commercial milk formula for pregnant women that are not covered by the Code (65). These practices undermine breastfeeding and the provision of breastfeeding support by health workers during ANC and at the time of birth.

Further, the data also indicate that breastfeeding promotion and support provided by health workers at ANC and birth contacts is insufficient to influence breastfeeding practices. Although all mothers have access to ANC and 76.6% made at

least four ANC visits, only 66.3% received breastfeeding advice by a health worker during an ANC visit; and breastfeeding counseling from a health worker was not significantly associated with breastfeeding practices, suggesting inadequate quality or frequency of counseling. This study is limited in not being able to grade the quality and frequency of advice received. Women in the sample preferred going to private clinics for ANC (possibly due to convenience) but giving birth at public hospitals (possibly due to perceived quality of service). In fact, the availability of breastfeeding support is likely to be lower, and Code violations higher in private clinics than public hospitals (38). Only 55.2% of mothers reported receiving breastfeeding counseling and support by a health worker around the time of birth at hospital and the receipt of such support was not associated with increased EBF3D, suggesting that quality is suboptimal. Previous studies in Vietnam have shown that effective breastfeeding counseling and support has a positive effect on early and exclusive breastfeeding (66), however, if health workers have insufficient time or skills, quality of support provided will be low and they may recommend the use of infant formula when feeding difficulties or concerns arise (60). The fact that the first-time mothers were less likely to practice EIBF suggests that maternal experience and confidence are important contributors to feeding practices at the time of birth and call for extra support from health staff.

To be effective, breastfeeding support should be predictable, scheduled, and include ongoing visits with trained health professionals including midwives, nurses, and doctors, or with trained volunteers (67). Support may be needed to tailor advice to specific cultural, geographic, or social settings (67). In Vietnam, although reproductive health practice guidelines include breastfeeding counseling (25), counseling and preventive health are not covered by health insurance (68, 69), which may reduce health worker motivation to provide these services. In addition, only a few mothers in our sample received breastfeeding advice and support from village health workers or nutrition collaborators, indicating that community-based support services need to be strengthened (66, 70).

Several actions could be taken to strengthen EIBF and EBF3D based on study findings, focusing on facility policies and environments before during and after birth to promote, support and enable early and exclusive breastfeeding practices.

First, policies and environments in hospitals must be changed to limit the availability of commercial milk formula and encourage successful breastfeeding (32, 71). Vietnam's national legislation on the Code is moderately aligned with the International Code of Marketing of Breast Milk Substitutes (scored at 74 out of 100) (18). Based on the Code in Vietnam (19, 20), recommended breastfeeding practices and the Code compliance (Criteria E1.3) have been integrated as one of 83 criteria under the National Hospital Standards and Accreditation for both public and private hospitals (21). However, clinics unaffiliated with hospitals are not regulated

under these standards (21) while private hospitals have low motivation to meet criteria E1.3. The study further indicates that many public hospitals are not meeting Code regulations. In the longer term, it is critical that monitoring and enforcement of the Code is strengthened across all facilities providing maternity services. As an immediate first step, maternity hospitals must be mandated by decree to exclude formula entirely from hospitals (including preventing it being brought in by patients and families), ban the distribution of free formula samples and make it impossible to purchase formula on hospital grounds or in shops nearby birthing facilities.

Second, the strong association between immediate and prolonged SSC and EIBF (and potentially also with EBF3D), indicates that improving this practice for all births should be a high priority. Study data show that only 49.3% of women receive immediate SSC and of these, only 11.6% receive uninterrupted SSC for the recommended 90 min. Vietnam has guidelines for the implementation of early essential newborn care for both vaginal (22) and cesarean births (23), which have been gradually introduced to maternity facilities nationwide. Early essential newborn care has been demonstrated to be associated with improved newborn outcomes and breastfeeding practices in Vietnam (24, 29, 52). Roll out has used a systematic approach that includes updating policies and protocols, clinical coaching of staff using adult learning principles, modifications to environments and birthing room supports and introduction of a data-driven quality improvement process, that has resulted in sustained improvements in practices around birth (72). Priority should be given to the introduction and expansion of this approach nationally using existing facilitators and proven methods.

Third, and related to the second point above, early newborn care practices at cesarean and vaginal births with episiotomy should be improved to encourage the principles of effective early essential newborn care. This includes non-separation of all clinically stable newborns, immediate and prolonged SSC, initiation of breastfeeding while in SSC with the mother and effective breastfeeding counseling and support, including recognition of feeding cues, position, and attachment. Introduction requires a collaborative approach between obstetrics, pediatric and anesthesia staff, a practiced system of actions with allocation of roles and changes to operating room environments. It has been successfully introduced in some hospitals in Vietnam, with clearly defined methods and protocols that should now be introduced more widely (23, 52).

Ongoing efforts to limit unnecessary cesarean births and the use of episiotomy must continue. We found that the prevalence of cesarean birth and episiotomy were high and associated with lower prevalence of EIBF and EBF3D. The prevalence of cesarean birth (44.6%) in our study was higher than the national rate of 34.4% (10) and much higher than the WHO's recommended prevalence of between 10 and 15% (12, 13, 46).

The high rate of episiotomy (46.1% of all births and 83.3% of vaginal births) suggests that the practice is routine, rather than restricted as recommended by WHO (73). Episiotomy is considered a harmful procedure that is associated with postpartum hemorrhage, postnatal hospitalization for more than 4 days, and third- or fourth-degree perineal tears (32, 55, 74). Limiting these harmful and unnecessary procedures should be a high priority at all levels, beginning with national guidelines and regulations; and integrating with efforts to improve respectful and evidence-based maternal care, including those promoted by early essential newborn care. Dealing with incentives to conduct procedures is an ongoing challenge (13, 15, 52).

Fourth, linked with the second and third points above, breastfeeding counseling and support at both ANC contacts and at the time of facility birth must be strengthened. Adequate support requires staff to have appropriate skills, time and a motivating environment that supports effective practices. Early essential newborn care includes a focus on this area, for the period around birth. Efforts to improve counseling and support have been demonstrated to be effective in many settings (67). This gap may require improved medical, midwifery and nursing pre- and in-service training, task-shifting in clinical settings and re-organization of care environments to provide adequate skills, time, and space for adequate counseling (75). It may also be helpful in Vietnam to include breastfeeding support in insurance reimbursement packages for ANC and childbirth; and to strengthen the skills of village health workers or nutrition collaborators with special focus on first time mothers and those with lower education. Mass and digital media campaigns may be useful to create social norms that are more supportive of breastfeeding.

Limitations

This study has several strengths, including representative population-based sampling, use of validated standardized questionnaires (32, 41–44), and use of hand-held devices to reduce errors during data collection and entry. The data allow identification of interventions that should be prioritized to prevent substantial economic and health losses (75). Several limitations are noted including purposive selection of sampling areas which may limit national representativeness; use of immunization household listings which were assumed to be complete; and inclusion of migrant women in district sampling lists who may not represent the socio-economic or cultural characteristics of women in the sampled province. The impact of these potential sampling biases is believed to be minor. In-person data collection occurred during the COVID-19 pandemic, which made some women hesitant to participate in the interview (a non-response rate of 14.6% was noted). It is not possible to know whether this

group differed significantly on socio-demographic or other characteristics, although the non-response rate was similar between all provinces.

Other limitations include recall bias (since women up to 11 months post birth were included) and reporting bias (respondents may have been influenced by the desire to report recommended breastfeeding practices and not report non-recommended practices such as formula use). However, validity and reliability for recalled breastfeeding data is reported as relatively high for survey data, which may have a recall period up to 24 months (42). Further, previous validation of the mothers' recall of immediate newborn care practices has shown high levels of agreement between observed and reported measures of initiation of SSC and duration of uninterrupted SSC in the first 24–72 h after birth (76). Although the validity and reliability of reported durations of SSC contact for recall periods of up to 11 months postpartum were not yet documented, mothers tend to remember well practices and events around birth even after 24 months (42). In addition, the relationships between EIBF and duration of SSC and associations of EBF3D with availability of formula were consistent between all provinces and different socio-economic groups suggesting that systematic bias was not a problem. Finally, this analysis of existing survey data meant researchers were unable to measure all potential factors associated with the likelihood of breastfeeding, including previous breastfeeding experiences, body mass, smoking, birth companion, difficulties initiating breastfeeding, availability of childcare or child support, and perinatal depression. Similarly, the quality and frequency of breastfeeding counseling and advice received could not be determined.

Conclusion

This study of 726 mothers with infants aged 0–11 months from provinces representative of the socio-economic characteristics of Vietnam found a low prevalence of EIBF (49.7%) and EBF3D (18.0%), and high prevalence of infant formula use (79.3%). Barriers to recommended breastfeeding practices in the first days of life included provider behaviors and medical procedures (cesarean birth, episiotomy, lack of immediate and uninterrupted SSC and limited effectiveness of breastfeeding counseling and support during antenatal care and around the time of birth) and unsupportive breastfeeding environments (bringing or purchasing formula milk at the health facility and receipt of free infant formula samples) at maternity facilities.

To improve breastfeeding practices, both health care provider practices and environments at maternity facilities must be improved. Quality improvement approaches to strengthen staff coaching, protocols, and health facility environments should be scaled up to ensure consistent implementation

of early essential newborn care, including immediate and prolonged SSC, and to reduce unnecessary cesarean sections and episiotomies. In tandem, action is urgently needed to improve breastfeeding counseling and support at all facility and community contacts around birth; mass and digital media campaigns may be useful to create social norms that are more supportive of breastfeeding from birth and during the first days of life. Stronger enforcement of national policies to regulate the presence of commercial milk formula industry representatives, provision of free samples, and availability of infant formula in public and private health facilities is needed, including ensuring that formula cannot be purchased in or around hospitals.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

This study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board (or Ethics Committee) of FHI 360 (protocol code 1383644; approved on April 16, 2019) and Hanoi University of Public Health (protocol code 019-501/DD-YTCC; approved on June 12, 2019). Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

Author contributions

TN, JC, JM, and RM: conceptualization. TN, JC, and JM: methodology, validation, data curation, and writing—original draft preparation. TN: software, formal analysis, investigation, visualization, supervision, and project administration. RM: resources and funding acquisition. TN, JC, HTT, TAH, AW, RM, and JM: writing—review and editing. All authors have read and agreed to the published version of the manuscript.

References

1. Aguayo VM, Morris SS. Introduction: Food systems for children and adolescents. *Glob Food Security*. (2020) 27:100435. doi: 10.1016/j.gfs.2020.100435
2. Smith ER, Hurt L, Chowdhury R, Sinha B, Fawzi W, Edmond KM, et al. Delayed breastfeeding initiation and infant survival: A systematic review and meta-analysis. *PLoS One*. (2017) 12:e0180722. doi: 10.1371/journal.pone.0180722
3. Victora CG, Bahl R, Barros AJ, Franca GV, Horton S, Krasevec J, et al. Breastfeeding in the 21st Century: Epidemiology mechanisms, and lifelong effect. *Lancet*. (2016) 387:475–90. doi: 10.1016/S0140-6736(15)01024-7
4. Kramer MS, Kakuma R. Optimal duration of exclusive breastfeeding. *Cochrane Database Syst Rev*. (2012) 8:CD003517. doi: 10.1002/14651858.CD003517.pub2

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

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5. Tran HT, Nguyen TT, Mathisen R. The use of human donor milk. *BMJ*. (2020) 371:m4243. doi: 10.1136/bmj.m4243
6. Development Initiatives. *Global nutrition report 2020: Action on equity to end malnutrition*. Bristol: Development Initiatives (2020).
7. UNICEF. *Capture the moment—early initiation of breastfeeding: The best start for every Newborn*. New York, NY: UNICEF (2018).
8. UNICEF. *Infant and young child feeding – unicef data*. New York, NY: UNICEF (2021).
9. General Statistics Office of Vietnam, UNICEF. *Vietnam multiple indicator cluster survey 2014*. Hanoi: Vietnam General Statistical Office (2015).
10. General Statistics Office of Vietnam, UNICEF. *Survey measuring viet nam sustainable development goal indicators on children and women 2020–2021*. Hanoi: General Statistics Office (2021).
11. Giang HTN, Ulrich S, Tran HT, Bechtold-Dalla Pozza S. Monitoring and interventions are needed to reduce the very high caesarean section rates in vietnam. *Acta Paediatr*. (2018) 107:2109–14. doi: 10.1111/apa.14376
12. Hobbs AJ, Mannion CA, McDonald SW, Brockway M, Tough SC. The Impact of caesarean section on breastfeeding initiation, duration and difficulties in the first four months postpartum. *BMC Pregnancy Childbirth*. (2016) 16:90. doi: 10.1186/s12884-016-0876-1
13. Rowe-Murray HJ, Fisher JR. Baby friendly hospital practices: Cesarean section is a persistent barrier to early initiation of breastfeeding. *Birth* (2002) 29:124–31. doi: 10.1046/j.1523-536x.2002.00172.x
14. Nguyen PTK, Tran HT, Thai TTT, Foster K, Roberts CL, Marais BJ. Factors associated with breastfeeding intent among mothers of newborn babies in da nang, viet nam. *Int Breastfeed J*. (2018) 13:2. doi: 10.1186/s13006-017-0144-7
15. de Loenzien M, Mac QNH, Dumont A. Women's Empowerment and elective cesarean section for a single pregnancy: A population-based and multivariate study in vietnam. *BMC Pregnancy Childbirth*. (2021) 21:3. doi: 10.1186/s12884-020-03482-x
16. Nguyen PH, Menon P, Ruel M, Hajeebhoy NA. Situational review of infant and young child feeding practices and interventions in viet nam. *Asia Pac J Clin Nutr*. (2011) 20:359–74.
17. Nguyen TT, Darnell A, Weissman A, Cashin J, Withers M, Mathisen R, et al. National nutrition strategies that focus on maternal, infant, and young child nutrition in Southeast Asia do not consistently align with regional and international recommendations. *Matern Child Nutr*. (2020) 16 (Suppl. 2):e12937. doi: 10.1111/mcn.12937
18. WHO, UNICEF, IBFAN. *Marketing of breast-milk substitutes: National implementation of the international code. Status report 2020*. Geneva: WHO (2020).
19. Vietnam National Assembly. *Decree on the Trading in and Use of Nutritious Products for Infants, Feeding Bottles and Teats, 100/2014/NĐ-CP*. Hanoi: Vietnam Government (2014).
20. Vietnam National Assembly. *Law on advertising, 16/2012/QH13*. Hanoi: Vietnam Government (2012).
21. Vietnam Ministry of Health. *National Hospital Standards and Accreditation, 6858/QĐ-BYT*. Hanoi: Vietnam Ministry of Health (2016).
22. Vietnam Ministry of Health. *Decision on Approval of the Technical Guide on Essential Care of Mothers and Newborns During and Right After Birth, 4673/QĐ-BYT*. Hanoi: Vietnam Ministry of Health (2014).
23. Vietnam Ministry of Health. *Decision on Approval of Professional Guidelines for Essential Care of the Mother and Newborn During and Immediately After a Cesarean Section, 6734/QĐ-BYT*. Hanoi: Vietnam Ministry of Health (2016).
24. Tran HT, Mannava P, Murray JCS, Nguyen PTT, Tuyen LTM, Hoang Anh T, et al. Early essential newborn care is associated with reduced adverse neonatal outcomes in a tertiary hospital in da nang, viet nam: A pre- post- intervention study. *EclinicalMedicine*. (2018) 6:51–8. doi: 10.1016/j.eclinm.2018.12.002
25. Vietnam Ministry of Health. *National Guidelines for Reproductive Health Services, 4128/QĐ-BYT*. Hanoi: Vietnam Ministry of Health (2016).
26. Joyce CM, Hou SS-Y, Ta BTT, Hoang DV, Mathisen R, Vincent I, et al. The association between a novel baby-friendly hospital program and equitable support for breastfeeding in vietnam. *Int J Environ Res Public Health*. (2021) 18:6706. doi: 10.3390/ijerph18136706
27. Cohen SS, Alexander DD, Krebs NF, Young BE, Cabana MD, Erdmann P, et al. Factors Associated with breastfeeding initiation and continuation: A meta-analysis. *J Pediatr*. (2018) 203:190.e–6.e. doi: 10.1016/j.jpeds.2018.08.008
28. Kelly YJ, Watt RG. Breast-feeding initiation and exclusive duration at 6 months by social class—results from the millennium cohort study. *Public Health Nutr*. (2005) 8:417–21. doi: 10.1079/phn2004702
29. Li Z, Mannava P, Murray JCS, Sobel HL, Jatobatu A, Calibo A, et al. Association between Early essential newborn care and breastfeeding outcomes in eight countries in Asia and the pacific: A cross-sectional observational -study. *BMJ Glob Health*. (2020) 5:e002581. doi: 10.1136/bmjgh-2020-002581
30. Murray EK, Ricketts S, Dellaport J. Hospital practices that increase breastfeeding duration: Results from a population-based study. *Birth*. (2007) 34:202–11. doi: 10.1111/j.1523-536X.2007.00172.x
31. Moore ER, Bergman N, Anderson GC, Medley N. Early skin-to-skin contact for mothers and their healthy newborn infants. *Cochrane Database Syst Rev*. (2016) 11:CD003519. doi: 10.1002/14651858.CD003519.pub4
32. WHO. *Guideline: Protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services*. Geneva: World Health Organization (2017). 2017 p.
33. Nguyen TT, Withers M, Hajeebhoy N, Frongillo EA. Infant formula feeding at birth is common and inversely associated with subsequent breastfeeding behavior in vietnam. *J Nutr*. (2016) 146:2102–8. doi: 10.3945/jn.116.235077
34. WHO. *Biennial meeting on accelerating progress in early essential newborn care. Da Nang, Viet Nam*. Manila: WHO Regional Office for the Western Pacific (2017).
35. Rollins NC, Bhandari N, Hajeebhoy N, Horton S, Lutter CK, Martines JC, et al. Why invest, and what it will take to improve breastfeeding practices? *Lancet*. (2016) 387:491–504. doi: 10.1016/s0140-6736(15)01044-2
36. Robinson H, Buccini G, Curry L, Perez-Escamilla R. The world health organization code and exclusive breastfeeding in China, India, and vietnam. *Matern Child Nutr*. (2019) 15:e12685. doi: 10.1111/mcn.12685
37. McFadden A, Mason F, Baker J, Begin F, Dykes F, Grummer-Strawn L, et al. Spotlight on infant formula: Coordinated global action needed. *Lancet*. (2016) 387:413–5. doi: 10.1016/s0140-6736(16)00103-3
38. Nguyen TT, Tran HTT, Cashin J, Nguyen VDC, Weissman A, Nguyen TT, et al. Implementation of the code of marketing of breast-milk substitutes in vietnam: Marketing practices by the industry and perceptions of caregivers and health workers. *Nutrients*. (2021) 13:2884. doi: 10.3390/nu13082884
39. Nguyen TT, Weissman A, Cashin J, Ha TT, Zambrano P, Mathisen R. Assessing the effectiveness of policies relating to breastfeeding promotion, protection, and support in southeast Asia: Protocol for a mixed methods study. *JMIR Res Protoc*. (2020) 9:e21286. doi: 10.2196/21286
40. General Statistics Office of Vietnam. *Statistical yearbook of vietnam*. Hanoi: General Statistics Office of Vietnam (2019).
41. WHO, UNICEF, IFPRI, UC Davis, FANTA, AED. *Indicators for assessing infant and young child feeding practices. Part I: Definition*. Geneva: WHO (2008).
42. WHO, UNICEF. *Indicators for assessing infant and young child feeding practices: Definitions and measurement methods*. Geneva: World Health Organization (2021). 2021 p.
43. WHO. *Who recommendations on newborn health: Guidelines approved by the who guidelines review committee*. Geneva: World Health Organization (2017).
44. WHO. *Who recommendations on antenatal care for a positive pregnancy experience*. Geneva: World Health Organization (2016).
45. WHO. *Icd-10: The international classification of diseases: Disorders related to length of gestation and fetal growth (P05–P08)*. Geneva: WHO (2010).
46. Bourdillon K, McCausland T, Jones S. The impact of birth-related injury and pain on breastfeeding outcomes. *J Health Vis*. (2020) 8:294–302. doi: 10.12968/johv.2020.8.7.294
47. Nguyen PH, Keithly SC, Nam NT, Tuan NT, Tran LM, Hajeebhoy N. Prolactin feeding practices in vietnam: Challenges and associated factors. *BMC Public Health*. (2013) 13:932. doi: 10.1186/1471-2458-13-932
48. Maastrup R, Hansen BM, Kronborg H, Bojesen SN, Hallum K, Frandsen A, et al. Factors associated with exclusive breastfeeding of preterm infants. Results from a prospective national cohort study. *PLoS One*. (2014) 9:e89077. doi: 10.1371/journal.pone.0089077
49. Flacking R, Nyqvist KH, Ewald U, Wallin L. Long-term duration of breastfeeding in Swedish low birth weight infants. *J Hum Lact*. (2003) 19:157–65. doi: 10.1177/0890334403252563
50. Widstrom AM, Brimdyr K, Svensson K, Cadwell K, Nissen E. Skin-to-skin contact the first hour after birth, underlying implications and clinical practice. *Acta Paediatr*. (2019) 108:1192–204. doi: 10.1111/apa.14754
51. Righard L, Alade MO. Effect of delivery room routines on success of first breast-feed. *Lancet*. (1990) 336:1105–7. doi: 10.1016/0140-6736(90)92579-7

52. Tran HT, Murray JCS, Sobel HL, Mannava P, Huynh LT, Nguyen PTT, et al. Early essential newborn care is associated with improved newborn outcomes following caesarean section births in a tertiary hospital in Da Nang, vietnam: A Pre/Post-intervention study. *BMJ Open Qual.* (2021) 10:e001089. doi: 10.1136/bmjopen-2020-001089
53. Sobel HL, Silvestre MA, Mantaring JB III, Oliveros YE, Nyunt US. Immediate newborn care practices delay thermoregulation and breastfeeding initiation. *Acta Paediatr.* (2011) 100:1127–33. doi: 10.1111/j.1651-2227.2011.0215.x
54. Vu Hoang D, Cashin J, Gribble K, Marinelli K, Mathisen R. Misalignment of global covid-19 breastfeeding and newborn care guidelines with world health organization recommendations. *BMJ Nutr Prev Health.* (2020) 3:339–50. doi: 10.1136/bmjnp-2020-000184
55. Kronborg H, Foverskov E, Vaeth M, Maimburg RD. The role of intention and self-efficacy on the association between breastfeeding of first and second child, a danish cohort study. *BMC Pregnancy Childbirth.* (2018) 18:454. doi: 10.1186/s12884-018-2086-5
56. Scott JA, Binns CW, Oddy WH, Graham KI. Predictors of breastfeeding duration: Evidence from a cohort study. *Pediatrics.* (2006) 117:e646–55. doi: 10.1542/peds.2005-1991
57. WHO, UNICEF. *How the marketing of formula milk influences our decisions on infant feeding.* Geneva: World Health Organization (2022). 2022 p.
58. Ahmmed F, Manik MMR. Trends in early initiation of breastfeeding in bangladesh and a multilevel analysis approach to find its determinants. *Sci Rep.* (2021) 11:5053. doi: 10.1038/s41598-021-84412-5
59. Gayatri M, Dasvarma GL. Predictors of early initiation of breastfeeding in indonesia: A population-based cross-sectional survey. *PLoS One.* (2020) 15:e0239446. doi: 10.1371/journal.pone.0239446
60. Li J, Nguyen TT, Wang X, Mathisen R, Fang J. Breastfeeding practices and associated factors at the individual, family, health facility and environmental levels in China. *Matern Child Nutr.* (2020) 16(Suppl. 2):e13002. doi: 10.1111/mcn.13002
61. Li J, Nguyen TT, Duan Y, Mathisen R, Yang Z. Advice to use infant formula and free samples are common in both urban and rural areas in China: A cross-sectional survey. *Public Health Nutr.* (2021) 24:1977–88. doi: 10.1017/S1368980020005364
62. Dubois L, Girard M. Social determinants of initiation, duration and exclusivity of breastfeeding at the population level. *Can J Public Health.* (2003) 94:300–5. doi: 10.1007/BF03403610
63. Tuan NT, Nguyen PH, Hajeebhoy N, Frongillo EA. Gaps between breastfeeding awareness and practices in vietnamese mothers result from inadequate support in health facilities and social norms. *J Nutr.* (2014) 144:1811–7. doi: 10.3945/jn.114.198226
64. Howard C, Howard F, Lawrence R, Andresen E, DeBlicke E, Weitzman M. Office prenatal formula advertising and its effect on breast-feeding patterns. *Obstet Gynecol.* (2000) 95:296–303. doi: 10.1016/S0029-7844(99)00555-4
65. Nguyen TT, Cashin J, Ching C, Baker P, Tran HT, Weissman A, et al. Beliefs and norms associated with the use of ultra-processed commercial milk formulas for pregnant women in vietnam. *Nutrients.* (2021) 13:4143. doi: 10.3390/nu13114143
66. Nguyen PH, Kim SS, Nguyen TT, Hajeebhoy N, Tran LM, Alayon S, et al. Exposure to mass media and interpersonal counseling has additive effects on exclusive breastfeeding and its psychosocial determinants among vietnamese mothers. *Matern Child Nutr.* (2016) 12:713–25. doi: 10.1111/mcn.12330
67. McFadden A, Gavine A, Renfrew MJ, Wade A, Buchanan P, Taylor JL, et al. Support for healthy breastfeeding mothers with healthy term babies. *Cochrane Database Syst Rev.* (2017) 2:CD001141. doi: 10.1002/14651858.CD001141.pub5
68. Vietnam National Assembly. *Health Insurance Law, 25/2008/QH12.* Hanoi: Vietnam National Assembly (2008).
69. Vietnam National Assembly. *Law on Social Insurance, 58/2014/QH13.* Hanoi: Vietnam National Assembly (2014).
70. Menon P, Nguyen PH, Saha KK, Khaled A, Sanghvi T, Baker J, et al. Combining Intensive counseling by frontline workers with a nationwide mass media campaign has large differential impacts on complementary feeding practices but not on child growth: Results of a cluster-randomized program evaluation in Bangladesh. *J Nutr.* (2016) 146:2075–84. doi: 10.3945/jn.116.232314
71. WHO, UNICEF. *Baby-friendly hospital initiative training course for maternity staff: Director's guide.* Geneva: World Health Organization (2020). 2020 p.
72. WHO. *Second biennial progress report : 2016-2017 (action plan for health newborn infants in the western pacific region : 2014-2020).* Manila: WHO Regional Office for the Western Pacific (2018). 2018 p.
73. WHO. *Who recommendations: Intrapartum care for a positive childbirth experience.* Geneva: World Health Organization (2018). 2018 p.
74. Linares AM, Rayens MK, Gomez ML, Gokun Y, Dignan MB. Intention to breastfeed as a predictor of initiation of exclusive breastfeeding in hispanic women. *J Immigr Minor Health.* (2015) 17:1192–8. doi: 10.1007/s10903-014-0049-0
75. Walters DD, Phan LTH, Mathisen R. The cost of not breastfeeding: Global results from a new tool. *Health Policy Plan.* (2019) 34:407–17. doi: 10.1093/heapol/czz050
76. Silvestre MAA, Mannava P, Corsino MA, Capili DS, Calibo AP, Tan CF, et al. Improving immediate newborn care practices in philippine hospitals: Impact of a national quality of care initiative 2008-2015. *Int J Qual Health Care.* (2018) 30:537–44. doi: 10.1093/intqhc/mzy049



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First do no harm overlooked: Analysis of COVID-19 clinical guidance for maternal and newborn care from 101 countries shows breastfeeding widely undermined

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Background: In March 2020, the World Health Organization (WHO) published clinical guidance for the care of newborns of mothers with COVID-19. Weighing the available evidence on SARS-CoV-2 infection against the well-established harms of maternal-infant separation, the WHO recommended maternal-infant proximity and breastfeeding even in the presence of maternal infection. Since then, the WHO's approach has been validated by further research. However, early in the pandemic there was poor global alignment with the WHO recommendations.

Methods: We assessed guidance documents collected in November and December 2020 from 101 countries and two regional agencies on the care of newborns of mothers with COVID-19 for alignment with the WHO recommendations. Recommendations considered were: (1) skin-to-skin contact; (2) early initiation of breastfeeding; (3) rooming-in; (4) direct breastfeeding; (5) provision of expressed breastmilk; (6) provision of donor human milk; (7) wet nursing; (8) provision of breastmilk substitutes; (9) relactation; (10) psychological support for separated mothers; and (11) psychological support for separated infants.

Results: In less than one-quarter of country guidance were the three key breastfeeding facilitation practices of skin-to-skin contact, rooming-in, and direct breastfeeding recommended. Donor human milk was recommended in

under one-quarter of guidance. Psychological support for mothers separated from their infants was recommended in 38%. Few countries recommended relactation, wet nursing, or psychological support for infants separated from mothers. In three-quarters of country guidance, expressed breastmilk for infants unable to directly breastfeed was recommended. The WHO and the United Kingdom's Royal College of Obstetricians and Gynecologists were each cited by half of country guidance documents with the United States Centers for Disease Control and Prevention directly or indirectly cited by 40%.

Conclusion: Despite the WHO recommendations, many COVID-19 maternal and newborn care guidelines failed to recommend skin-to-skin contact, rooming-in, and breastfeeding as the standard of care. Irregular guidance updates and the discordant, but influential, guidance from the United States Centers for Disease Control may have been contributory. It appeared that once recommendations were made for separation or against breastfeeding they were difficult to reverse. In the absence of quality evidence on necessity, recommendations against breastfeeding should not be made in disease epidemics.

KEYWORDS

COVID-19, breastfeeding, policy, psychosocial support systems, rooming-in care

1. Introduction

On 13 March 2020, the World Health Organization (WHO) published detailed clinical guidance on caring for infants of mothers with COVID-19 (1). In this guidance, the WHO stated that newborns should be placed skin-to-skin with their mothers after birth, initiate breastfeeding within an hour of birth, remain proximate to their mothers during the day and night, and exclusively breastfeed (1). When mothers were too ill to breastfeed, they should be supported to express milk and they and their infants should be provided with psychological support to mitigate the adverse effects of any separation that occurred (1). Additionally, mothers were to apply infection prevention and control (IPC) practices including wearing a mask, washing their hands, and cleaning surfaces they had been in contact with (1). Although the WHO has since updated their clinical guidance (2–4), these recommendations have remained unchanged.

The WHO followed a precautionary approach, weighing the limited knowledge on COVID-19 against the well-established harms of maternal-infant separation and determined that close mother-infant contact and breastfeeding should continue (5). They had learnt from the experience of the Human Immunodeficiency Virus (HIV) pandemic, in which it was demonstrated that seeking to prevent infection at all costs could result in more infant deaths than balancing all risks (6). The WHO's COVID-19 recommendations for mothers and newborns therefore aligned with the standards of care of the

WHO Early Essential Newborn Care Practices and the Baby-Friendly Hospital Initiative (7, 8). The WHO guidance reflected a recognition that not following these standards of care impedes breastfeeding and maternal attachment, leading to increased infant morbidity, mortality, and child maltreatment (9). In the longer term, reduced breastfeeding also increases maternal mortality from reproductive cancers and type II diabetes and has significant economic costs to societies related to health care costs, excess mortality, and cognitive losses from poorer child development (10).

Nonetheless, in an analysis we conducted of COVID-19 maternal and newborn care guidance from 33 countries collected 21 March 2020 to 30 April 2020 misalignment with the WHO recommendations was widespread (11). Most countries did not recommend keeping mothers with COVID-19 and their infants in close proximity or the practice of direct breastfeeding. It was uncommon to recommend psychological support for mothers separated from their infants and rare to recommend psychological support for infants separated from their mothers (11). The influence of recommendations from health agencies other than the WHO was evident in national guidelines and, where this differed from the WHO, was a source of confusion. In particular, the guidance of the United States Centers for Disease Control and Prevention (USCDC), which recommended maternal-infant separation, was commonly cited and was implicated in this confusion (11).

The negative effect of separating mothers and infants because of COVID-19 has been quantified. Bartick et al. (12)

found that when infants of mothers with COVID-19 did not experience skin-to-skin contact they were 2.6 times more likely not to be exclusively breastfed up to 3 months of age than when they experienced skin-to-skin contact. They also found that when infants were kept in a separate room from their mothers, they were 3.8 times more likely to not be exclusively breastfed up to 3 months of age than infants who roomed in with their mothers. When mothers and infants were separated, 58% of mothers reported feeling very distressed and 29% of mothers who sought to breastfeed after reunification were unable to do so (12).

Rollins et al. (13) used the Lives Saved Tool to estimate the impact of policies separating mothers with COVID-19 and their infants on infant mortality in low- and middle-income countries. Using upper estimates of SARS-CoV-2 infection, transmission, and mortality, they calculated that maintaining maternal-infant proximity and breastfeeding when mothers had COVID-19 might result in a total of 2,800 infant deaths. In comparison, they estimated that infant mortality when mothers ceased breastfeeding temporarily or permanently due to policies of separation would result in 189,000–273,000 infant deaths (13).

Since the WHO first made recommendations on breastfeeding and newborn care in the context of COVID-19, there has been a substantial volume of research published. It has been confirmed that COVID-19 is rarely serious in infants (14), vertical transmission of SARS-CoV-2 during pregnancy or birth appears unlikely (15), and viable SARS-CoV-2 is not present in breastmilk (16). Further, it is unusual for infants to become infected with SARS-CoV-2 in the days after birth (17) and skin-to-skin contact, breastfeeding, and rooming-in do not increase the rate of COVID-19 symptoms in infants (12). Furthermore, mother-infant separation does not prevent infants from being infected with SARS-CoV-2 (16) as it exposes infants to the risk of nosocomial and other transmission routes (14). However, maintaining breastfeeding is likely to help protect infants against COVID-19 as breastmilk of mothers who have been infected with or vaccinated against COVID-19 contains antibodies against SARS-CoV-2 (18, 19). Further, SARS-CoV-2 is neutralized when added to the breastmilk of women with COVID-19 (20). And finally, the breastmilk of mothers infected with SARS-CoV-2 primes the infant's own immune system to protect them against infection as shown by the presence of SARS-CoV-2 spike-specific secretory immunoglobulin A (IgA) and secretory immunoglobulin G (IgG) in infant saliva (21). Thus, the cautious approach of the WHO in recommending maternal and infant proximity and breastfeeding when mothers have COVID-19 has been validated. As knowledge about COVID-19 increased, it would be expected that country guidance would concomitantly improve in alignment with that of the WHO. This study aimed to assess global alignment with WHO recommendations and to assess how alignment

had changed over time for the countries included in our previous analysis.

2. Materials and methods

2.1. Design

A critical integrative literature review of international COVID-19 guidance was undertaken. This design was chosen because it “*summarizes past empirical or theoretical literature to provide a more comprehensive understanding of a particular phenomenon or healthcare problem*” (22), p. 546]. In this case, the problem was a lack of knowledge on the degree to which COVID-19 country guidance for breastfeeding and newborn care aligned with WHO recommendations and how alignment had changed over time.

2.2. Sample

One hundred and eighty-three COVID-19 guidance documents from 108 countries on six continents containing content on pregnancy, intrapartum, and postpartum care in the context of COVID-19 were reviewed for inclusion in the study. A hierarchy of inclusion for guidance was followed with national government guidance prioritized, followed by state/provincial government guidance, and then professional medical association guidance. Where there was more than one government guidance document identified, all current guidance were included for analysis. Where guidance from multiple professional organizations was identified, guidance from the obstetrics and gynecologists' association was prioritized over pediatricians' association guidance. Where a country's government guidance only addressed breastfeeding or was targeted at mothers rather than clinicians, professional organizational guidance was included if available. If there was significant uncertainty that guidance was current, it was excluded. If newer versions of guidance were published after the collection period, they were not included in the analysis.

2.3. Data Collection

International guidance documents on pregnancy, intrapartum, and postpartum care in the context of COVID-19 were collected between 15 November 2020 and 31 December 2020. Guidance documents were specifically sought from all countries that are members of the World Health Assembly (WHA) but guidance from other countries or organizations encountered in searches were also included. In the first instance, the websites of the Ministries of Health in each country were searched for guidance. Guidance published on Ministry of

Health websites was assumed to be current unless otherwise stated. Where guidance (or direction to guidance published elsewhere) could not be located on Ministry of Health websites, country contacts were asked to assist in identifying guidance. Where country contacts could not locate guidance, the Ministry of Health, Minister for Health, and/or United Nations Children's Fund (UNICEF) country offices were contacted and asked to assist in locating guidance. Where guidance documents stated that practices in specific and named external documents should be followed (for example the national infant feeding guidance or guidance from a professional association) the recommendations of those documents were included in the analysis. After evaluation against the inclusion and exclusion criteria, guidance documents from 101 countries and two regional agencies were included in the analysis. Where necessary, translation of guidance was undertaken by *Alive & Thrive* staff or by other individuals working in maternal and infant health known to the authors.

2.4. Data Analysis

Each guidance document was initially assessed and coded for alignment with the WHO *Clinical Management of COVID-19: Interim Guidance*, 27 May 2020 (2) by two authors. Any discrepancies were then discussed by all authors as a group and coding decided by consensus. Recommendations were coded regarding: (1) Skin-to-skin contact (S2S); (2) Early initiation of breastfeeding (EIBF); (3); Rooming-in (RI); (4) Direct breastfeeding (BF); (5) Provision of expressed breastmilk (EBM); (6) Provision of donor human milk (DHM); (7) Wet nursing (WN); (8) Provision of breastmilk substitutes (BMS); (9) Relactation (R); (10) Psychosocial support for separated mothers (PS-M); and (11) Psychosocial support for separated infants (PS-I). The WHO alignment scores were calculated for each guidance document. For each recommended practice, a score of 1 indicated alignment and a score of 0 indicated divergence from the WHO recommendation. The highest possible score was 11 and the lowest 0.

The practices of skin-to-skin contact, early initiation of breastfeeding, and direct breastfeeding were coded as recommended when guidance was unambiguously supportive of the practice. Where skin-to-skin contact, early initiation of breastfeeding, and direct breastfeeding were supported only on maternal/family request, after a discussion of risk, or with the decision to be made by health providers, they were coded as not recommended and the circumstances under which the practice was supported were noted. Where it was recommended that infants be isolated from their mothers, skin-to-skin contact, early initiation of breastfeeding, and direct breastfeeding were assumed impossible and coded as not recommended unless otherwise stated. For coding rooming-in,

the Baby-Friendly Hospital Initiative definition requiring that infants remain proximate to their mothers, share a bed, be placed in a side-car attached to her bed, or in a crib directly beside her bed, was used (23). Recommendations allowing mothers to room-share with infants at a distance or infants to be kept in an incubator or behind a screen were coded as not recommending rooming-in with a notation made on the recommendation for physical distancing. Similarly, when rooming-in was provided only on maternal/family request or after a discussion of risk or with the decision to be made by health providers, rooming-in was coded as not recommended with an appropriate notation. When rooming-in was provided only if there were no facilities to permit maternal-infant separation, rooming-in was coded as not recommended. Requirements for documentation or provision of maternal written consent for skin-to-skin contact, rooming-in, room-sharing, or breastfeeding were noted.

Alternative feeding methods were coded based on whether recommendations for use prioritized breastmilk options. Recommendations regarding the use of expressed breastmilk were coded as in alignment with the WHO recommendations where guidance was unambiguously supportive if mothers were not directly breastfeeding. If use of expressed breastmilk was conditionally supported, it was coded as not in alignment with the WHO recommendations with a notation on reasons. Recommendations regarding donor human milk were coded as in alignment with the WHO recommendations where guidance supported use when maternal breastfeeding or expressed breastmilk were unavailable. If donor human milk was specified as only available for premature infants this was coded as contrary to the WHO recommendations. Recommendations regarding use of breastmilk substitutes were coded as in alignment with the WHO recommendations when they specified that use was supported if maternal expressed breastmilk was unavailable. Conversely if breastmilk substitutes were prioritized over, or equal to breastmilk, this was coded as contrary to the WHO recommendations.

Recommendations for psychological support for mothers were coded in alignment with the WHO recommendations regardless of whether it was connected to separation from infants. Recommendations that infants separated from their mothers should be provided with a specific alternative caregiver were included as recommending psychological support for infants.

When there was no information about whether a practice was recommended or not, it was coded as "no recommendation made." When a conflict in recommended practices was identified within the same document, the recommendation that most differed from the WHO guidance was coded and included for analysis. When guidance had different recommendations based on maternal symptoms, the recommendation for mothers who had the most severe

symptoms but were still physically capable of infant care was coded. When conflicts between guidance from the same country or idiosyncratic recommendations were identified through the guidance collection process, they were noted. Recommendations for the washing of breasts were noted. References to guidance documents from other countries within the country guidance were recorded as were publication dates of guidance.

Recommendations of 32 countries' guidance that we previously assessed (11) were compared to the guidance from the same countries in the current data set. In this comparison, Malawi was excluded because updated guidance or confirmation of currency could not be obtained. In addition, the score for the Canadian guidance was adjusted to take into account different treatment of external guidance in the coding of the current study. In the earlier research, the Canadian national infant feeding recommendations were included in the coding as the COVID-19 guidance had recommended that "standard practice" be followed. However, in the current study, external guidance was only coded where a specific document was named and so the national infant feeding recommendations were not included.

3. Results

Clinical guidance from 77 government agencies, 24 professional medical associations, and two regional agencies were included in our analysis (**Supplementary Table 1**). Nineteen (18.5%) were from Africa, 31 (30.1%) from Asia, three (2.9%) from the Caribbean, 18 (17.5%) from Central, North, and South America, 29 (28.2%) from Europe and three (2.9%) from Oceania. Ninety-nine countries from which guidance was obtained were members of the WHA and two (Kosovo, Taiwan) were not members. The regional guidance documents were from the Pan American Health Organization (PAHO) and the Pacific Joint Incident Management Team (PJMIT). Among the guidance reviewed, only that from PAHO was fully aligned with the WHO. The WHO alignment scores for countries ranged from 0 (Belarus, China, Latvia, Japan, Singapore, Slovakia, South Korea, Taiwan, and Thailand) to 9 (Italy and Norway) (**Figure 1**). Detailed information on alignment of each guidance is listed in **Supplementary Table 2**.

3.1. Skin-to-skin contact, early initiation of breastfeeding, direct breastfeeding and maternal proximity

In just over one third of the guidance reviewed, skin-to-skin contact was recommended, and in just less than one third of guidance early initiation of breastfeeding for

babies born to mothers with COVID-19 was recommended. It was common for guidance to provide no recommendations regarding these practices. Direct breastfeeding was more commonly supported than either skin-to-skin contact or early initiation of breastfeeding and was recommended in nearly two thirds of the guidance (**Table 1** and **Figures 2–4**).

Different degrees of maternal-infant proximity for women with COVID-19 were recommended in guidance documents ranging from rooming-in, to conditional rooming-in or room-sharing if the family requested (with risks discussed), room-sharing with the infant kept two meters distance from the mother, to complete isolation of the infant from their mother. Only one third of guidance unequivocally recommended rooming-in for mothers with COVID-19 and their infants. Nineteen (18.4%) guidance recommended isolation of infants from their mothers. Of the 39 (37.9%) sets of guidelines that permitted rooming-in or room-sharing only under specific circumstances, in 19 (18.4%) of these cases, maternal, family consent or health professional consent was required. In some of these guidance documents, isolation of infants from mothers was a clear expectation and rooming-in or room-sharing were provided only if mothers or parents refused. For example, the Bahrain National Taskforce COVID-19 National Protocols recommended that, "*Temporary separation between the mother and the newborn minimizes the risk of transmission and is advised. If parents refuse separation and willing to room in together, then precautions should be taken to minimize risk of viral transmission*" (24), p. 51]. Guidance on maternal proximity was absent in ten (9.7%) countries' guidance (**Table 1** and **Figure 5**).

In total, only 21 national guidance documents (20.4%) (Australia, Bangladesh, Burkina Faso, Cambodia, Denmark, Dominican Republic, Ecuador, Ethiopia, Ghana, India, Italy, Kosovo, Moldova, Mozambique, Nepal, Niger, Norway, South Africa, Timor-Leste, United Kingdom (UK), and Venezuela) and guidance from two regional agencies (PAHO and PJMIT) recommended the three core breastfeeding-enabling practices of skin-to-skin contact, direct breastfeeding, and rooming in.

3.2. Relactation

Only 11 guidance documents (10.7%) recommended that mothers be supported to relactate if separation or severe illness had resulted in lactation cessation (**Table 1** and **Figure 6**).

3.3. Psychological support

While more than one third of guidance documents recommended the provision of psychological support for mothers, less than 10% provided a recommendation for psychological support for separated infants (**Table 1** and

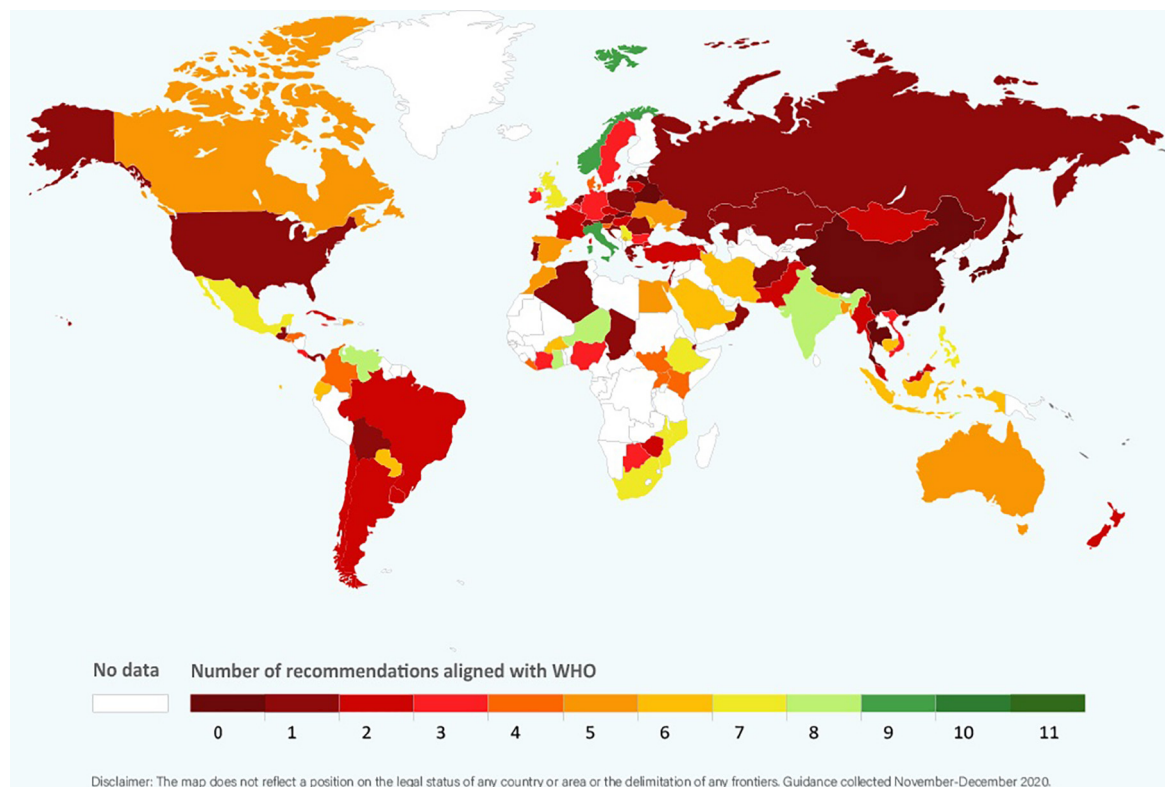


FIGURE 1

Global alignment with WHO recommendations (score 0 to 11; data from 101 countries).

TABLE 1 Number and frequency of guidance recommending, not recommending, and providing no recommendation on skin-to-skin contact, early initiation of breastfeeding, direct breastfeeding, rooming-in, relactation, and provision of psychological support for mothers and infants ($N = 103$).

Practice	Recommended n (%)	Not recommended ^a n (%)	Absent/No recommendation n (%)
Skin-to-skin contact	36 (35.0)	36 (35.0)	31 (30.1)
Early initiation of breastfeeding	30 (29.1)	23 (22.3)	50 (48.5)
Direct breastfeeding	63 (61.2)	38 (36.9)	2 (1.9)
Rooming-in	35 (34.0)	58 (56.3)	10 (9.7)
Relactation	11 (10.7)	0 (0.0)	92 (89.3)
Psychological support for mothers	39 (37.9)	0 (0.0)	64 (62.1)
Psychological support for infants	9 (8.7)	0 (0.0)	94 (91.3)

^aIncludes all categories except for “recommended” and “no information” (Not recommended; Allowed with 2 meters distance or with family preference).

Figures 7, 8). Among the guidance that recommended isolation of infants from their mothers with COVID-19, only three (2.9%) also recommended psychological support for separated mothers (Indonesia, Kazakhstan, and Saudi Arabia) and only one (1.0%) recommended psychological support for separated infants (Serbia). Guidance varied in how much information they included on how to provide support for separated mothers and infants. The Philippines Ministry of Health was among those that included more information stating that mothers should be provided with, “Psychosocial/mental health support, lactation

and maternal nutrition counseling, and practical infant feeding support, especially for those who may need to be separated from the newborn” (25), p5]. The Paraguay Ministry of Public Health and Social Welfare provided detail on support for infants with a separate section in their guidance entitled, “Choosing a companion for the newborn” noting that this person should be someone the mother “trusts to provide emotional support and help in the care of the newborn” and stating that they should be trained in infant care including, “infant hunger cues and administration of expressed breast milk by

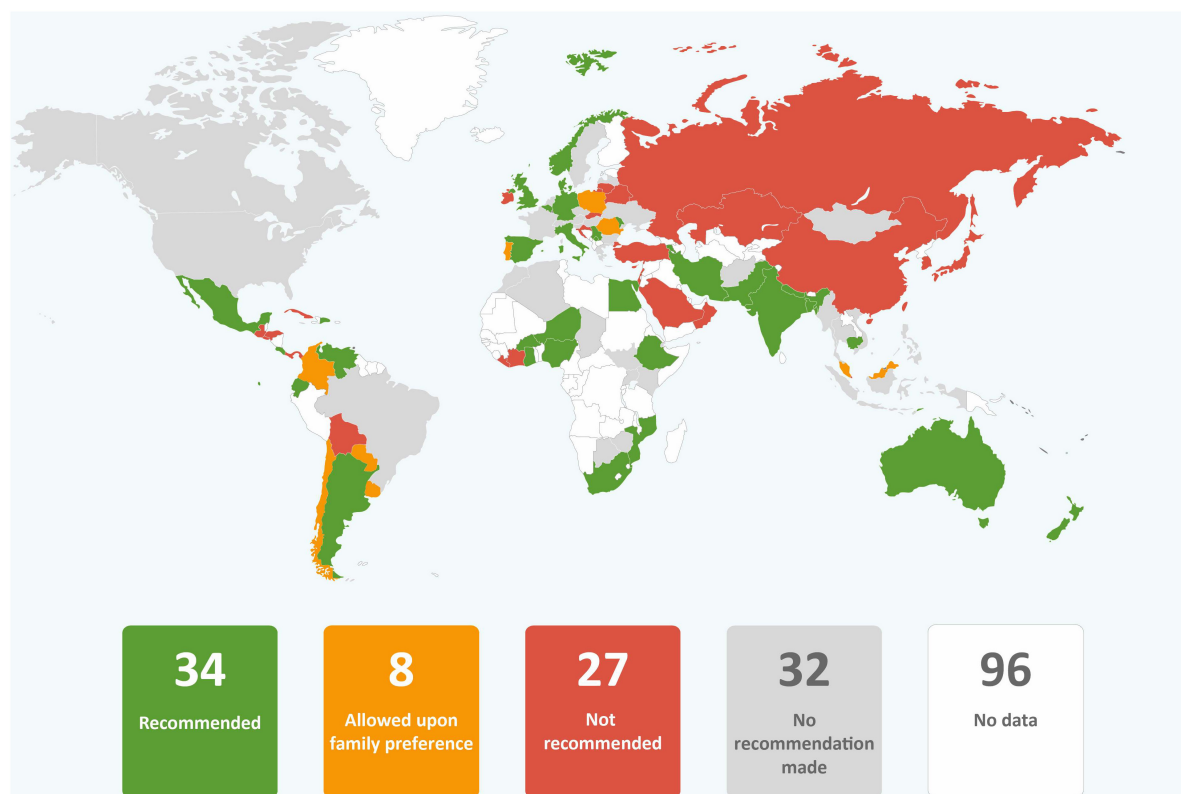


FIGURE 2
Global distribution of recommendations on skin-to-skin contact for infants of mothers with COVID-19 (data from 101 countries).

cup, spoon or finger, diapering, bathing, dressing, sleeping” (26), p. 2].

3.4. Alternative feeding methods

In most guidance, providing expressed breastmilk to infants was recommended when mothers and infants were separated or direct breastfeeding was not recommended because of maternal COVID-19 status (Table 2 and Figure 9). However, guidance from eleven countries (9.7%) recommended against or provided only conditional support for feeding expressed breastmilk from mothers with confirmed COVID-19 (Brazil, China, Japan, Kazakhstan, Latvia, Malaysia, Portugal, Singapore, Slovakia, South Korea, and Thailand). Donor human milk was commonly absent as an alternative feeding method and recommended by just under a quarter of country guidance (Table 2 and Figure 10). None of the countries that recommended against expressed breastmilk feeding when mothers had COVID-19, recommended donor human milk be provided. It was rare for wet nursing to be recommended as an alternative feeding method and this was the recommendation of the WHO least adopted by countries (Table 2 and Figure 11). Indeed, only four countries and one regional agency (PAHO) recommended

wet nursing for infants unable to access their own mothers' breastmilk. Appropriate recommendations for feeding infants with breastmilk substitutes when breastfeeding or provision of expressed breastmilk was not possible, were included in 25 (24.3%) guidance documents. Seven (6.8%) country guidance documents specifically recommended feeding breastmilk substitutes to infants born to mothers with COVID-19 in preference to breastfeeding or feeding expressed breastmilk (Figure 12). Although breastmilk substitute feeding formed a part of the recommendations of many countries, few countries provided detailed guidance on management of safe infant formula feeding (data not shown) and none discussed the need to ensure that families had the resources to access, purchase, and properly prepare infant formula after hospital discharge.

3.5. Breast washing

Fifteen (14.6%) countries inappropriately recommended breast washing before breastfeeding while six (5.8%) countries recommended breast washing only if breasts had been coughed on (in line with the WHO recommendations). Guidance from the Philippines noted that breast washing should not be

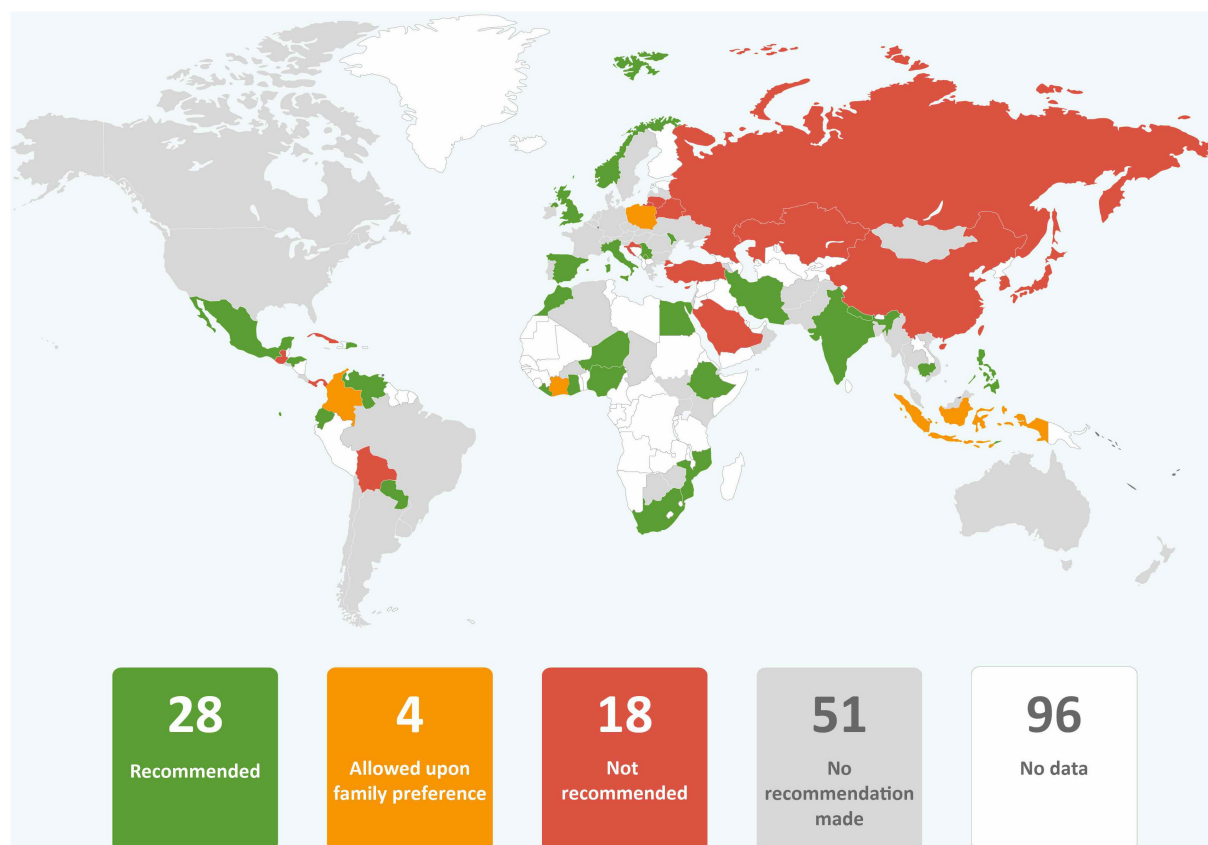


FIGURE 3
Global distribution of recommendations on early initiation of breastfeeding for infants of mothers with COVID-19 (data from 101 countries).

undertaken as long as IPC measures were followed. Statements regarding what to wash breasts with were rare but Iran was an exception with guidance from the Ministry of Health stating to “avoid washing the breast with disinfectants, especially alcohol-based ones” (27), p. 6]. Three (2.9%) countries recommended breast washing before expressing milk.

3.6. Guidance referenced

The most frequently referenced organizational guidance in guidance in our dataset ($N = 103$) were from the WHO [$n = 51$, (49.5%)], the Royal College of Obstetricians and Gynecologists and Royal College of Midwives (RCOG) ($n = 50$, 48.5%), the USCDC ($n = 33$, 32.0%), and the American College of Obstetricians and Gynecologists (ACOG) ($n = 20$, 19.4%). The ACOG guidance simply reiterated the USCDC and directed readers to the USCDC guidance and either one or both of these organizational guidelines were referenced by guidance from $n = 40$ (38.8%) countries. Thirty-eight (36.9%) countries’ government guidance documents did not reference the WHO, of these 12 (11.7%) referenced no external guidance. The

confusion created by the conflicting recommendations of the WHO and RCOG (both of which recommended maternal proximity and breastfeeding) and the USCDC (which did not) was evident in some country guidance. For example, the guidance from the Royal Thailand College of Obstetrics and Gynecology noted that the WHO, the RCOG as well as guidance from Canada, Australia and New Zealand and “most European countries” recommended maternal proximity and breastfeeding. However, they also state that the USCDC recommended maternal-infant separation. This guidance document then provided no recommendation on breastfeeding but instead stated that mothers should be provided with information on the pros, cons, and risks of breastfeeding their infants before making a decision.

3.7. Conflicts, lack of clarity, and anomalies within guidance documents

Conflicts and confusion were present in some countries’ guidance documents. For example, guidance from Honduras recommended that no skin-to-skin contact be provided but

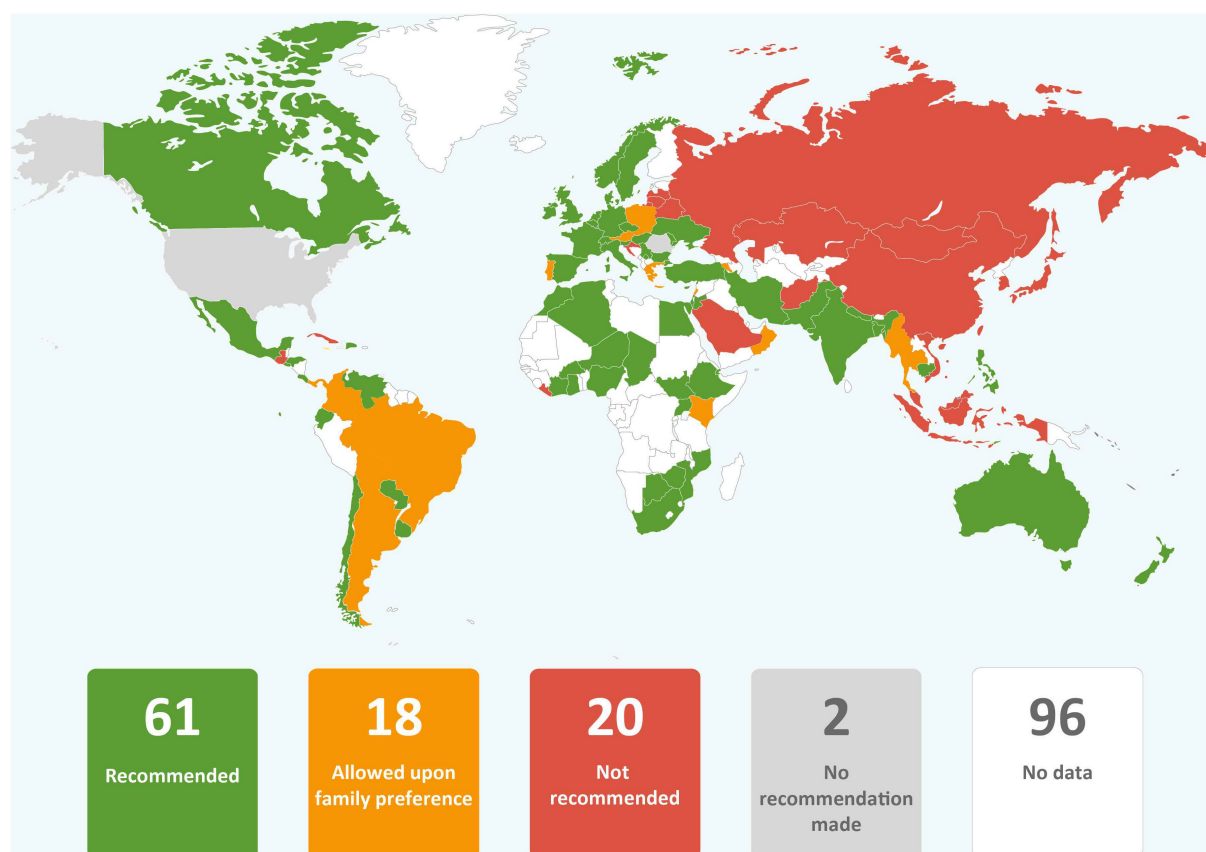


FIGURE 4
Global distribution of recommendations on direct breastfeeding for infants of mothers with COVID-19 (data from 101 countries).

also said that the WHO Early Newborn Care Practices (which includes skin-to-skin contact) should be followed. Guidance from Afghanistan recommended both for and against direct breastfeeding. The Saudi Arabia government published a series of guidance documents and did not withdraw older guidance when publishing new documents. This resulted in contradictory recommendations between guidance documents, for example, against and for separation and direct breastfeeding. The Kazakhstan Ministry of Health guidance was among several that was difficult to interpret because it provided different and unclear recommendations for different scenarios.

Many guidance documents abstained from mentioning key practices altogether (for example skin-to-skin contact), while others discussed practices but declined to provide a recommendation. For example, the US CDC discussed but did not provide recommendations on rooming-in or breastfeeding and was among eight countries whose guidelines provided no recommendations on specific practices but instead stated that mothers or families should be informed of the risks and benefits and make their own decision. The Malaysian Ministry of Health guidance was among several that recommended that

individual hospitals should develop their own guidelines on specific practices.

Eight (7.8%) countries stated that mothers should be required to provide written consent for practices recommended by the WHO including skin-to-skin contact, maternal proximity, provision of expressed breastmilk, and breastfeeding. In some cases, a consent form which clearly implied that proximity and breastfeeding were risky was included. For example, the consent form for direct breastfeeding in the guidance of the Guatemalan Institute of Social Security stated, “*Having had the risks involved and alternatives for breastfeeding explained, I TAKE RESPONSIBILITY AND ASSUME THE RISKS THAT WERE EXPLAINED TO ME AND THE COMPLICATIONS THAT THIS MAY CAUSE IN MY BABY’S HEALTH, I SIGN SAID CONSENT*” (emphasis in original) (28), p. 32]. In only one country guidance was consent required for a practice that was not in line with WHO recommendations (Slovakia for separation). The issue of the rights of the mother-newborn dyad regarding proximity was raised only in the guidance from Kosovo and Cambodia both of which said, “*Every newborn has the right to access his or her mother or parent. No mother should be separated*

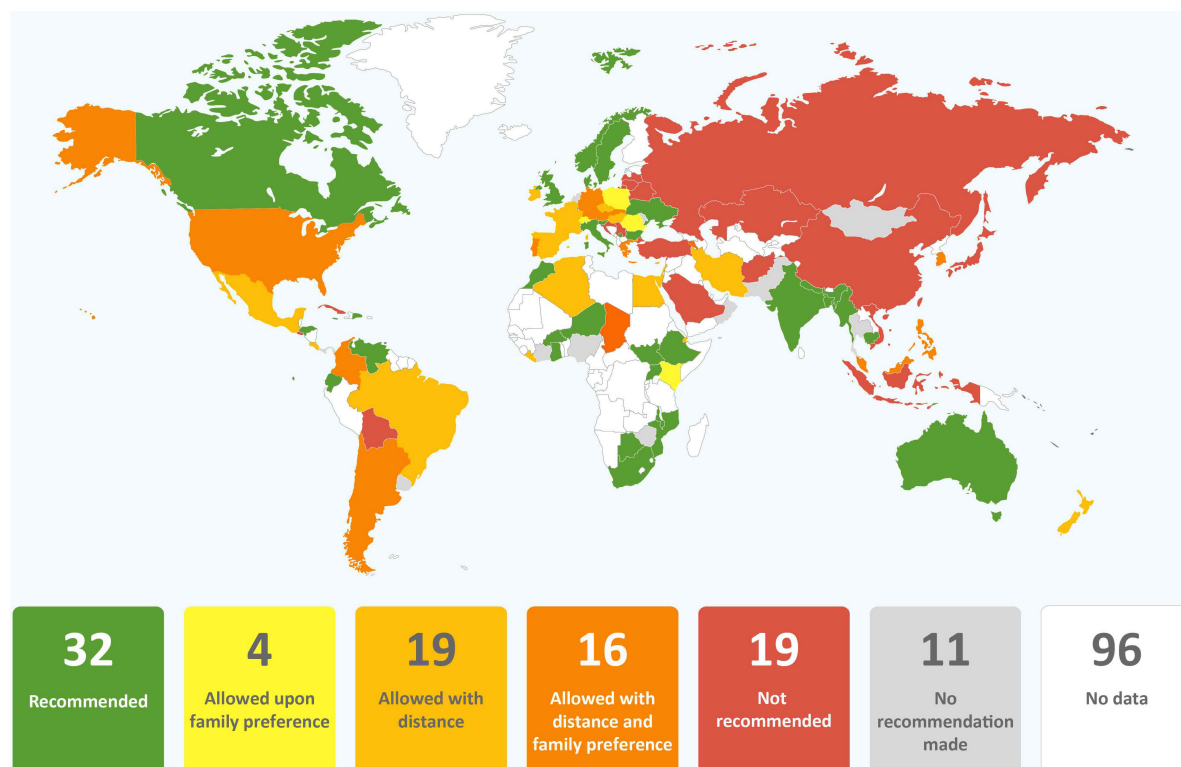


FIGURE 5

Global distribution of recommendations for rooming in for infants of mothers with COVID-19 (data from 101 countries).

from her baby without her informed consent" (29), p. 71, (30), p. 33].

A variety of questionable or impractical recommendations were made. Guidance from Brazil, Columbia, and Mexico recommended that mothers avoid talking during breastfeeding. Guidance from Costa Rica stated that mothers should put on a clean gown prior to breastfeeding. Guidance from Brazil stated that infants should be prevented from touching their mother's face. Guidance from Côte d'Ivoire, Germany, Hungary, Paraguay, and South Africa advised that mothers with COVID-19 not kiss their babies. Guidance from South Korea recommended testing the breastmilk of women with COVID-19 for SARS-CoV-2 and to consider feeding expressed breastmilk only after confirmation of a negative result. Seemingly in response to poor practices and misinformation by others, guidance from Djibouti, France, Iran, the Philippines, and the UK noted that masks should not be put on infants.

3.8. Publication dates of guidance

Guidance from 95 (92.2%) countries were dated, with the first guidance published 9 February 2020 (China) and the latest published or updated in December 2020 (Iran

and Malaysia). More than half of countries' whose guidance had publication dates were either published or most recently updated between March and May 2020 ($n = 48$, 50.5%) (Supplementary Figure 1).

3.9. Changes in recommendations

In the 32 countries for which comparison between the recommendations of March-April 2020 and November-December 2020 could be made, 16 (50%) countries increased in alignment with the WHO recommendations; three countries (9.4%) decreased in alignment; and 13 (40.6%) remained the same (Supplementary Figure 2). In six countries (18.6%) (China, Jamaica, Myanmar, Nigeria, Singapore, and Vietnam), alignment remained the same because the guidance had not been updated at the time of data collection. Some country alignment scores increased markedly with Ethiopia improving by seven and India, Italy, and the Philippines improving by six. The proportion of individual recommendations in alignment with the WHO increased for all recommendations when compared to both the 32 countries for which direct comparison could be made and overall for the 103 country and regional guidance in the November-December 2020 data set (Table 3).

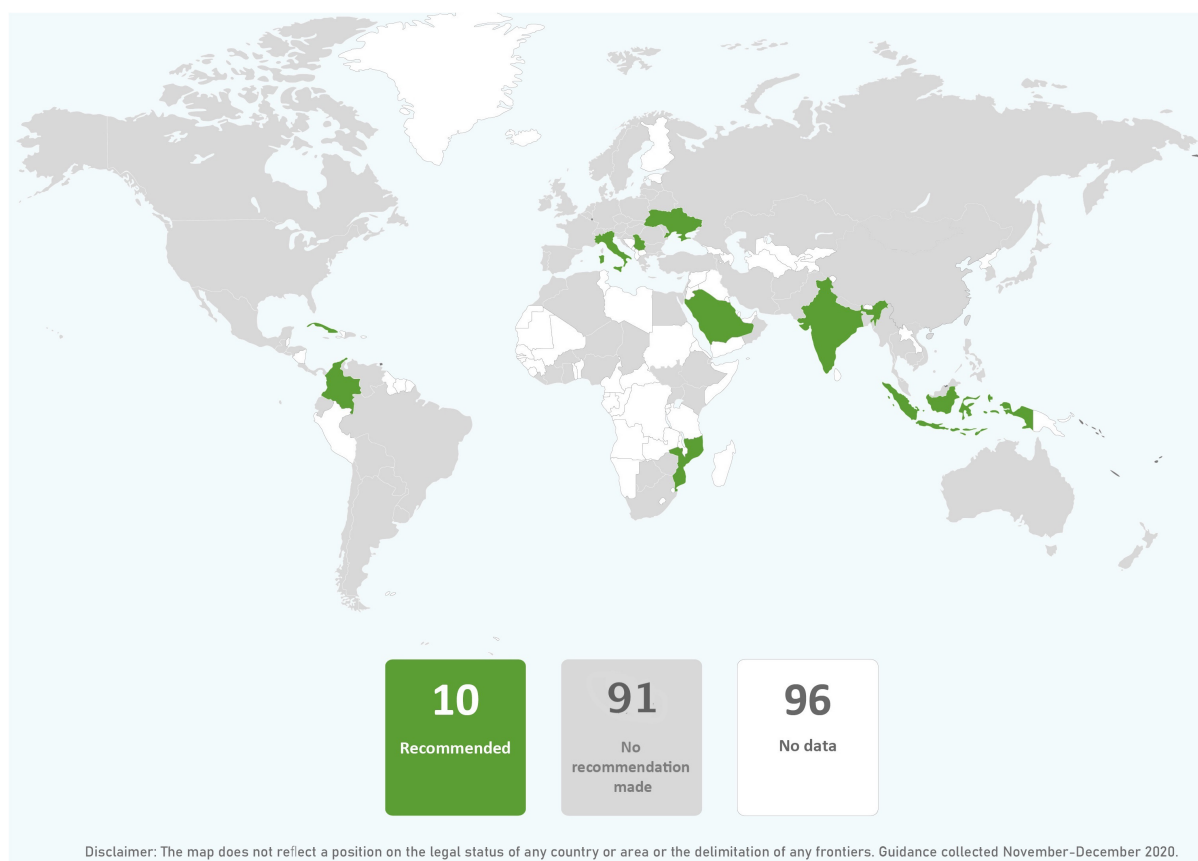


FIGURE 6

Global distribution of recommendations on relactation support for mothers with COVID-19 (data from 101 countries).

4. Discussion

In this analysis of COVID-19 maternal and newborn guidance documents, we revealed that alignment of country recommendations with the recommendations of the WHO regarding breastfeeding and related practices improved during 2020. Alignment particularly improved for skin-to-skin contact, early initiation of breastfeeding, direct breastfeeding, donor human milk when mother's milk is unavailable, and psychological support for mothers separated from their infants.

However, it is concerning that approximately 9 months after the WHO first published their clinical guidance and after a substantial volume of research on COVID-19 had been published, alignment with the WHO recommendations remained at an overall low level. Of the 103 guidance documents collected from November through December 2020, nearly two thirds recommended direct breastfeeding, but only one third recommended skin-to-skin contact and one third recommended rooming-in. Alarming, less than a quarter of this guidance unequivocally recommended the three key practices that support breastfeeding, namely: skin-to-skin contact, direct breastfeeding, and rooming-in (9). Thus,

country guidance placed many mothers in a situation where they were advised to breastfeed but simultaneously denied support for practices that facilitate and enable breastfeeding. To recommend breastfeeding while putting in place structural barriers to breastfeeding is unfair to women (31). It also results in reduced exclusivity and duration of breastfeeding (9). The fact that 20% of guidance documents required that infants be isolated from mothers with COVID-19 placed women at a very high risk of being unable to breastfeed in many countries (12). While in the remaining nearly 40% of guidance, rooming-in or room-sharing was permitted when mothers or families wanted it, it was evident in some guidance documents that this was not simply a case of mothers stating their preferences. Rather, mothers would need to strongly advocate to be allowed to room-in or room-share with their infants. Requirements for mothers to provide written consent is reflective of the representation of rooming-in (as well as skin-to-skin contact and breastfeeding) as risky practices rather than a part of the standard of care. In some contexts, these requirements may have pre-dated COVID-19, evidencing already weak support for breastfeeding that continued or may have deteriorated during the pandemic. As an example,

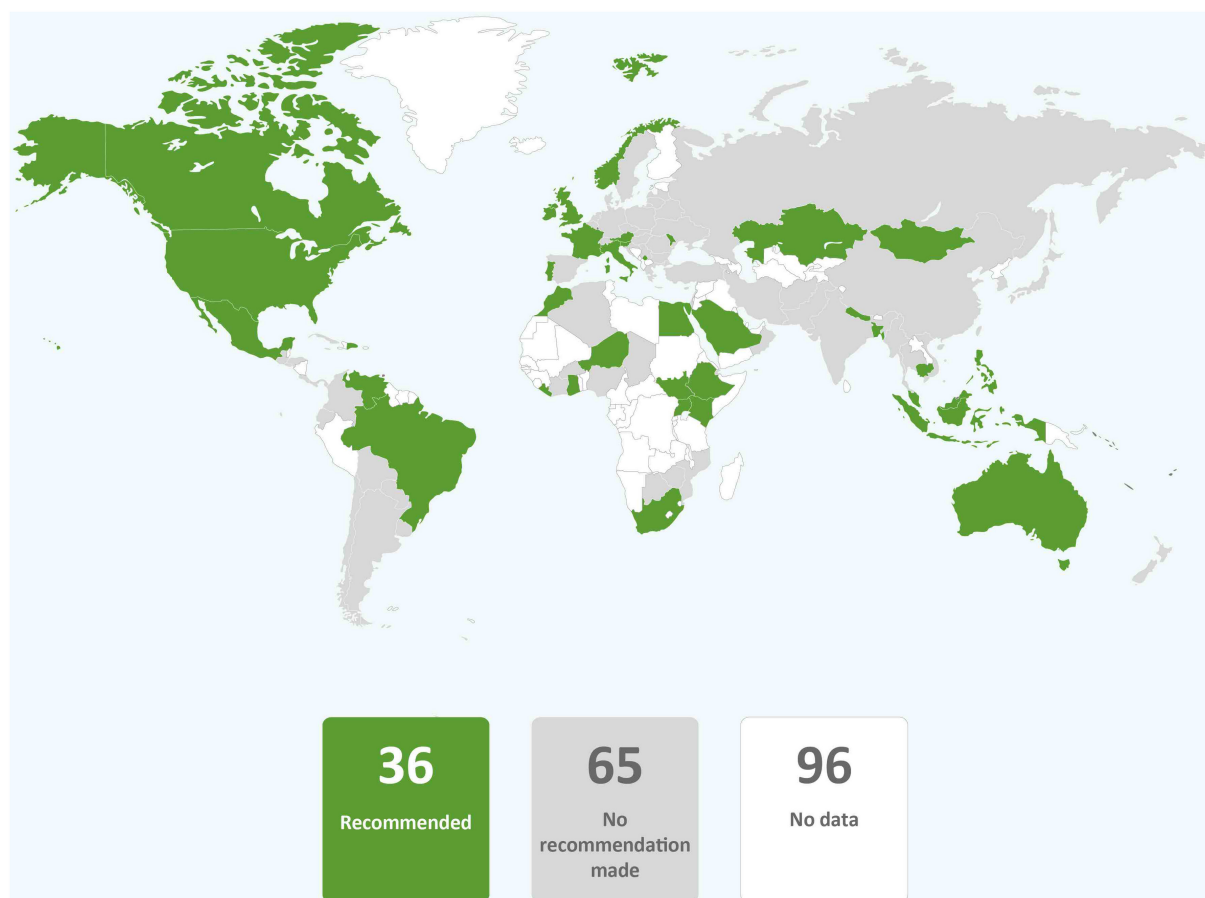


FIGURE 7

Global distribution of recommendations on psychological support for mothers with COVID-19 (data from 101 countries).

prior to the pandemic, the Japanese Society of Perinatal and Neonatal Medicine stated that pregnant women be provided with information on the risks and benefits of skin-to-skin contact with the practice to be implemented recorded in medical records (32).

Health workers are obligated to provide care in a manner that does no harm. Improved policies and redesigned processes of care are among several low-cost strategies that protect patient safety and prevent adverse health outcomes (33, 34). In our analysis, the absence of recommendations for evidence-based practices, including where statements were made that mothers should be provided with information on the risks and benefits and make their own decision, represents an abandonment of responsibility by health authorities toward mothers and health providers. In practice, it means that mothers must rely on the knowledge of individual health professionals. The HIV pandemic demonstrated that lack of clear infant feeding recommendations compromises the ability of health professionals to support mothers in decision making (35) and places disproportionate emphasis on the opinions of

individual health professionals (36) to the detriment of mothers and infants. It is concerning that so many health authorities abrogated their responsibility in this way.

Feeding infants their mothers' expressed breastmilk if they were unable to directly breastfeed was the most common recommendation that aligned with the WHO guidance remaining the same between March-April 2020 and November-December 2020. However, one quarter of guidance documents did not recommend feeding infants expressed breastmilk and either had no recommendation, recommended against, or recommended only feeding expressed milk if it was a maternal/family preference or after testing. Given that there is no evidence of replicable SARS-CoV-2 in breastmilk, or that the virus could be transmitted *via* breastmilk, the absence of an unconditional universal recommendation to feed expressed breastmilk to infants who are unable to directly breastfeed, is contrary to public health principles.

The number of recommendations in favor of using donor human milk increased between March-April 2020 and November-December 2020. This may have partly been a result of advocacy by organizations like the Global Alliance of Milk

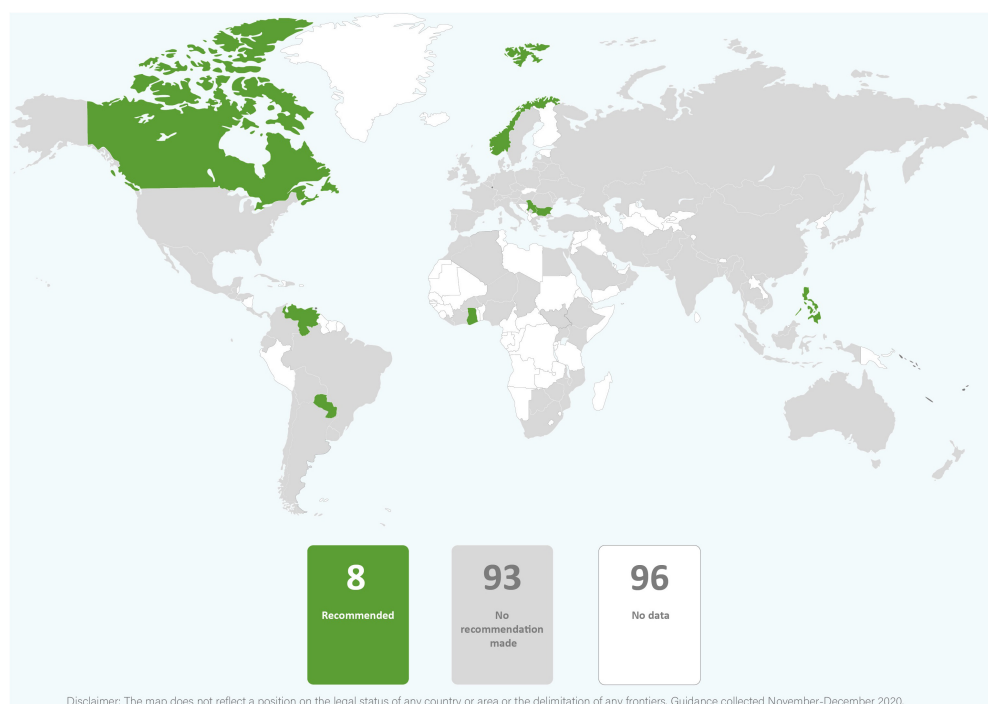


FIGURE 8

Global distribution of recommendations on psychological support for infants of mothers with COVID-19 (data from 101 countries).

TABLE 2 Number and frequency of guidance documents recommending, not recommending, and providing no recommendation on alternative feeding methods of expressed breastmilk, donor human milk, and wet nursing ($N = 103$).

Practice	Recommended n (%)	Not recommended n (%)	Absent/No recommendation n (%)
Expressed breastmilk	76 (73.8)	11 (9.7) ^a	16 (15.5)
Donor human milk	23 (22.3)	2 (1.9)	78 (75.7)
Wet nursing	5 (4.9) ^b	0 (0.0)	98 (95.1)

^aIncludes “not recommended” and “allowed upon family request.”

^bIncludes four countries and one regional agency (PAHO).

Banks and Associations (formed early in the pandemic) and others (37, 38). The proportion of guidance recommendations in favor of relactation also increased, doubling from the first to the second collection of guidance documents. However, the overall proportion of guidance documents recommending relactation remained low with only one in nine guidance documents including the practice. The potential impact of relactation and motivation to relactate during the pandemic has been described. Rollins et al. (13) calculated that where mothers with COVID-19 in low- and middle-income countries were separated from their infants and ceased breastfeeding, relactation by even half would reduce infant mortality arising from separation by nearly one third. Furthermore, researchers from Australia showed that early in the pandemic, unusually high numbers of mothers wanted support with relactation, being motivated to ensure food security and protect their infants from infection (39). It is notable that the number of guidance

documents recommending wet nursing remained extremely low with only one in 20 recommending this practice. Prudhon et al. (40) identified that supporting relactation in emergencies is an area in need of further research and Smith and Iellamo (41) identified that an absence of guidance on wet nursing impedes support for this option in emergencies. The low uptake of recommendations for relactation and wet nursing confirms the need for further research and guidance.

Psychological support for mothers separated from their infants was the recommendation that most increased in frequency between March–April 2020 and November–December 2020 in the guidance documents collected for this research. In many respects this is not surprising since, as the pandemic progressed, it became clear that social isolation, physical inactivity, economic insecurity, and domestic violence, together with specific COVID-19 fears adversely impacted the mental health of pregnant women and new mothers (42–45). Mothers

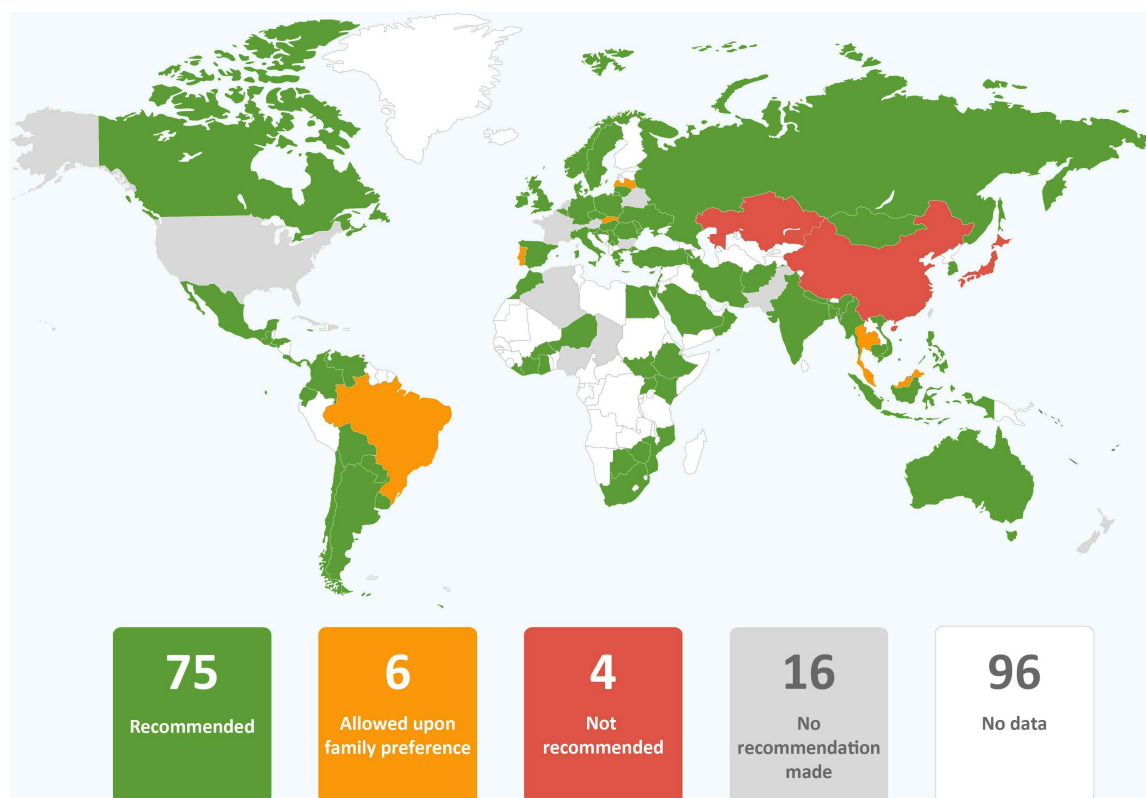


FIGURE 9

Global distribution of recommendations on the provision of expressed breastmilk to infants of mothers with COVID-19 unable to directly breastfeed (data from 101 countries).

whose infants were separated from them because they had COVID-19, experienced greater distress as compared to women who were not separated (12, 46). However, although the number of country guidance recommending psychological support increased, it was still present in less than half of the guidance. This is troubling, not only because of the impact of separation without support on women, but also because of the potential impact of poor mental health on maternal caregiving and therefore on infant mental health and child development (47).

4.1. Psychological support for separated infants

Less than 10% of countries included a recommendation that infants separated from their mothers should be provided with psychological support. Maternal separation is distressing for infants. From birth, infants know the voice (48) and smell (49) of their mother and are distressed by their mothers' absence (50). Separation from their mother and lack of comfort constitutes a significant psychological insult (51). Moreover, nursing staff may be unable to provide comfort to separated

infants because of time constraints (52) and over the course of the pandemic, videos have emerged of infants in hospital nurseries alone and crying. Many forms of psychological support that are available to mothers (for example verbal reassurance and video calls) cannot assist infants. However, in the absence of the mother, others are able to provide comfort (53, 54). Thus, provision of an alternative caregiver is an appropriate intervention, as recommended in some of the guidance documents in this study. It is disturbing nonetheless that the psychological needs of infants separated from their mothers was recognized by so few countries' guidance documents.

The impact of separation and interruption of breastfeeding on maternal attachment and caregiving capacity is known (9) and reduced maternal-infant attachment scores from separation due to COVID-19 have been documented (55). However, support for separated mothers to attach to their infants after reunification could assist. Skin-to-skin contact (56), infant massage (57), carrying (58), and breastfeeding (59) have all been shown to support the development of maternal-infant attachment. However, neither the WHO guidance nor any of the guidance included in this study provided specific recommendations on supporting separated mothers

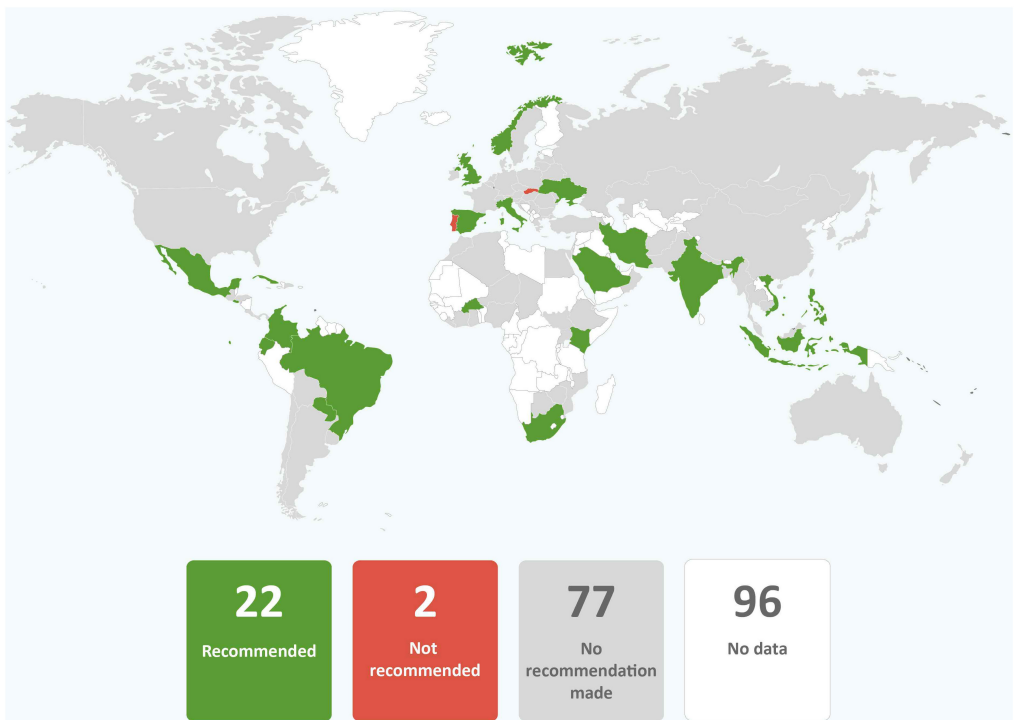


FIGURE 10
Global distribution of recommendations on providing donor human milk to infants of mothers with COVID-19 unable to provide their own breastmilk (data from 101 countries).

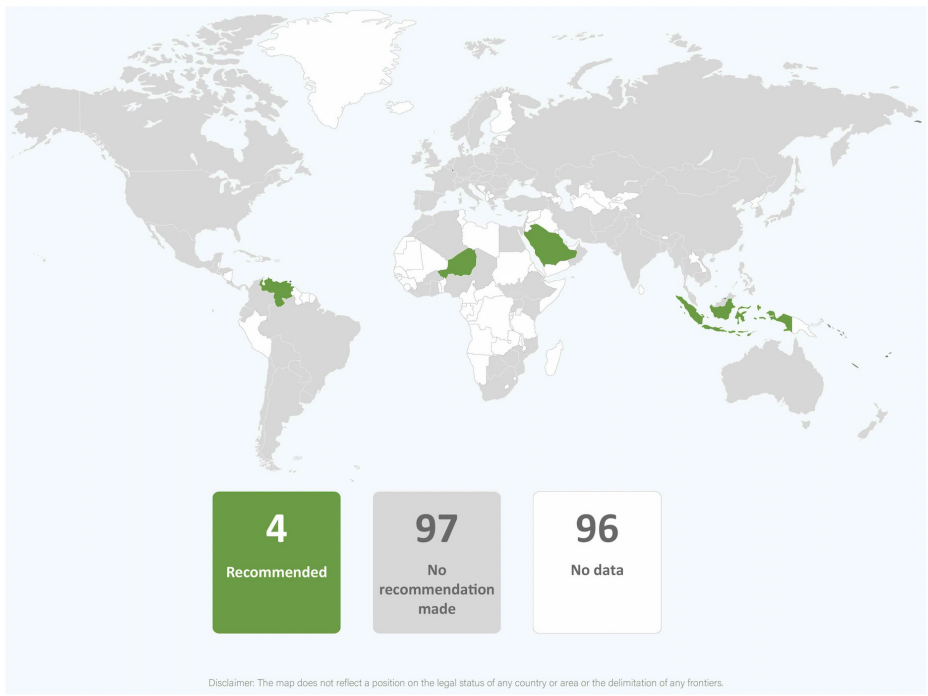


FIGURE 11
Global distribution of recommendations on wet nursing infants of mothers with COVID-19 (data from 101 countries).

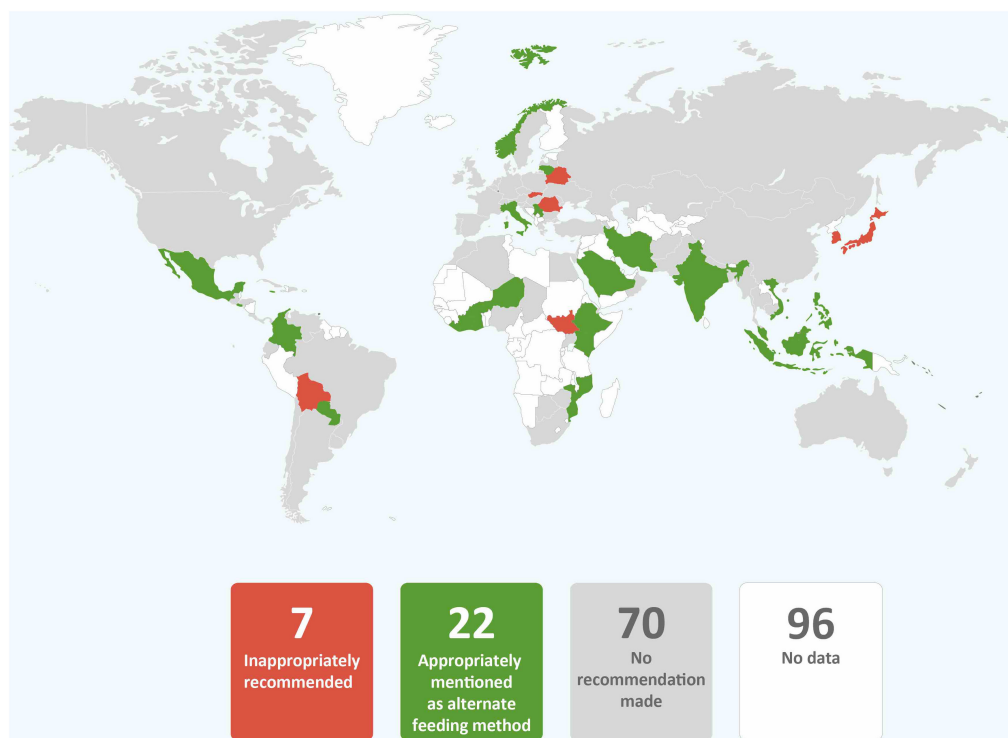


FIGURE 12

Global distribution of recommendations to provide breastmilk substitutes to infants of mothers with COVID-19 only where breastfeeding or expressed breastmilk is not available (data from 101 countries).

TABLE 3 Frequency of country and regional guidance in alignment with each of the eleven World Health Organization (WHO) COVID-19 recommendations for maternal and newborn care in guidance collected March–April 2020 and November–December 2020.

	Percentage of guidance in alignment with the WHO recommendation										
	S2S ^a <i>n</i> (%)	EIBF <i>n</i> (%)	RI <i>n</i> (%)	BF <i>n</i> (%)	EBM <i>n</i> (%)	DHM <i>n</i> (%)	WN <i>n</i> (%)	BMS <i>n</i> (%)	PS-M <i>n</i> (%)	PS-I <i>n</i> (%)	R <i>n</i> (%)
March–April 2020 collection (<i>n</i> = 32)	7 (21.9)	5 (15.6)	11 (34.4)	15 (46.9)	23 (71.9)	3 (9.4)	0 (0.0)	6 (18.8)	4 (12.5)	1 (3.1)	2 (6.3)
November–December 2020 collection (<i>n</i> = 32 ^b)	13 (40.6)	10 (31.3)	12 (37.5)	18 (56.3)	22 (68.8)	13 (40.6)	2 (6.3)	14 (43.8)	19 (59.4)	3 (9.4)	4 (12.5)
November–December 2020 collection (<i>n</i> = 103 ^c)	36 (35.0)	30 (29.1)	35 (34.0)	63 (61.2)	76 (73.8)	23 (22.3)	5 (4.9)	25 (24.3)	39 (37.9)	9 (8.7)	11 (10.7)

^aS2S, skin-to-skin contact; EIBF, early initiation of breastfeeding; RI, rooming in; BF, direct breastfeeding; EBM, expressed breastmilk; DHM, donor human milk; WN, wet nursing; BMS, breastmilk substitutes; PS-M, psychological support for mothers; PS-I, Psychological support for infants; R, relactation; ^bsame countries as in March–April 2020 collection; ^cfull data set.

and infants after reunification. This is an oversight that must be rectified.

4.2. Influence of external guidance on country recommendations

In the guidance collected during March–April 2020, the USCDC was the most influential organization cited by guidance from 40% of the countries, followed by the RCOG (38%) and then the WHO (21%). In the November–December

2020 guidance collection, the WHO and RCOG were cited by guidance from 50% of the countries and the USCDC (inclusive of ACOG) by 39%. These data raise several questions. First, given that 99 out of 101 of the countries whose guidance was included in this study are members of the WHA, why was the WHO not more frequently cited and recommendations applied? In our first guidance collection, the relative infrequency with which the WHO was referenced could have partly been because the WHO guidance had been only recently published. However, the second guidance collection was initiated 8 months after WHO first published

their COVID-19 clinical guidance, giving plenty of time for countries to assimilate WHO's recommendations. In some cases, the WHO might not have been cited because countries had not updated their guidance after initial publication; nearly one third of countries' most recent guidance was published during February–April 2020. However, the fact that guidance documents from 38 Ministries of Health in WHA member states did not reference guidance from the WHO is concerning.

Second, why was the USCDC still cited frequently even as evidence became overwhelming that maternal-infant proximity and breastfeeding was far safer than separation? As with the lack of use and citation of the WHO, early publication of country guidance documents and the lack of revision of some guidance documents may have contributed to these lapses. However, the work of the USCDC in global public health may have also encouraged Ministries of Health and professional associations to view the USCDC as a reliable authority whose recommendations could be applied in their own context. Within the USA, domestic health authorities, including the USCDC, worked together to ensure that their organizational recommendations did not conflict and cause confusion domestically (60). However, the experience of the COVID-19 pandemic suggests that the USCDC needs to also consider the influence of their recommendations internationally. In future pandemics, consideration should be given to reducing international confusion where USCDC recommendations conflict with the WHO risking causing harm. Greater coordination between the USCDC and the WHO may be warranted as well as indicating clearly when USCDC recommendations are intended only for domestic use. One can speculate that the effect of the COVID-19 pandemic on infant morbidity and mortality could have been lessened if the USCDC had been unified with the WHO and the RCOG in recommending maternal proximity and breastfeeding for mothers with COVID-19 from the beginning of the pandemic.

4.3. Limitations

It is a limitation of this study that there was no assessment of whether and how country guidance may have changed since collection. Guidance was not collected from all countries and it was assumed that guidance published on Ministry of Health websites was current when this may not have been the case. Where guidance was not dated, the date of publication could not be ascertained and where guidance did not contain references, it could not be determined how the guidance was influenced by other sources. Finally, the degree to which health professionals in hospitals followed guidance was not explored and should be considered in future research.

4.4. Conclusion

Our analysis of COVID-19 clinical guidance for maternal and newborn care from 101 countries showed that concerns regarding SARS-CoV-2 transmission through maternal proximity or breastfeeding took precedence over the evidence that impeding breastfeeding would be more harmful. Although there was improvement between country guidance gathered during March–April 2020 and November–December, COVID-19 maternal and newborn care guidance from most countries still failed to treat skin-to-skin contact, rooming-in and breastfeeding as the standard of care. In many country guidance documents, maternal proximity and breastfeeding were treated as an exception, sometimes requiring “informed consent” if allowed at all. Many health authorities also declined to provide clear recommendations even as evidence about COVID-19 and the safety of maternal proximity and breastfeeding grew, contrary to the principle of do no harm. While the influence of the WHO guidance increased, the USCDC remained influential globally and early recommendations for isolation of infants from their mothers persisted. This analysis has demonstrated that in the absence of quality evidence of necessity, recommendations against breastfeeding should not be made, particularly early in disease epidemics as these recommendations can persist despite evolving evidence to the contrary. Furthermore, international cooperation in the development and management of guidance is needed to ensure that recommendations made in one country do not undermine the advice of the WHO elsewhere. The COVID-19 pandemic has highlighted again that confidence in breastfeeding and its importance is fragile and the mother-infant relationship is undervalued. The value of breastfeeding in protecting against infectious and non-infectious disease, supporting maternal caregiving, providing food security and brain development must be more widely and deeply understood.

Data availability statement

The original contributions presented in this study are included in the article/[Supplementary material](#), further inquiries can be directed to the corresponding author.

Author contributions

DV, KG, and KM conceived of the study. DV, KG, KM, and RM acquired guidance documents. DV, JC, KG, KM, and RM analyzed and interpreted data. All authors drafted and revised

the manuscript, approved the final version, and agreed to be accountable for all aspects of the work.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial

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Supplementary material

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References

- World Health Organization. *Clinical Management of Severe Acute Respiratory Infection (SARI) when COVID-19 Disease is Suspected: Interim Guidance, 13 March 2020*. Geneva: World Health Organization (2020). doi: 10.15557/PiMR.2020.0003
- World Health Organization. *Clinical Management of COVID-19: Interim Guidance, 27 May 2020*. Geneva: World Health Organization (2020). doi: 10.15557/PiMR.2020.0004
- World Health Organization. *COVID-19 Clinical Management: Living Guidance, 25 January 2021*. Geneva: World Health Organization (2021).
- World Health Organization. *COVID-19 Clinical Management: Living Guidance, 23 November 2021*. Geneva: World Health Organization (2021).
- World Health Organization. *Frequently Asked Questions: Breastfeeding and COVID-19 For Health Care Workers*. Geneva: World Health Organization (2020).
- Gribble K, Mathisen R, Ververs M, Coutoudis A. Mistakes from the HIV pandemic should inform the COVID-19 response for maternal and newborn care. *Int Breastfeed J*. (2020) 15:67. doi: 10.1186/s13006-020-00306-8
- World Health Organization Western Pacific Region. *Early Essential Newborn Care: Clinical Practice Pocket Guide*. Geneva: World Health Organization (2014).
- World Health Organization. *Protecting, Promoting and Support Breastfeeding in Facilities Providing Maternity and Newborn Services: The Revised Baby-Friendly Hospital Initiative*. Geneva: World Health Organization (2018).
- Gribble K, Marinelli K, Tomori C, Gross M. Implications of the COVID-19 pandemic response for breastfeeding, maternal caregiving capacity and infant mental health. *J Hum Lact*. (2020) 36:591–603. doi: 10.1177/0890334420949514
- Walters D, Phan L, Mathisen R. The cost of not breastfeeding: global results from a new tool. *Health Policy Plan*. (2019) 34:407–17. doi: 10.1093/heapol/czz050
- Vu Hoang D, Cashin J, Gribble K, Marinelli K, Mathisen R. Misalignment of global COVID-19 breastfeeding and newborn care guidelines with World Health Organization recommendations. *BMJ Nutr Prev Health*. (2020) 3:e000184. doi: 10.1136/bmjnp-2020-000184
- Bartick M, Valdés V, Giusti A, Chapin E, Bhana N, Hernández-Aguilar M, et al. Maternal and infant outcomes associated with maternity practices related to COVID-19: the COVID mothers study. *Breastfeed Med*. (2021) 16:189–99. doi: 10.1089/bfm.2020.0353
- Rollins N, Minckas N, Jehan F, Lodha R, Raiten D, Thorne C, et al. A public health approach for deciding policy on infant feeding and mother–infant contact in the context of COVID-19. *Lancet Glob Health*. (2021) 9:e552–7. doi: 10.1016/S2214-109X(20)30538-6
- Gale C, Quigley M, Placzek A, Knight M, Ladhani S, Draper E, et al. Characteristics and outcomes of neonatal SARS-CoV-2 infection in the UK: a prospective national cohort study using active surveillance. *Lancet Child Adolesc Health*. (2021) 5:113–21. doi: 10.1016/S2352-4642(20)30342-4
- Tolu L, Ezech A, Feyissa G. Vertical transmission of severe acute respiratory syndrome coronavirus 2: a scoping review. *PLoS One*. (2021) 16:e0250196. doi: 10.1371/journal.pone.0250196
- Neef V, Buxmann H, Rabenau H, Zacharowski K, Raimann F. Characterization of neonates born to mothers with SARS-CoV-2 infection: review and meta-analysis. *Pediatr Neonatol*. (2020) 62:11–20. doi: 10.1016/j.pedneo.2020.10.001
- Cimolai N. A comprehensive analysis of maternal and newborn disease and related control for COVID-19. *SN Compr Clin Med*. (2021) 3:1272–94. doi: 10.1007/s42399-021-00836-0
- Fox A, Marino J, Amanat F, Krammer F, Hahn-Holbrook J, Zolla-Pazner S, et al. Robust and specific secretory IgA against SARS-CoV-2 detected in human milk. *iScience*. (2020) 23:101735. doi: 10.1016/j.isci.2020.101735

19. Perl S, Uzan-Yulzari A, Klainer H, Asiskovich L, Youngster M, Rinott E, et al. SARS-CoV-2-specific antibodies in breast milk after COVID-19 vaccination of breastfeeding women. *JAMA*. (2021) 325:2013–4. doi: 10.1001/jama.2021.5782
20. Pace R, Williams J, Järvinen K, Belfort M, Pace C, Lackey K, et al. Characterization of SARS-CoV-2 RNA, antibodies, and neutralizing capacity in milk produced by women with COVID-19. *mBio*. (2021) 12:e3192–3120. doi: 10.1128/mBio.03192-20
21. Conti M, Terrieri S, Piano Mortari E, Albano C, Natale F, Boscarino G, et al. Immune response of neonates born to mothers infected with SARS-CoV-2. *JAMA Netw Open*. (2021) 4:e2132563–2132563. doi: 10.1001/jamanetworkopen.2021.32563
22. Whittemore R, Knafl K. The integrative review: updated methodology. *J Adv Nurs*. (2005) 52:546–53. doi: 10.1111/j.1365-2648.2005.03621.x
23. Jaafar S, Ho J, Lee K. Rooming-in for new mother and infant versus separate care for increasing the duration of breastfeeding. *Cochrane Database Syst Rev*. (2016) 2016:Cd006641. doi: 10.1002/14651858.CD006641.pub3
24. Bahrain National Taskforce for the Combatting the Coronavirus Covid-19. *COVID-19 National Protocols*. Manama: Ministry of Health Kingdom of Bahrain (2020).
25. Republic of the Philippines Ministry of Health. *Interim Guidelines on COVID-19 Management of Pregnant Women, Women about to Give Birth, and Newborns*. San Lazaro: Republic of the Philippines Ministry of Health (2020).
26. Paraguay Ministry of Public Health and Social Welfare. *Protocol for COVID-19: Management Guide for Pregnant Women and Obstetric Events*. Asunción: Paraguay Ministry of Public Health and Social Welfare (2020).
27. Islamic Republic of Iran Ministry of Health and Medical Education. *Newborn Care Guide from a Suspected or Confirmed Mother with COVID-19 Disease*. 4th ed. Shahrak-e Gharb: Islamic Republic of Iran Ministry of Health and Medical Education (2020).
28. Guatemalan Institute of Social Security. *Diagnosis and Patient Management Protocol Suspicious and Confirmed COVID-19 Obstetrics and Gynecology Hospital*. Guatemala: Guatemalan Institute of Social Security (2020).
29. Republic of Kosovo Ministry of Health. *Manual for COVID-19 Prevention and Control*. Pristina: Republic of Kosovo Ministry of Health (2020).
30. Kingdom of Cambodia Ministry of Health. *National COVID-19 Technical Brief for Maternal and Child Health Services*. Phnom Penh: Kingdom of Cambodia Ministry of Health (2020). doi: 10.1111/jhn.12496
31. Brown A. Breastfeeding as a public health responsibility: a review of the evidence. *J Hum Nutr Dietet*. (2017) 30:759–70.
32. Japanese Society of Perinatal and Neonatal Medicine. *Points to Note When Implementing “Early Mother-Infant Contact”*. (2012). Available online at: https://www.jspnm.com/sbsv13_8.pdf (accessed August 24, 2012)
33. Seventy-second World Health Assembly. *Global Action on Patient Safety*. (2019). Available online at: https://apps.who.int/gb/ebwha/pdf_files/WHA72/A72_R6-en.pdf?ua=1 (accessed May 28, 2019).
34. English M, Ogola M, Aluvaala J, Gicheha E, Irimu G, McKnight J, et al. First do no harm: practitioners’ ability to ‘diagnose’ system weaknesses and improve safety is a critical initial step in improving care quality. *Arch Dis Child*. (2021) 106:326–32. doi: 10.1136/archdischild-2020-320630
35. Moland K, de Paoli M, Sellen D, van Esterik P, Leshabari S, Blystad A. Breastfeeding and HIV: experiences from a decade of prevention of postnatal HIV transmission in sub-Saharan Africa. *Int Breastfeed J*. (2010) 5:10. doi: 10.1186/1746-4358-5-10
36. Koricho A, Moland K, Blystad A. Poisonous milk and sinful mothers: the changing meaning of breastfeeding in the wake of the HIV epidemic in Addis Ababa Ethiopia. *Int Breastfeed J*. (2010) 5:12. doi: 10.1186/1746-4358-5-12
37. Shenker N, Staff M, Vickers A, Apriglio J, Tiwari S, Nangia S, et al. Maintaining human milk bank services throughout the COVID-19 pandemic: a global response. *Matern Child Nutr*. (2021) 17:e13131. doi: 10.1111/mcn.13131
38. Olonan-Jusi E, Zambrano P, Duong V, Anh N, Aye N, Chua M, et al. Human milk banks in the response to COVID-19: a statement of the regional human milk bank network for Southeast Asia and beyond. *Int Breastfeed J*. (2021) 16:29. doi: 10.1186/s13006-021-00376-2
39. Hull R, Kam R, Gribble K. Providing breastfeeding support during the COVID-19 pandemic: concerns of mothers who contacted the Australian breastfeeding association. *Breastfeed Rev*. (2020) 28:25–35. doi: 10.1101/2020.07.18.20152256
40. Prudhon C, MacLaine A, Hall A, Benelli P, Harrigan P, Frize J. Research priorities for improving infant and young child feeding in humanitarian emergencies. *BMC Nutr*. (2016) 2:27. doi: 10.1186/s40795-016-0066-6
41. Smith J, Iellamo A. Wet nursing and donor human milk sharing in emergencies and disasters: a review. *Breastfeed Rev*. (2020) 28:7.
42. Kotlar B, Gerson E, Petrillo S, Langer A, Tiemeier H. The impact of the COVID-19 pandemic on maternal and perinatal health: a scoping review. *Reprod Health*. (2021) 18:10. doi: 10.1186/s12978-021-01070-6
43. Davenport M, Meyer S, Meah V, Strynadka M, Khurana R. Moms are not ok: COVID-19 and maternal mental health. *Front Glob Womens Health*. (2020) 1:1. doi: 10.3389/fgwh.2020.00001
44. Iyengar U, Jaiprakash B, Haitsuka H, Kim S. One year into the pandemic: a systematic review of perinatal mental health outcomes during COVID-19. *Front Psychiatry*. (2021) 12:674194. doi: 10.3389/fpsyt.2021.674194
45. Chmielewska B, Barratt I, Townsend R, Kalafat E, van der Meulen J, Gurol-Urganci I, et al. Effects of the COVID-19 pandemic on maternal and perinatal outcomes: a systematic review and meta-analysis. *Lancet Glob Health*. (2021) 9:e759–72. doi: 10.1016/S2214-109X(21)00079-6
46. Hendrix C, Werchan D, Lenniger C, Ablow J, Amstadter A, Austin A, et al. COVID-19 impacts on perinatal care and maternal mental health: a geotemporal analysis of healthcare disruptions and emotional well-being across the United States. *SSRN Electr J*. (2021). doi: 10.2139/ssrn.3857679
47. Lalor J, Ayers S, Celleja Agius J, Downe S, Gouni O, Hartmann K, et al. Balancing restrictions and access to maternity care for women and birthing partners during the COVID-19 pandemic: the psychosocial impact of suboptimal care. *BJOG*. (2021) 128:1720–5. doi: 10.1111/1471-0528.16844
48. Kisilevsky B, Hains S, Lee K, Xie X, Huang H, Ye H, et al. Effects of experience on fetal voice recognition. *Psychol Sci*. (2003) 14:220–4.
49. Schaal B, Marlier L, Soussignan R. Olfactory function in the human fetus: evidence from selective neonatal responsiveness to the odor of amniotic fluid. *Behav Neurosci*. (1998) 112:1438–49.
50. Michelsson K, Christensson K, Rothgänger H, Winberg J. Crying in separated and non-separated newborns: sound spectrographic analysis. *Acta Paediatr*. (1996) 85:471–5. doi: 10.1111/j.1651-2227.1996.tb14064.x
51. Bergman N. Birth practices: maternal-neonate separation as a source of toxic stress. *Birth Defects Res*. (2019) 111:1087–109. doi: 10.1002/bdr2.1530
52. Shannon J, Peters K, Blythe S. The challenges to promoting attachment for hospitalised infants with NAS. *Children*. (2021) 8:167. doi: 10.3390/children8020167
53. Erlandsson K, Dsilna A, Fagerberg I, Christensson K. Skin-to-skin care with the father after cesarean birth and its effect on newborn crying and prefeeding behavior. *Birth*. (2007) 34:105–14. doi: 10.1111/j.1523-536X.2007.00162.x
54. Huang X, Chen L, Zhang L. Effects of paternal skin-to-skin contact in newborns and fathers after cesarean delivery. *J Perinat Neonatal Nurs*. (2019) 33:68–73. doi: 10.1097/JPN.0000000000000384
55. Peng S, Zhang Y, Liu H, Huang X, Noble D, Yang L, et al. A multi-center survey on the postpartum mental health of mothers and attachment to their neonates during COVID-19 in Hubei Province of China. *Ann Transl Med*. (2021) 9:382–382. doi: 10.21037/atm-20-6115
56. Flacking R, Thomson G, Ekenberg L, Löwegren L, Wallin L. Influence of NICU co-care facilities and skin-to-skin contact on maternal stress in mothers of preterm infants. *Sex Reprod Healthc*. (2013) 4:107–12.
57. Glover V, Onozawa K, Hodgkinson A. Benefits of infant massage for mothers with postnatal depression. *Semin Neonatol*. (2002) 7:495–500. doi: 10.1053/siny.2002.0154
58. Norholt H. Revisiting the roots of attachment: a review of the biological and psychological effects of maternal skin-to-skin contact and carrying of full-term infants. *Infant Behav Dev*. (2020) 60:101441. doi: 10.1016/j.infbeh.2020.101441
59. Linde K, Lehnig F, Nagl M, Kersting A. The association between breastfeeding and attachment: a systematic review. *Midwifery*. (2020) 81:102592. doi: 10.1016/j.midw.2019.102592
60. Flannery D, Puopolo K. Perinatal COVID-19: guideline development, implementation, and challenges. *Curr Opin Pediatr*. (2021) 33:188–94. doi: 10.1097/MOP.0000000000000997



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Corrigendum: *First do no harm* overlooked: Analysis of COVID-19 clinical guidance for maternal and newborn care from 101 countries shows breastfeeding widely undermined

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In the published article, there was an error in [Figure 6](#) as published. China and Mongolia were shaded white when they should have been shaded gray and counted among the countries with “no recommendation made.”

The corrected [Figure 6](#) appears below.

In the published article, there was an error in [Figure 8](#). The 93 countries with “no recommendation made” should have been shaded gray instead of white.

The corrected [Figure 8](#) appears below.

In the published article, there was an error in [Figure 11](#) as published. The name of the country “South Sudan” was in the image when it should not have been.

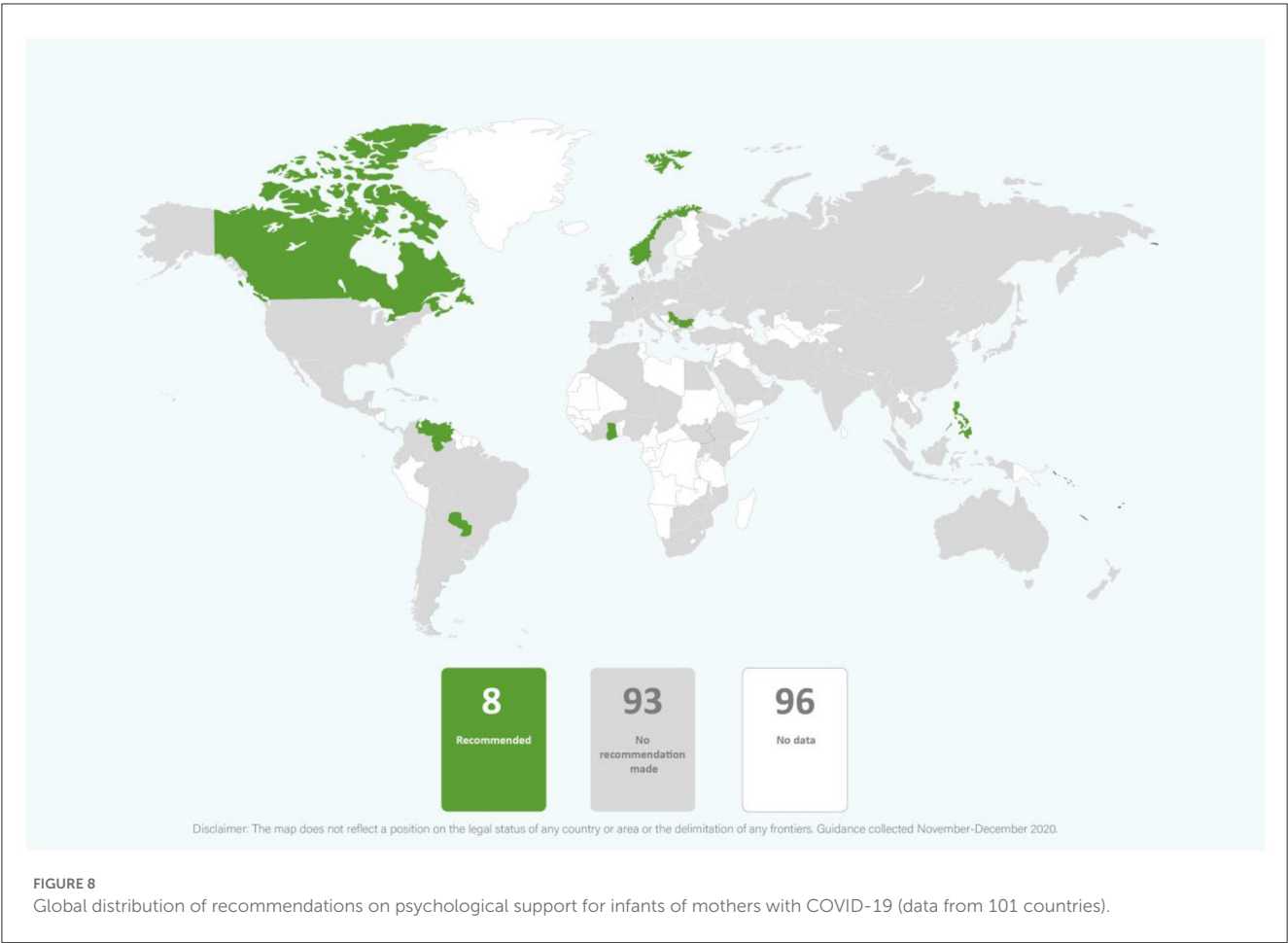
The corrected [Figure 11](#) appears below.

The authors apologize for these errors and state that this does not change the scientific conclusions of the article in any way. The original article has been updated.

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Cross-sectional multimedia audit reveals a multinational commercial milk formula industry circumventing the Philippine Milk Code with misinformation, manipulation, and cross-promotion campaigns

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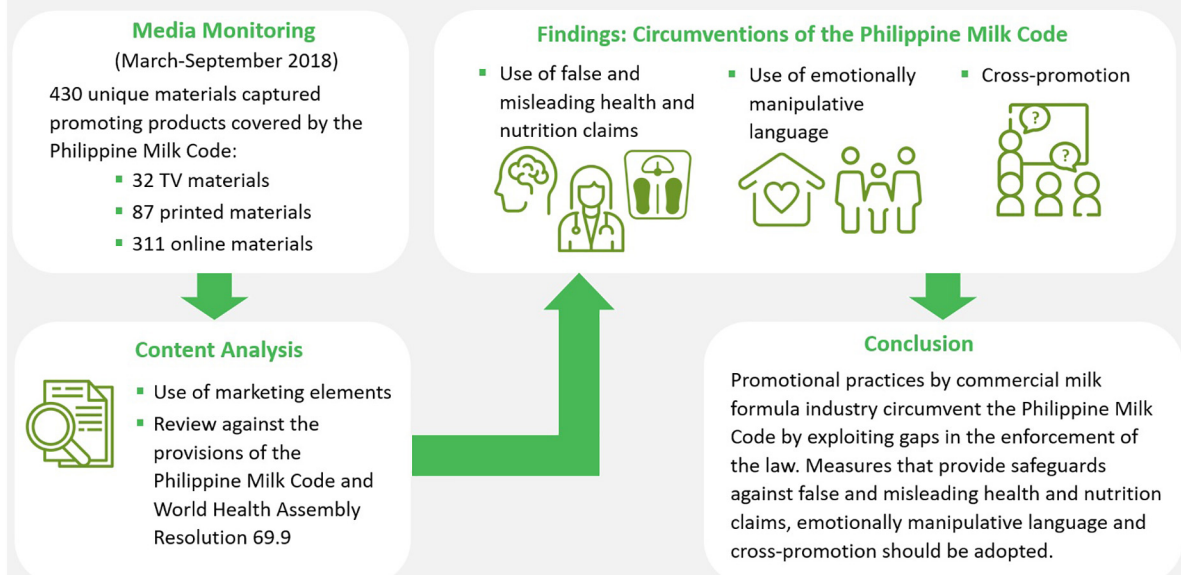
The Philippine Milk Code was enacted in 1986 to protect breastfeeding and reduce inappropriate marketing of breastmilk substitutes (BMS). The Philippine Milk Code is categorized as “substantially aligned” with the International Code of Marketing of Breast-milk Substitutes (“the Code”), but its provisions are assessed as relatively weak in prohibiting promotion to the general public. The extent to which violations of the Philippine Milk Code persist in traditional media platforms and in the digital space has not been systematically explored. This study employed a cross-sectional multimedia audit to examine the marketing and promotion of products under the scope of the Code, as well as those regulated by the Philippine Milk Code. Through a media monitoring conducted from March to September 2018, a total of 430 unique television ($n = 32$), printed ($n = 87$) and online ($n = 311$) promotional materials were identified. A coding tool was used to analyze the content, including the marketing elements used in the materials. Our findings show that commercial milk formula (CMF) for children ≥ 36 months old was the most promoted type of product ($n = 251$); and staging of events ($n = 211$), provision of special discounts or financial inducements ($n = 115$) and the use of taglines ($n = 112$) were the most used marketing elements. Promotion of CMF for children < 36 months old was uncommon, which supports the conclusion that there is broad compliance with the Philippine Milk Code in terms of the types of products promoted. However, analysis of marketing elements reveals that the CMF industry circumvents the Philippine Milk Code through the use of false and misleading health and nutrition claims, emotionally manipulative language in promotional materials, and cross-promotion. The findings indicate gaps in enforcement and regulatory measures that require urgent attention.

KEYWORDS

breastfeeding, commercial milk formula, content analysis, cross-promotion, inappropriate marketing, media monitoring, Philippines, the Code

Cross-sectional multimedia audit reveals a multinational commercial milk formula industry circumventing the Philippine Milk Code with misinformation, manipulation, and cross-promotion campaigns

Products covered: commercial milk formula (CMF) for children <36 months old, CMF for children ≥36 months old, CMF for pregnant women, other milk products and popular beverages, commercially available complementary food, and breastmilk substitute feeding accessories including feeding bottles and teats and pacifiers



GRAPHICAL ABSTRACT

Promotional materials for products under the scope of the Philippine Milk Code were examined using content analysis methods. The findings show evidence of circumventions of the Philippine Milk Code in modern and traditional media channels that exploit gaps in the legislation and its enforcement.

Introduction

Breastfeeding is a life-saving intervention that averts 595,379 deaths among children 0–23 months old each year (1). Globally, the economic cost of not breastfeeding is estimated at USD 574 billion annually or 0.7% of the global gross national income (1, 2). Aggressive marketing and promotion of breastmilk substitutes (BMS), a type of commercial milk formula (CMF) marketed as partial or total replacements for breastmilk for children 0–36 months of age, has played a significant role in undermining breastfeeding (3). The World Health Assembly (WHA) introduced the International Code of Marketing of Breast-Milk Substitutes (“the Code”) to protect breastfeeding and reduce inappropriate marketing of BMS, artificial feeding accessories such as bottles and teats, and complementary foods when marketed as a replacement for breastmilk (4). However, inappropriate marketing of BMS has continued and violations of the Code persist across the world (5).

The Philippines was among the first countries to adopt a national legislation on the Code through Executive Order No. 51 s. 1986 (EO51), or the National Code of Marketing of Breastmilk Substitutes, Breastmilk Supplements and Related Products, more commonly

known as the Philippine Milk Code. Revised Implementing Rules and Regulations (RIRR) were adopted in 2007 after a protracted legal battle against the formula milk industry (5). The Philippine Milk Code withstood several legal challenges (6, 7) and as of 2022, is still categorized as “substantially aligned” with the Code and is one of only 32 countries globally and one of the only two countries in Southeast Asia in this category (8). The Philippine Milk Code defines BMS as any food being marketed or otherwise presented “as a partial or total replacement of breastmilk” whether or not suitable for that purpose (9), thus not limiting its scope to any age group. Promotion of feeding accessories such as bottles and teats are also prohibited. In 2019, Republic Act (RA) No. 11148 or the First 1000 Days Act was enacted. Its provisions considered the WHA Resolution 69.9 recommendations to end the inappropriate promotion of food for infants and young children and defined BMS to include milk products “marketed for feeding infants and young children up to the age of three years” (10). This clarified that CMF for children younger than 36 months old are BMS. Products for children more than 36 months can be classified as BMS if they are marketed or otherwise presented as a partial or total replacement for breastmilk, in line with the scope of the Philippine Milk Code. The Philippine Milk Code has served as a strong legal basis for other supportive policies such as the Department of Health (DOH) Administrative Order 2007–0017, or the Guidelines on the Acceptance and Processing of Foreign and Local Donations during Emergency and Disaster Situations, which provides restrictions on donations of BMS during humanitarian emergencies (11). While the Philippine Milk Code’s provisions are strong in terms of scope, monitoring and enforcement, and in

Abbreviations: BMS: breastmilk substitute; CACF: commercially available complementary food; CMF: commercial milk formula; CMF-PW: commercial milk formula for pregnant women; DOH: department of health; EO51: executive order no. 51 s. 1986; GNP: gross national product; RA: republic act; RIRR: revised implementing rules and regulations; TV: television; TVC: television commercial; URL: uniform resource locators; WHA: World Health Assembly.

prohibiting promotion in healthcare facilities, they are relatively weak in prohibiting promotion to the general public and in prohibiting conflicts of interest in the health system (8).

In 2020, the size of the baby food market in the Philippines reached over USD 850 million, with sales of CMF products comprising 95% of the total market (12). In the last 15 years, minimal decline was recorded in the sales of formula products for children 0–12 months, but sales of formula milk for children 13–36 months and specialized formula significantly increased (13).

The prevalence of exclusive breastfeeding among all infants under 6 months of age is 57.9%, but by 6 months, only 35.1% of infants are still exclusively breastfeeding (14). Only 34.2% of infants continued to be breastfed up to 2 years (14). Every year, nearly 3 million avoidable cases of childhood diarrhea and pneumonia, 21,000 cases of Type 2 Diabetes in women, and 17,000 cases of childhood obesity are attributable to not breastfeeding according to recommendations in the Philippines and these translate to an annual economic loss of USD 16.3 million in health system costs and USD 2.3 billion due to cognitive losses associated with not breastfeeding (15).

Despite the strength of the Philippine Milk Code, violations persist in the country (16), including in the aftermath of humanitarian emergencies that occur with regularity. A sharp rise in reported violations in the Philippines during the early phase of the COVID-19 pandemic were among those highlighted in a recent multi-country study (17). The extent to which violations of the Philippine Milk Code persist in more traditional media platforms and in the digital space has not been systematically explored.

This study was conducted to examine the marketing and promotion of products under the scope of the Code, as well as the content of marketing and promotional materials regulated by the Philippine Milk Code. The findings support public health practitioners and others to identify and recommend appropriate policy actions to strengthen the implementation of the Philippine Milk Code, its implementing rules and regulations, and other related policies. The findings also contribute to the global evidence-base of persistent violations of the Code since its adoption and can be used to inform agenda setting and resolutions of the WHA.

Materials and methods

This is a cross-sectional study to examine data collected from a multimedia monitoring of promotional activities for products covered by the Philippine Milk Code from March to September 2018.

Products covered

The multimedia monitoring covered promotional materials for products under the scope of the Philippine Milk Code, including “infant formula; other milk products, foods and beverages, including bottled complementary foods, when marketed or otherwise represented to be suitable, with or without modification, for use as a partial or total replacement of breastmilk; feeding bottles and teats” (9). These include promotional materials for the following products:

- Breastmilk substitutes as defined in RA 11148, which are milk products marketed for children up to 36 months old (<36 months) (10). These products include CMF for children

0–5 months old, CMF for children 6–11 months old and CMF for children 12–35 months old.

- Other milk products, foods and beverages including CMF for children aged 36 months old or older (≥ 36 months), CMF for pregnant women (CMF-PW), milk products (in liquid or powder form) and other popular beverages (e.g., chocolate and malt drinks) marketed with no specific age range indicated, and commercially available complementary food (CACF).
- Breastmilk substitute (BMS) feeding accessories including feeding bottles and teats, and pacifiers.

Setting

The Philippines is a lower middle-income country (18) in Southeast Asia with gross national product (GNP) worth USD 394.1 billion in 2021 (19). The country's economy is driven by incomes from the services, industry, and agriculture, forestry and fisheries sectors (20) and is supported by strong labor market and consumer demand (21). In 2021, its population is estimated at 111 million (22). In 2020, 1.5 million live births were registered in the country (23). Rates of neonatal, infant and under-5 mortality rates were estimated at 12.6, 21.0, and 26.4 per one thousand live births, respectively (24). Functional literacy rate among Filipinos 10 to 64 years old was at 91.6% in 2019 (25). About 96.0% of Filipinos watch television (TV); 73.9 and 63.6% surf the internet for social media and for email or research works, respectively; and 63.3 and 73.2% read newspapers and magazines, respectively (26). About 130 languages are used in the Philippines (27) but Filipino is officially declared as the national language (28). English, which is widely spoken, is also considered as an official language in the country (28) and is commonly used as medium of instruction and business language.

Data collection

The identification of marketing materials included in the study was guided by the process employed in a media audit by Vinje et al. which covered promotion of products under the scope of the Code in Cambodia, Indonesia, Myanmar, Thailand, and Vietnam (29). A local, independent firm (Media Meter) was engaged to perform systematic monitoring of TV, print, and online media materials. A set of keywords was used to guide the capture of materials ([Supplementary Table 1](#)). The keywords included manufacturer/company, brand, and product names as well as general keywords that included “malnutrition” and type of food, bottles, and teats (e.g., infant formula, follow-up formula, growing-up milk).

Data collection took place from March to September 2018. Monitoring of TV, which covered major TV networks and identified cable channels was limited to “primetime” (6:00 to 9:00 am and 6:00 to 9:00 pm). For printed materials, monitoring covered publications in print including major newspapers, tabloids, and magazines. The monitoring of online materials covered online news and magazine sites, blog sites and other websites. Due to the limitations in the monitoring firm's capabilities, the monitoring did not include e-commerce sites or ad placements by online advertising platforms that display brief advertisements, service offerings, product listings, or videos to web users. Ad placements on social media platforms

and mobile apps were also not included. The monitoring attempted to capture related social media posts (user generated content) from Facebook, Instagram, and Twitter but restrictions due to privacy policies limited the collection of content on these platforms. Therefore, social media content was not included in this study.

Materials captured from TV (video clips) and printed publications (scanned copies) were digitally archived and stored for content accessibility. For online content, the specific uniform resource locators (URL) where the captured content was found were recorded. Digital archiving of internet-based material was conducted. However, some links were found to be inactive or have errors in content (broken links) during follow-up.

All the materials were reviewed and manually coded by researchers who are fluent in English and Filipino, the two languages commonly used in media materials in the Philippines. For materials written in other languages, Google Translate was utilized to translate the materials to English.

Data analysis

Conceptual analysis of materials was done using a coding tool developed and adapted from Zhao et al. (30) and Berry and Gribble (31), which are both based on content analysis methods. The coding tool included the following categories:

1. General information—documents product details: manufacturer or company name, brand or product name, and type of product.
2. Type of material—identifies if the material is a regular advertisement (TV commercial for TV, ad placement for print), news/feature article for print and online, or news/lifestyle program for TV, user generated content-blogs (for online), advertorial.
3. Marketing information or reference—information included in the materials for accessing the product or information about the product: retail outlet location, hotline number, and online access details such as website, email address and social media page.
4. Marketing elements—identifies the marketing techniques used in the material: special price or discount, voucher, free product sample, contest, event, corporate social responsibility or advocacy, availability for online purchase, free delivery, use of logo or tagline.
5. Emotional appeal—documents strategies used to engage feelings of the viewer: use of imagery such as celebrities, mascots, character representation (e.g., happy family), fictional or cartoon characters.
6. Rational appeal—includes strategies to engage reasoning of the viewer: health claims, nutrition claims, quality assurance claims, scientific recommendations, importation claims and promotional offers.

To determine potential violations and inappropriate marketing and promotion of products, the content of materials was analyzed against the provisions of the Philippine Milk Code and its RIRR (Table 1) and with WHA Resolution 69.9 recommendations. For the materials discussing events, the content was analyzed for the promotional elements used during the activity (as described in the

TABLE 1 Key provisions of the 2006 revised implementing rules and regulations of the Philippine Milk Code.

Rule 5 – Advertising, promotion, marketing, and sponsorships
<p>Section 13. "Total Effect." Promotion of products within the scope of this Code must be objective and should not equate or make the product appear to be as good or equal to breastmilk or breastfeeding in the advertising concept. It must not in any case undermine breastmilk or breastfeeding. The "total effect" should not directly or indirectly suggest that buying their product would produce better individuals, or resulting in greater love, intelligence, ability, harmony or in any manner bring better health to the baby or other such exaggerated and unsubstantiated claim.</p>
<p>Section 15. Content of Materials. The following shall not be included in advertising, promotional and marketing materials:</p> <p>a. Texts, pictures, illustrations or information which discourage or tend to undermine the benefits or superiority of breastfeeding or which idealize the use of breastmilk substitutes and milk supplements. In this connection, no pictures of babies and children together with their mothers, fathers, siblings, grandparents, other relatives or caregivers (or <i>yayas</i>) shall be used in any advertisements for infant formula and breastmilk supplements;</p> <p>b. The term "humanized," "maternalized," "close to mother's milk" or similar words in describing breastmilk substitutes or milk supplements;</p> <p>c. Pictures or texts that idealize the use of infant and milk formula.</p>
Rule 6 – Prohibited acts
<p>Section 16. All health and nutrition claims of products within the scope of the Code are absolutely prohibited. For this purpose, any phrase or words that connote to increase emotional, intellectual abilities of the infant and young child and other like phrases shall not be allowed.</p>
<p>Section 17. False or misleading information or claims of products within the scope of the Code are prohibited.</p>
<p>Section 19. Manufacturers, distributors and marketing firms or representatives of products within the scope of this Code are prohibited from donating or giving directly or indirectly, samples and supplies to any members of the general public, to hospitals, and other health facilities, including their personnel and members of their families.</p>
<p>Section 20. Manufacturers, distributors and marketing firms or their representatives of products within the scope of this Code are prohibited from using the health workers and the healthcare system in the dissemination, distribution and promotion of products within the scope of the Code.</p>
<p>Section 21. Gifts of any sort from milk companies/manufacturers, distributors, and representatives of products within the scope of this Code, with or without company name or logo or product or brand name shall not be given to any member of the general public, to hospitals and other health facilities, including their personnel and members of their families.</p>
<p>Section 22. No manufacturer, distributor or representatives of products covered by the Code shall be allowed to conduct or be involved in any activity on breastfeeding promotion, education and production of information, education and communication (IEC) materials on breastfeeding, holding of or participating as speakers in classes or seminars for women and children activities and to avoid the use of these venues to market their brands or company names.</p>
<p>Section 23. There shall be no point-of-sale advertising, giving of samples or any promotion devices to induce sales directly to the consumers at the retail level, such as special displays, discount coupons, premiums, rebates, special sales, bonus and tie-in sales, loss-leaders, prices or gifts for the products within the scope of this Code.</p>

materials), such as the presence of celebrities, distribution of free samples, discounts for participants and other promotional offers during the event.

Results

A total of 5,798 materials were captured within the monitoring period. Materials screened included 3,806 TV materials, 349 print

materials, and 1,643 pieces of online content. **Figure 1** illustrates the screening of materials for inclusion in the analysis. Overall, 430 unique marketing materials were identified for analysis. Most captured materials were in English, Filipino, or a combination of both. Only five, all of which were online materials, were written in another language (Cebuano).

Promotion by type of product

Of the 430 unique materials captured across multimedia, 379 promoted CMF and milk products and other beverages with no specific age range indicated. Of the 379 materials, CMF for children ≥ 36 months old was the most commonly promoted type of product (66.2%) (**Figure 2**). Fourteen percent mentioned only the manufacturer's name and did not mention any specific product being promoted while 10.0% promoted other milk products and beverages marketed with no specific age range indicated. Promotion of CMF-PW were found in 8.2% of these materials while 1.9% included promotion for CMF for children <36 months.

For CACF promotion, 39 unique materials were captured, all of which promoted Nestle products.

For BMS feeding accessories, 19 unique materials were found promoting 12 brands of feeding bottles and teats and 3 brands of pacifier. Two materials mentioned only the names of bottles and teats manufacturers and two other materials promoted the use of pacifiers but did not mention a particular brand.

Mass media coverage

Of the 430 unique materials captured for monitoring, online media had the highest share of unique content (72.3%), followed by print materials (20.2%) and TV (7.4%). **Table 2** presents the types of products promoted across media channels monitored.

Television

The 32 unique TV materials captured in the monitoring aired on seven different TV channels and included 26 TV commercials (TVCs) and six video clips from news and lifestyle TV programs.

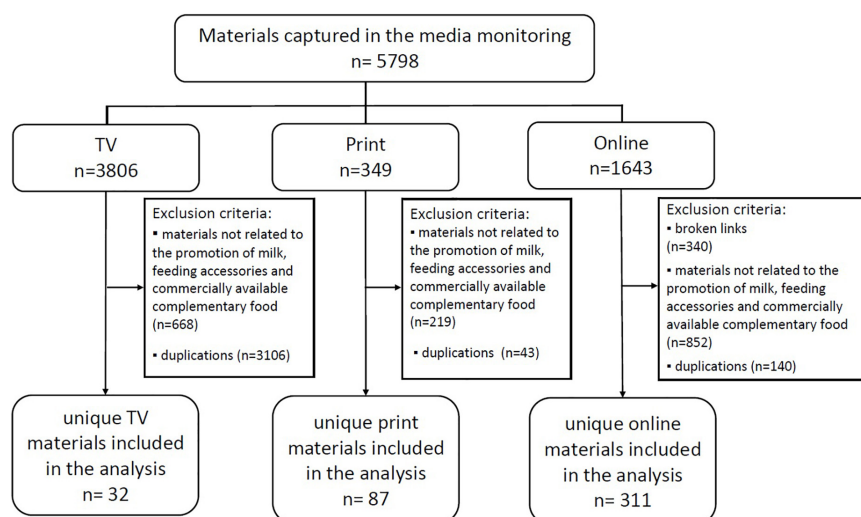


FIGURE 1

Methods process flow for the identification of unique TV, printed, and online materials for detailed analysis.

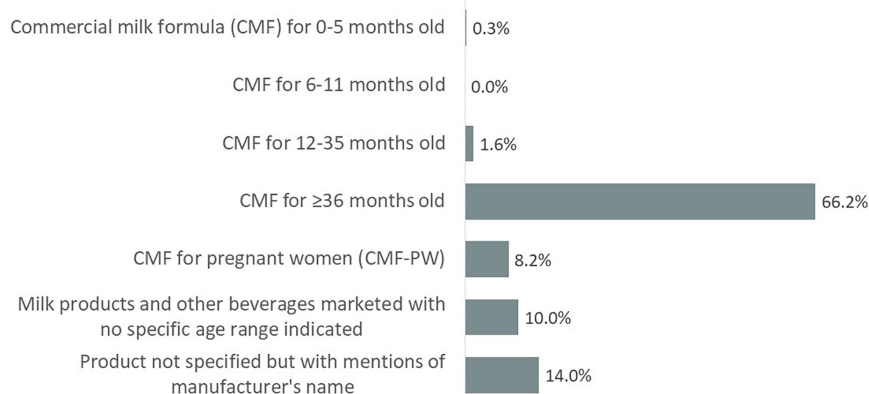


FIGURE 2

Distribution of CMF and milk products and other beverages marketed with no specific age range indicated promotion in unique materials ($n = 379$).

TABLE 2 Number of unique materials by the type of product across multimedia platforms monitored.

Type of product	TV (<i>n</i> = 32)	Print (<i>n</i> = 87)	Online (<i>n</i> = 311)	Total (<i>n</i> = 430)
Commercial milk formula (CMF) and milk products and other beverages marketed with no specific age range indicated	31	78	270	379
CMF for 0–5 months old	0	0	1	1
CMF for 6–11 months old	0	0	0	0
CMF for 12–35 months old	4	1	1	6
CMF for ≥ 36 months old	26	50	175	251
CMF for pregnant women (CMF-PW)	0	11	20	31
Milk products and other beverages marketed with no specific age range indicated	0	11	27	38
Product not specified but with mentions of CMF/milk product manufacturer's name	1	11	41	53
Commercially available complementary food (CACF)	1	8	30	39
Cerelac (Nestle)	1	8	29	38
Gerber (Nestle)	0	0	1	1
Breastmilk substitute (BMS) feeding accessories	0	1	18	19
Bottles and teats	0	1	14	15
Pacifiers	0	0	5	5
Product not specified but mentions BMS feeding accessory manufacturer's name	0	0	2	2

Words in bold indicate product category. Values in bold indicate number of unique materials per product category.

CMF for children ≥ 36 months was the most commonly promoted product on TV (26 unique materials). Four materials promoted CMF for children 12–35 months old. There was one material which promoted a CACF product manufactured by Nestle. No TV material for BMS feeding accessories was captured in the monitoring. Of the 26 TVCs, promotions for Nestle accounted for 73% (19/26), followed by Abbott at 15% (4/26) and Reckitt at 12% (3/26). The other six materials which were presented as segments of news and lifestyle programs promoted Nestle products.

Print

Of the 87 captured unique print materials, 15 (17%) were ad placements and 72 (83%) were presented as either news reports or feature articles. Eleven of the 15 ad placements were advertisements of supermarket chains operating under SM Retail, Inc. (Pasay City, Philippines), [SM Supermarket (*n* = 4), SM Hypermarket (*n* = 4) and Savemore (*n* = 3)], which featured CMF and milk products and other beverages marketed with no specific age range indicated along with other products that they offer (an example of this supermarket advertisement is shown in [Supplementary Figure 1](#)). Three ad placements were found to promote events co-sponsored by milk manufacturers. CMF for children ≥ 36 months was the most promoted type of product, which was found in 57% (50/87) of the unique printed materials. Eight printed materials promoted a CACF brand from Nestle and one material promoted a brand of bottles and teats. Nestle had the most promotions in print (87% or 76/87).

Online

A total of 311 unique online promotional materials were captured in the media monitoring. Most of the products promoted were brand variants of CMF for children ≥ 36 months, which were found in 58.5% (182/311) of the unique online materials analyzed. Promotion for Nestle was found in 82.3% (256/311) of the materials and promotion for Nestle's brands of CMF for children ≥ 36 months was collectively present in 49.8% (155/311) of the materials. Promotion of milk

products and other beverages marketed with no specific age range indicated was seen in 10.9% (34/311) of the materials.

Twenty-nine of the 30 CACF online materials captured promoted Cerelac, a brand from Nestle. One material promoted another CACF brand from Nestle but it was directed to an audience overseas. All 20 online materials captured for CMF-PW were promoting a single brand from Nestle. There were also 18 unique materials for BMS feeding accessories which promoted 14 unique products. By type of material, 210 were user-generated content in the form of blogs and 97 were online news and lifestyle feature articles. Four were advertorials or content disclosed as being paid or sponsored content.

Overall, promotion on primetime TV was the most extensively utilized through airing of TVCs. While there were only 26 unique TVCs captured, they were broadcast 3,132 times during the period covered, showing the use of repetition as a marketing technique. The majority of TVCs were aired on ABS-CBN Channel 2 (*n* = 1,231) and GMA 7 (*n* = 1,859), two major TV channels operating on free TV at the time of the media monitoring. While each TVC ran for 15–60 s, collectively all TVCs captured in the monitoring had a total running time of 78,390 s. The high number of unique materials captured from various websites and blog sites likewise show widespread promotion online.

Promotional content

Marketing information

Materials reviewed commonly contained guidance on how to access online information about the products. Among the 32 TV materials, two included the product websites, another two gave keywords for an online search to get more information about the product, and three others provided links to related social media pages. For print, 11 advertisements of supermarket chains operating under SM Retail, Inc. (Pasay City, Philippines), which featured CMF products and other milk and beverages included links to SM Markets website. The website presented listings of promotions

offered and available goods for sale. However, there were no specific manufacturer nor products' direct marketing information shared in these supermarket ads. Seventeen printed news and feature articles included the company or product website or social media page, or websites of e-commerce platforms where the products can be purchased. For online, about 37.9% (118/311) of materials reviewed provided links to websites for accessing more information about products. These included 63 links to Lazada and Shopee websites, two of the largest e-commerce platforms in the country where consumers can purchase the products.

Two TV and three online materials provided phone numbers to call for product information. Names of physical stores where products retailed were included in eight online materials while two TVCs mentioned availability of products in "suking tindakan," or neighborhood stores.

Marketing elements

The materials reviewed showed a variety of promotional tactics aimed at engaging consumers. A strategy could include more than one marketing or promotional element. [Table 3](#) lists the frequency of these marketing elements across multimedia as seen in the review.

Events

Staging events was the most frequent ($n = 211$) marketing element used across multimedia. A series of events with a single theme to promote a particular brand were reported in a number of print feature articles and online postings (feature articles or blogs) over the review period. An example is the series of events for Nestle's Promil Four i-Shine Talent Camp which promoted a brand of CMF for children ≥ 36 months. Our monitoring captured a total of 15 feature articles from printed publications, 31 online postings, and 5 TV materials about the i-Shine Talent Camp across 5 months (examples of these materials are shown in [Supplementary Figure 2](#)). Other examples were the (a) Grow Happy Nation events for a Nestle brand of CMF for children ≥ 36 months, which offered interactive activities for parents and children (featured in 4 print and 23 online materials released in 4 different months); (b) parenting events promoting another Nestle brand of CMF for children ≥ 36 months (presented in 4 print and 19 online materials captured in five consecutive months); and (c) Let's Eat Bulilit campaign activities to promote a Nestle CACF product including participation by parents and their kids (found in 3 print and 15 online materials published within five consecutive months). Some materials that featured events also featured celebrities (4 TV materials, 23 print materials, and 84 online materials). There were materials promoting events co-sponsored or supported by milk manufacturers, such as a commemorative activity in a local government unit, a micro entrepreneur convention, and a raffle promo of a supermarket chain.

Special pricing/discounts/financial inducements

Offers of special pricing or discounts were also commonly included in materials reviewed. Among the TVCs, there were two materials promoting brands of CMF for children ≥ 36 months that advertised a suggested retail price for product size variations. For print, 12 ads as well as 13 news and feature articles included promotional discounted prices. About 92% (23/25) of these promoted CMF for children ≥ 36 months. For online, 88 materials featured special prices or discounts. About 78% (69/88) of these were for products classified as CMF for children ≥ 36 months while 14% (12/88) mentioned only the milk manufacturer/company names and

did not specify products for which the special prices or discounts apply. Five online materials advertised discounts for BMS feeding accessories. One blog posted about a special deal for a brand of CMF for children 0–5 months and one CACF brand, but it was directed to an audience overseas. Around 68% (60/88) of the online materials which included special prices or discounts were part of promotional content of e-commerce platforms Shopee and Lazada. Information on the availability of products for online purchase (e.g., availability in Shopee or Lazada) was also identified in 70% (62/88) of online materials.

Logos and taglines

In all the captured unique TVCs ($n = 26$), product shots and logos were prominently visible. For print materials, 14 of the 15 ad placements utilized product shots or logos. Among the 311 online materials, logos were visible in 28 materials. Company or brand logos could be part of the promotional materials for an event, a stock image used by the content producer or writer, or photograph of the actual product. News and feature articles from online platforms were largely written in text, whereas user generated content by bloggers usually featured their own pictures or stock images. Taglines were used in 31 TV, 11 print, and 70 online materials. [Table 4](#) lists the taglines of products found in the materials.

Emotional appeal

Among the TVCs, the most commonly employed strategy was having celebrity endorsers ($n = 7$) and brand jingles ($n = 7$). Images of a happy family were shown in four materials. Two fictional or cartoon characters were also used among the TVCs—one was a bear for promoting one of Nestle's CACF product, and the depiction of the "Batang May Laban (Strong Kid)" for a Nestle's brand of CMF for children ≥ 36 months. A mascot, the Nestle blue bear, was also featured in one TVC.

About 37% (32/87) and 32.1% (100/311) of print and online materials, respectively, featured celebrity endorsers. The same celebrities were commonly featured in multiple materials on multiple channels. For example, a celebrity who was a new father was featured in 22 marketing exposures (1 TVC, 4 print and 17 online materials) for a Nestle's CACF product. In nine of these materials, the father was shown alongside his baby. One material described that the father was chosen to be the face of the brand because "he is a certified millennial parent aspiring to be the best dad ever."

There were also those which featured more than one celebrity in a single promotional material, such as a blog entry about a parenting event for the promotion of one of Nestle's brand of CMF for children ≥ 36 months, which featured five celebrities who are all mothers to pre-school children. There was also a pre-school age brand ambassador for one of Nestle's brand of CMF for children ≥ 36 months, who is the child of a celebrity couple and has significant social media following. For one of Nestle's brands of CMF for children ≥ 36 months, a famous composer and musician was engaged for their campaign about nurturing children's talents.

The use of mascots (or brand character) was among the least observed marketing tactics in this review. Only six materials (1 TVC and 5 online materials) employed the use of a brand character, which were all for the promotion of one Nestle CACF brand. The brand character was shown in the materials from pictures of the product packaging or in photographed appearance of the mascot in events. Pictures of family members or children with or gathered around the products were also observed in 49 materials, which were

TABLE 3 The number of used marketing elements in unique materials across multimedia platforms monitored.

Marketing element	TV (<i>n</i> = 32)	Print (<i>n</i> = 87)	Online (<i>n</i> = 311)	Total (<i>n</i> = 430)
Event	6	45	160	211
Special price/discount/financial inducement	2	25	88	115
Tagline	31	11	70	112
Logo/product shot	26	14	28	68
Available for online purchase	0	5	62	67
Others (Contests, free product sample, free item, interactive game, free delivery, corporate social responsibility activity)	1	7	36	44

TABLE 4 List of products and taglines in promotional materials captured in media monitoring.

Manufacturer/company	Brand/product	Tagline
Abbott	PediaSure Plus (CMF for ≥ 36 months)	• See visible growth in just 8 weeks
	New Similac GainSchool (CMF for ≥ 36 months)	• Strong immunity for faster learning
FrieslandCampina/Alaska Milk Corporation	Alaska Powdered Milk Drink (CMF for ≥ 36 months)	• <i>Wala pa ring tatalo sa Alaska</i> (still nothing beats Alaska)
Reckitt/Mead Johnson	Enfagrow A+ Four (CMF for ≥ 36 months)	• Help nourish your child's greatness right from the very start • For the IQ and EQ advantage
	Lactum 3+ (CMF for ≥ 36 months)	• <i>Ibang Level BIBO Kid</i> (Higher Level, ACTIVE Kid) • #FunMealTimeTransformation
Nestle	Bear Brand Fortified Powdered Milk (CMF for ≥ 36 months)	• <i>Para ang Tibay Always Present</i> (Endurance Always Present) • <i>Mag-Bear Brand Araw-Araw</i> (Bear Brand Everyday) • <i>Magcocotumbas sa Tibay!</i> ("Magcocotumbas" in Endurance) • <i>Pinipili ang Napatunayan, Bear Brand Araw-araw</i> (choosing what was proven, Bear Brand everyday)
	Nankid Optipro Four (CMF for ≥ 36 months)	• Help reshape your child's future today/#ReShapeTheFuture
	Nestokid 4/Nestogrow4 (CMF for ≥ 36 months)	• Grow happy Shalalala
	Nido Advanced Protectus 3+ (CMF for ≥ 36 months)	• Love that protects
	Nido Fortigrow (CMF for ≥ 36 months)	• Your love. Their future.
	Cerelac (CACF)	• <i>Let's Eat Bulilit!</i> (let's eat, little one!)
	Bonakid Pre-School 3+ (Nestle) (CMF for ≥ 36 months)	• <i>Pag 3-Pataas, Mag-Bonakid Pre-school 3+ ; Batang Matatag, Batang may Laban</i> (For 3 years old and above, Bonakid Pre-school 3+; strong child, child who has fighting chance)
	Promil Four (Nestle) (CMF for ≥ 36 months)	• Nurture the gift
	Promil Gold Four (Nestle) (CMF for ≥ 36 months)	• Advance today's gift

mostly pictures of bloggers themselves with their children and other participants of the events they attended.

Rational appeal

All the TVCs reviewed, including promotion of CMF for children ≥ 36 months (*n* = 17) and milk products and other beverages marketed with no specific age range indicated (*n* = 4), contained health and nutrition claims. However, the materials for the four milk products and one CACF marketed for toddlers below 36 months only contained information on its suggested retail price, packaging sizes, flavor variants, and retail outlets.

Among the print and online materials, not all included health or nutrition claims. For example, the supermarket advertisements among the printed materials only featured product shots and information on prices. Articles about sales promotions, discounts, co-sponsorship of events, in print and online, also did not include health or nutrition claims. But health and/or nutrition claims were found in 32.2% (128/398) of the print and online materials (60 for CMF for children ≥ 36 months, 20 for milk products and other beverages marketed with no specific age range indicated, 25 for CMF-PW, 17 for CACF, 6 for BMS feeding accessories). Table 5 lists examples of health and nutrition claims for CMF for children ≥ 36 months, milk products and other beverages marketed with no specific age

range indicated and CACF in TV, print and online materials. Note that as was the case with the TV materials, there were no materials claiming health and nutrition benefits for milk products marketed for children < 36 months. Table 5 also lists health benefit claims related to BMS feeding accessories, as identified in print and online materials. And although there were only six materials captured with claimed benefits for BMS feeding accessories, the materials presented different products across eight brands.

For the materials promoting CMF for children 12–36 months, four provided information on the introduction of variants' new package sizes and corresponding suggested retail price while another ad announced a new formulation. None used any other marketing element nor mentioned health or nutritional claims.

Cross-promotion

Marketing elements used in the promotional materials were further examined to detect cross-promotion (Supplementary Table 2). There is cross-promotion when promotional elements of a CACF or beverage appear very similar to those of the company's range of CMF products for < 36 months, effectively promoting the latter.

TABLE 5 Examples of product benefit claims in unique promotional materials.

Health claims in materials promoting CMF for children ≥36 months and CACF					
Functional processes		Growth and development effects		Physiological process or outcome	Protection against disease
<ul style="list-style-type: none">• Easier digestion• Facilitates energy release from food• Contributes to normal function of the immune system• Helps develop beneficial intestinal microflora• Aids in better calcium absorption• Fast absorption of nutrients		<ul style="list-style-type: none">• Supports your child's growing needs• Supports overall growth and development• Helps strengthen immunity• Faster growth and development• Makes sure bone growth is normal and consistent• Support your child's cognitive and emotional development• Helpful for growth and mental development• Important building block for brain and eye development• Support mental and physical development• Boosts not just intelligence but all 8 signs of brain development• Helps to support age-appropriate weight gain and development• Helps strengthen the immune system• Supports brain and eye development		<ul style="list-style-type: none">• Provides gut comfort• Help kids reach ideal height and weight• Supports a healthy digestive system• Helps perform well in school• Helps improve digestive health• Strengthens tummies to provide better digestion	<ul style="list-style-type: none">• Helps protect against infections• Scientifically proven to help support your child's respiratory defenses• To help reduce the risk of obesity of your kid later in life• Helps prevent micronutrient deficiency
Nutrition claims in materials promoting CMF for children ≥36 months, milk products and other beverages marketed with no specific age range indicated and CACF					
Protein	Mineral	Carbohydrates	Fat	Biologically active ingredients	Others
<ul style="list-style-type: none">• High quality protein• High quality, lower quantity protein• Triple protein complex• Added whey protein	<ul style="list-style-type: none">• More bioavailable Calcium• 2.5× more Vitamin D• Fortified with iron and zinc	Human milk oligosaccharides	<ul style="list-style-type: none">• Lecithin• Milk fat globule membrane• DHA• DHA and ARA	<ul style="list-style-type: none">• Naturally rich in antioxidants• Bifidus BL• L. comfortis• Probiotics/prebiotics• <i>L. rhamnosus</i>	<ul style="list-style-type: none">• No sugars, no additives• Nutrient dense with no preservatives• Contains 1/3 of a child's daily energy requirements• Nutrisentials– combination of unique and important nutrients• No added sucrose
Benefit claims in materials promoting breastmilk substitute feeding accessories					
<ul style="list-style-type: none">• Promotes natural latch on• Minimizes nipple confusion• Lessens milk backflow and therefore mid-ear complications• Material that is closest to human skin• Has no open pores to harbor bacteria• No drip air vent helps prevent colic• Allows natural tongue movement• Anti-colic• Minimizes swallowed air and prevents gas				<ul style="list-style-type: none">• Adapts to child's palate for natural drinking experience• Approved by the oral health foundation• Promotes correct mouth development• Ergonomic and encourages correct neck positioning• BPA free• Allows easy grip• Non-toxic• Heat resistant up to 180 degrees Celsius• Protects against germs–nipple pops back into protective bubble when it falls	

Figure 3 presents images of eight milk products from the materials analyzed. The products on the left were marketed as CMF for children 12–35 months, and the respective products on the right are CMF for children ≥ 36 months produced by the same manufacturer. It is noticeable how similar the packaging, branding, and labeling of the specific CMF product for 12–36 months to the corresponding CMF for children ≥ 36 months.

There were only five promotional materials for CMF for children 12–35 months identified across the multimedia platforms

monitored. The four CMF for children ≥ 36 months included in Figure 3 had a total of 95 product mentions in unique promotional contents across multimedia platforms monitored. Various marketing techniques were utilized in the promotion of the materials, including the use of health and nutrition claims. Further, 12.3% of all promotional materials carried only the name of the milk manufacturer or company, which indirectly promoted all the products the companies manufacture, including CMF for children < 36 months. The media monitoring also documented promotions of CMF-PW manufactured by



FIGURE 3

Images of eight products from the reviewed materials showing cross-promotion through similar packaging, branding, and labeling of CMF for children less than 36 months old (left) and CMF for children 36 months or older (right).

Nestlé. Marketing of CMF-PW presents opportunities for cross-promoting other types of CMF, including CMF for children <36 months.

Discussion

This study was conducted to examine the marketing and promotion of products under the scope of the Code and to analyze the content of promotional materials regulated by the Philippine Milk Code through a media monitoring. The distribution of promotional materials captured in the media monitoring, in which only one of 430 unique materials was found to promote CMF for children 0–6 months, is consistent with a global trend in CMF market growth which is increasingly driven by sales of products marketed for children 12–36 months (32, 33). This finding may initially be considered as a reflection of this trend rather than as evidence of local enforcement of the Philippine Milk Code. However, the relative absence of promotion for CMF for children <36 months compared with CMF for children ≥36 months in this study supports the conclusion that there is broad compliance with the Philippine Milk Code in terms of the types of products promoted.

However, analysis of marketing elements of materials reveals how companies circumvent the Philippine Milk Code through false and misleading health and nutrition claims and the use of emotionally manipulative strategies in promotional materials. The Philippine Milk Code prohibits the use of false or misleading information or claims for products within its scope (34). The use of health and nutrition claims was not seen in materials promoting CMF for children <36 months but was extensively used in promoting CMF for children ≥36 months. The use of emotional and aspirational approaches in product promotion, a known practice by formula milk companies (35), was also observed in this review. Language that evokes emotional connection to the brand, such as the use of taglines

about love, happiness and nurturing children's gifts and future, were used in the materials promoting CMF for children ≥36 months. Endorsement of products by celebrities, or the TVCs depicting scenes that mirror ideal life situations and casting actors to whom the target market can easily relate with, evoke consumers' aspirations of a good life or better future for their children and family. The use of false or misleading information or claims and of emotionally manipulative strategies are established exploitative marketing approaches (35) even if the latter is not explicitly prohibited by the Philippine Milk Code. Coupled with the common use of brand-based marketing, the net effect can also be considered cross-promotion from CMF for children ≥36 months to CMF for children <36 months. CMF for children ≥36 months was the most promoted in all media and its constant and ubiquitous promotion normalizes the use of CMF and undermines breastfeeding. This is evidence of a gap that requires urgent attention by both implementers of the Philippine Milk Code and policymakers at the level of the DOH and the legislative bodies.

Despite the Philippine Milk Code having been assessed as strong in terms of required and prohibited content in labeling and promotional material for CMF and related products (8), we found that TVCs and print ads for CMF for children 12–36 months contained no statements on the benefits and superiority of breastfeeding as required by Section 5 of the Philippine Milk Code. We also observed that TVC voice-over of statements such as “Use of milk supplements must only be upon the advice of a health professional,” and “Unnecessary and improper use may be dangerous to the child's health” were sped up to fit into TVCs' running time, severely compromising viewer comprehension of the message.

Further, for CMF for children ≥36 months, disclosure statements provided merely read “it is not suitable for infant feeding and is not a BMS.” The use of this disclosure statement is unclear as “infant” is commonly defined as a child within the age range of 0–12 months, and some might take to mean that the product is also suitable for feeding children between 12 and 35 months old. For CACF, disclosure statements read “It is not a BMS. Infants 6 months

onward should be given fresh, indigenous, and natural foods in combination with breastfeeding.” There is generally no supportive messaging on recommended infant and young child feeding as these are not explicitly required by the Philippine Milk Code.

Findings of a study commissioned by the National Nutrition Council indicate that Cerelac, the brand promoted in 38 of the 39 CACF materials captured in the monitoring, is commonly fed to Filipino infants with some being introduced to the product even before they reach 6 months of age Gordoncillo et al. (36). Our findings show the use of health and nutrition claims and the use of pictures of a father together with a baby in the promotion of this product. The WHA 69.9 guidance document has pointed out that inappropriate marketing of CACF can mislead and confuse caregivers about the products’ nutrition and health-related qualities and about their age appropriateness and safe use (37). It can also lead caregivers to think that family foods are inadequate and create product dependency (37).

This study also documented promotions of BMS feeding accessories and the use of various benefit claims which idealize the use of these products. Such promotions normalize bottle feeding and undermine breastfeeding.

The Philippine Milk Code prohibits promotion through financial inducements at retail level. While evidence of such inducements was found for the promotion of CMF for children ≥ 36 months, coverage of these products by the Philippine Milk Code is still subject to case-by-case deliberation and this gap can be capitalized for inappropriate promotion.

Company hosting of or publicized participation in events is a common strategy seen in this analysis. Holding of events to promote products is closely linked to experiential marketing, a marketing technique which encourages consumer interaction and product trial (38). These events create opportunities for other forms of promotion that violate the Philippine Milk Code’s prohibitions on the giving, directly or indirectly, of samples and supplies of products within its scope, or gifts of any sort to any member of the public (9); and prohibitions against distribution by manufacturers or distribution of any gifts or articles or utensils that may promote CMF for children < 36 months to pregnant women or mothers of infants (9). The Philippine Milk Code, however, does not explicitly prohibit contact with mothers and caregivers, and this is an acknowledged gap in the legislation (8). Hosting of events by CMF companies targeting participation of health workers is well documented (35) but the use of experiential marketing involving direct participation of parents, caregivers and children is a trend that should be closely monitored for possible use as venues for inappropriate marketing of products covered by the Code. We also found promotional materials documenting activities that may not have been directly initiated by CMF manufacturers but are nonetheless prohibited by the Philippine Milk Code. Examples included a supermarket chain announcing special prices for products within the scope of the Philippine Milk Code, a private company’s event with co-sponsorship from a milk manufacturer during which the latter distributed co-branded “giveaways,” and a local government unit activity that was co-sponsored by a milk manufacturer. These would be considered non-advertising promotion activities (37). It is not possible to ascertain from the gathered materials whether any of the promotional material used in the documented activities was evaluated by the relevant authorities.

We found evidence of circumventions of the Philippine Milk Code that proliferate in the digital space. Blog posts of individuals or

celebrities, which include photographs of children with the product, can be considered violations of the Philippine Milk Code which prohibits the use of images (such as infants/children together with mothers) that may discourage or undermine breastfeeding or idealize the use of CMF and bottle-feeding.

Other possible violations of the Philippine Milk Code overlap in digital platforms. For example, bloggers covering the same events that involve CMF manufacturers used identical wording in their posts. At least eight bloggers posted about a Nestle event in May 2018, with the same title and text for all their posts (including unsubstantiated health and nutrition claims) suggesting that the postings were coordinated. This is in line with recent documentation of CMF companies engaging social media influencers including “mommy bloggers” to promote their products online, with some utilizing digital marketing techniques to reach pregnant women and mothers to influence their infant feeding decisions (39, 40). Only two of the 117 blog sites captured in the monitoring had disclosure statements about sponsored content. This type of Philippine Milk Code circumvention is not only restricted to bloggers but also to news publication outlets with both print and online formats. While many of the news and feature articles online and in print appear to be “advertorials” or sponsored content, only four articles gave such disclosures. This is a clear enforcement gap that is not currently addressed by the Philippine Milk Code.

This study is one of few to explore the content of marketing and promotional materials for multiple CMF, CACF, and BMS feeding accessory products across predominant media channels in the Philippines. However, our study had some limitations including the fact that this review which was limited to retrospectively examining generated media captures from March to September 2018, likely underestimated the extent of marketing and promotion of products covered under the scope of the Code and the Philippine Milk Code because not all promotional materials captured during the monitoring period were available for assessment by the authors. For online materials, the contents of some links were found to be broken and were not included in the assessment. Privacy restrictions prevented the collection of marketing materials on individual or private social media pages, and thus only public social media content was assessed. The monitoring did not include e-commerce sites and ad placements in online advertising platforms that display brief advertisements, service offerings, product listings, or videos to web users. Monitoring and assessment of ad placements in social media platforms and mobile apps were also not included in the scope of this study. For TV, the monitoring was limited to primetime, which was a total of 6 h per day. It also has to be noted that while the data coding was done by technical experts on the Code and the Philippine Milk Code, and the results were reviewed and cross-checked by four more technical experts, there was no reliability measurements performed to check the stability, reproducibility, and accuracy of the coding results.

Conclusion

Our media monitoring and content analysis show evidence of circumventions of the Philippine Milk Code in modern and traditional media channels that exploit gaps in the legislation and

its enforcement. The Philippine government, with support from development partners and breastfeeding advocacy coalitions should jointly enhance enforcement of the Philippine Milk Code and adopt other regulatory measures that provide safeguards against false and misleading health and nutrition claims, emotionally manipulative language in the promotion of products intended for use by children, and exploitative digital marketing strategies that circumvent marketing regulations. Regulatory agencies and civil society actors that support the Philippine Milk Code monitoring and enforcement in the Philippines should remain vigilant in monitoring promotion in traditional media channels and include regular media audits in routine monitoring.

Data availability statement

The original contributions presented in this study are included in the article/**Supplementary material**, further inquiries can be directed to the corresponding author.

Author contributions

PZ, JD-S, DC, and CM-S conceptualized the study, worked on the study design, data analysis, curation, and validation. DC, JD-S, CM-S, PZ, JC, TN, and RM contributed in drafting the manuscript, reviewing, and editing. All authors contributed to the article and approved the submitted version.

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References

- Walters D, Phan L, Mathisen R. The cost of not breastfeeding: global results from a new tool. *Health Policy Plan.* (2019) 34:407–17. doi: 10.1093/heapol/czz050
- Ahsan S, Jain S, Walters D. Nutrition international. *The global cost of not breastfeeding.* (2022). Available online at: <https://www.aliveandthrive.org/sites/default/files/2022-07/CONBF%20Global%20Brief-v6%20%281%29.pdf> (Accessed on October 3, 2022).
- Brady J. Marketing breast milk substitutes: problems and perils throughout the world. *Arch Dis Child.* (2012) 97:529–32. doi: 10.1136/archdischild-2011-301299
- World Health Organization [WHO]. *International code of marketing of breast-milk substitutes.* (1981). Available online at: <https://www.who.int/publications/i/item/9241541601> (accessed October 3, 2022).
- Becker G, Zambrano P, Ching C, Cashin J, Burns A, Policarpo E, et al. Global evidence of persistent violations of the international code of marketing of breast-milk substitutes: a systematic scoping review. *Matern Child Nutr.* (2022) 18(Suppl. 3):e13335. doi: 10.1111/mcn.13335
- Supreme Court En Banc, Republic of the Philippines, G.R. 173034 – Pharmaceutical and Health Care Association of the Philippines, petitioner, vs. Health Secretary Francisco T. Duque III, Health Under Secretaries, Nieto EP, et al. *Respondents.* (2007). Available online at: <https://elibrary.judiciary.gov.ph/thebookshelf/showdocs/1/44615> (accessed October 4, 2022).
- World Health Organization [WHO]. *WHO expresses alarm over bill on breastfeeding in the Philippines.* (2012). Available online at: <https://www.who.int/westernpacific/news/detail/01-09-2012-who-expresses-alarm-over-bill-on-breastfeeding-in-the-philippines> (accessed October 4, 2022).
- World Health Organization [WHO]. *Marketing of breast-milk substitutes: national implementation of the international code, Status Report.* (2022). Available online at: <https://apps.who.int/iris/handle/10665/354221> (accessed October 4, 2022).
- Republic of the Philippines. *Executive order no. 51: national code of marketing of breastmilk substitutes, breastmilk supplement and other related products.* (1986). Available online at: <https://www.fda.gov.ph/wp-content/uploads/2021/05/Executive-Order-51.pdf> (accessed on October 4, 2022).
- Republic of the Philippines. *Republic act 11148 – an act scaling up the national and local health and nutrition programs through a strengthened integrated strategy for maternal, neonatal, child health and nutrition in the first one thousand (1000) days of life, appropriating funds therefor and for other purposes.* (2018). Available online at: <https://www.officialgazette.gov.ph/2018/11/29/republic-act-no-11148/> (accessed on January 12, 2023).
- Department of Health [DOH], Republic of the Philippines. *Administrative order 2007-0017: guidelines on the acceptance and processing of foreign and local donations during emergency and disaster situations.* (2007). Available online at: <https://www.nnc.gov.ph/phocadownloadpap/userupload/menriquez/AO%202017-0007.pdf> (accessed on October 4, 2022).
- Access to Nutrition Initiative [ATNI]. *The Philippines Marketing of Breast-Milk Substitutes and Complementary Foods.* (2021). Available online at: https://accesstonutrition.org/app/uploads/2021/05/ATNI_BMS_-PH-Summary-report_FINAL.pdf (accessed October 4, 2022).
- Baker P, Zambrano P, Mathisen R, Singh-Vergeire M, Escobar A, Mialon M, et al. Breastfeeding, first-food systems and corporate power: a case study on the market and political practices of the transnational baby food industry and public health

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

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- resistance in the Philippines. *Glob Health*. (2021) 17:125. doi: 10.1186/s12992-021-00774-5
14. Department of Science and Technology – Food and Nutrition Research Institute [DOST-FNRI], Republic of the Philippines. *Expanded national nutrition survey: 2019 results*. (2021). Available online at: http://enutrition.fnri.dost.gov.ph/site/uploads/2019%20ENNS%20Results%20Dissemination_Nutritional%20Status%20and%20Feeding%20Practices%20of%20Children%20Under%202.pdf (accessed on October 4, 2022).
15. Alive & Thrive. *The cost of not breastfeeding in the Philippines*. (2020). Available online at: https://www.aliveandthrive.org/sites/default/files/attachments/Cost-of-Not-Breastfeeding_Philippines_V3.pdf (accessed on October 4, 2022).
16. International Baby Food Action Network [IBFAN], International Code Documentation Centre [ICDC]. *Report on the monitoring of the code in 11 countries of Asia: inappropriate marketing of baby foods and feeding bottles*. (2018). Available online at: <https://www.bpni.org/wp-content/uploads/2018/12/Monitoring-of-the-Code-in-11-Countries-of-Asia.pdf> (accessed on October 4, 2022).
17. Ching C, Zambrano P, Nguyen T, Tharaney M, Zafimanjaka M, Mathisen R. Old tricks, new opportunities: how companies violate the international code of marketing of breast-milk substitutes and undermine maternal and child health during the COVID-19 pandemic. *Int J Environ Res Public Health*. (2021) 18:2381. doi: 10.3390/ijerph18052381
18. World Bank. *World bank country and lending groups country classification*. (2022). Available online at: <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519> (accessed December 6, 2022).
19. World Bank. *World bank national accounts data and OECD national accounts data files: GDP (current US\$) – Philippines*. (2022). Available online at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=PH> (accessed on December 6, 2022).
20. Department of Trade and Industry [DTI]. *Philippine national accounts 2019-2021 (Q4)*. (2022). Available online at: <https://innovate.dti.gov.ph/wp-content/uploads/2022/01/Philippine-National-Accounts.pdf> (accessed on December 6, 2022).
21. World Bank. *World bank in the Philippines – overview*. (2022). Available online at: <https://www.worldbank.org/en/country/philippines/overview> (accessed on December 6, 2022).
22. World Bank. *Population, total – Philippines*. (2022). Available online at: <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=PH> (accessed on December 6, 2022).
23. Philippine Statistics Authority [PSA]. *Registered live births in the Philippines, 2020*. (2022). Available online at: <https://psa.gov.ph/content/registered-live-births-philippines-2020> (accessed on December 6, 2022).
24. The United Nations Inter-agency Group for Child Mortality Estimation [UN-IGME]. *Philippines: neonatal mortality rate – total, infant mortality rate – total, under-five mortality rate – total*. (2022). Available online at: <https://childmortality.org/data/Philippines> (accessed on December 6, 2022).
25. Philippine Statistics Authority [PSA]. *Press release – functional literacy rate is estimated at 91.6 percent in 2019*. (2022). Available online at: <https://psa.gov.ph/content/functional-literacy-rate-estimated-916-percent-2019> (accessed on December 6, 2022).
26. Philippine Statistics Authority [PSA]. *Press release – functional literacy rate of filipinos by exposure to different forms of mass media ranges from 92.6 percent to 97.1 percent in 2019*. (2022). Available online at: https://psa.gov.ph/sites/default/files/attachments/hsd/pressrelease/1%20-%20Press%20Release%20No%203%20-%20FLEMMS_signed.pdf (accessed on December 6, 2022).
27. Komisyon sa Wikang Filipino [KWF]. *Repository ng mga wika at kultura*. (2021). Available online at: <https://kwfwikaatkultura.ph/mga-wika/> (accessed on December 6, 2022).
28. Republic of the Philippines. *The 1987 constitution of the republic of the Philippines – article xiv education, science and technology, arts, culture and sports*. (1987). Available online at: <https://www.officialgazette.gov.ph/constitutions/the-1987-constitution-of-the-republic-of-the-philippines/the-1987-constitution-of-the-republic-of-the-philippines-article-xiv/> (accessed on January 12, 2023).
29. Vinje K, Phan L, Nguyen T, Henjum S, Ribe L, Mathisen R. Media audit reveals inappropriate promotion of products under the scope of the international code of marketing of breast-milk substitutes in South-East Asia. *Public Health Nutr*. (2017) 20:1333–42. doi: 10.1017/S1368980016003591
30. Zhao J, Li M, Freeman B. A baby formula designed for chinese babies: content analysis of milk formula advertisements on Chinese parenting apps. *JMIR Mhealth Uhealth*. (2019) 7:e14219. doi: 10.2196/14219
31. Berry N, Gribble K. Health and nutrition content claims on websites advertising infant formula available in Australia: a content analysis. *Matern Child Nutr*. (2017) 13:e12383. doi: 10.1111/mcn.12383
32. Rollins N, Bhandari N, Hajeebhoy N, Horton S, Lutter C, Martines J, et al. Why invest, and what it will take to improve breastfeeding practices? *Lancet*. (2016) 387:491–504. doi: 10.1016/S0140-6736(15)01044-2
33. Baker P, Santos T, Neves P, Machado P, Smith J, Piwoz E, et al. First-food systems transformations and the ultra-processing of infant and young child diets: the determinants, dynamics and consequences of the global rise in commercial milk formula consumption. *Matern Child Nutr*. (2021) 17:e13097. doi: 10.1111/mcn.13097
34. Department of Health, Republic of the Philippines. *Revised implementing rules and regulations of executive order no. 51, otherwise known as the “milk code”, relevant international agreements, penalizing violations thereof, and for other purposes*. (2006). Available online at: <https://www.fda.gov.ph/wp-content/uploads/2021/05/Administrative-Order-No.-2006-0012.pdf> (accessed October 4, 2022).
35. World Health Organization [WHO], United Nations Children's Fund [UNICEF]. *How the marketing of formula milk influences our decisions on infant feeding*. (2022). Available online at: <https://www.who.int/publications/i/item/9789240044609> (accessed October 4, 2022).
36. Gordoncillo N, Talavera M, Paunlagui M, Africa L, Domingo D, Madrid A, et al. *Formative Research on Infant and Young Child Feeding for the Early Childhood Care and Development (ECCD) First 1000 Days Program*. Taguig: National Nutrition Council, University of the Philippines (2018).
37. World Health Organization [WHO]. *Guidance on ending the inappropriate promotion of foods for infants and young children: implementation manual*. (2017). Available online at: <https://apps.who.int/iris/bitstream/handle/10665/260137/9789241513470-eng.pdf> (accessed on October 4, 2022).
38. Datta VA. conceptual study on experiential marketing: importance, strategic issues and its impact. *Int J Res Granthaalayah*. (2017) 5:26–30. doi: 10.29121/granthaalayah.v5.i7.2017.2105
39. World Health Organization [WHO]. *Scope and impact of digital marketing strategies for promoting breastmilk substitutes*. (2022). Available online at: <https://www.who.int/publications/i/item/9789240046085> (accessed on October 4, 2022).
40. Furneaux R. *The baby brands turning Indonesian Instagram into free formula ads. The Bureau of Investigative Journalism*, July 30. (2020). Available online at: <https://www.thebureauinvestigates.com/stories/2020-07-30/the-baby-brands-turning-indonesian-instagram-into-free-formula-milk-ads> (accessed on October 4, 2022).



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Estimating the prevalence of exclusive breastfeeding with data from household surveys: Measurement issues and options

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The importance of breastfeeding for infant and maternal health is well established. The World Health Organization recommends that all infants be exclusively breastfed until they reach 6 months of age. The standard indicator to measure adherence to this criterion is the percentage of children aged 0–5 months who are currently being exclusively breastfed. This paper proposes supplementary measures that are easily calculated with existing survey data. First, for an accurate assessment of the WHO recommendation, we estimate the percentage of infants who are being exclusively breastfed at the exact age of 6 months. Second, an adjustment is proposed for prelacteal feeding. These two modifications, separately and in combination, are applied to data from 31 low- and middle-income countries that have participated in the Demographic and Health Surveys Program since 2015. There is considerable variation in the effects across countries. The modifications use existing data to provide a more accurate estimate than the standard indicator of the achievement of the exclusive breastfeeding until 6 months recommendation.

KEYWORDS

exclusive breastfeeding, infant feeding, IYCF indicators, demographic and health survey data, WHO EBF recommendation

Introduction

Breastfeeding is the biologically normal way of feeding human infants. It provides protection from infectious disease (1–3), facilitates normal development and cognition, reduces risk of chronic diseases and is also beneficial for the mother (3–5). It is especially crucial in low- and middle-income countries where it is estimated that over 800,000 child deaths or (11.6% of all deaths) are associated with infants not being breastfed as recommended (3).

The mechanisms by which breastfeeding has a protective effect on infant health, while other forms of feeding have a deleterious impact, are still being studied. They include immune protection conferred by breastmilk in the form of antibodies and white cells to resist infection, glycans that bind to pathogens, and breastmilk's oligosaccharides and lactose which nurture the growth of beneficial bacteria (6). Breastmilk consumption has a demonstrated long-term positive effect on the gut microbiome of infants which in turn has been shown to reduce intestinal and other morbidities, and enables positive neurodevelopmental outcomes (7). On the other hand, feeding foods or liquids other than breastmilk, including infant formula, deprive

infants of breastmilk's protection while introducing pathogens, as well as potentially damaging the intestinal lining, and increasing susceptibility to infection. Even small amounts of other foods or liquid feeds can be damaging (6).

As a global public health recommendation, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) advised in the Global Strategy for Infant and Young Child Feeding that "infants should be exclusively breastfed for the first 6 months of life to achieve optimal growth, development and health" (8). The Global Strategy explicitly recommends exclusive breastfeeding over any breastfeeding because feeding other foods or liquids to infants under 6 months increases their risk of infectious disease. The World Health Assembly has set a global target of 50% of children exclusively breastfeeding in the first 6 months of life by 2025 (9).

To ensure these targets are reached, reliable and accurate monitoring of exclusive breastfeeding (EBF) rates is critical. This is especially the case in low-and middle-income countries (LMICs) where infant mortality rates may be high (9). Household surveys are the main source of information about breastfeeding in LMICs. The largest survey programs are the Demographic and Health Surveys (DHS) and the Multiple Indicator Cluster Surveys (MICS), sponsored by the United States Agency for International Development (USAID) and UNICEF, respectively. The DHS and MICS are virtually identical in terms of sampling designs, questionnaires, indicators, and reporting. This paper refers to DHS surveys, but its findings can be applied to other household surveys that collect breastfeeding data, including MICS surveys. In both programs, estimates are derived from mothers' reports of breastfeeding and consumption of liquids and foods by the child in the 24 h before the survey¹.

The large-scale measurement and reporting of EBF prevalence is complex and necessarily imperfect (10, 11). However, for countries to create policy and implement programming to improve exclusive breastfeeding rates, it is essential to have the most accurate estimates possible.

This paper focuses on the measurement and reporting of prevalence estimates of EBF. First, it highlights a discrepancy between the EBF recommendation and the standard indicator that is used to monitor it (12). The WHO recommendation is that "infants should be exclusively breastfed for the first 6 months of life" (8). However, the DHS and other indicators measure EBF as the percentage of children less than 6 months of age who are currently exclusively breastfed, that is, the prevalence of EBF at age 0–5 completed months. The prevalence of EBF declines steadily with the age of the child, so the prevalence in the interval 0–5 months is necessarily greater than the prevalence at the exact age of 6 months. Thus, the standard indicator overestimates the percentage of children meeting the EBF recommendation and is frequently misinterpreted (11). This gives a falsely positive view of EBF prevalence and undermines the urgency of promoting EBF.

Second, the paper describes how prelacteal feeding affects EBF prevalence. This refers to any liquids and foods that are given to newborns before the first breastfeed, usually on the first day of life

(13). The DHS's working definition of prelacteal feeding is anything other than breastmilk given within the first three² days after birth (14). Prelacteal feeding greatly increases the risk of illness in infants and young children (15, 16), by disrupting the microbiome, damaging the intestinal lining, and introducing pathogens (17) thereby increasing infant morbidity and mortality. Nevertheless, prelacteal feeding is highly prevalent, particularly in LMICs (16). Prelacteal feeds and delayed initiation of breastfeeding are strongly associated, and with increased mortality rates in infants (18). However, the standard indicator for EBF does not account for prelacteal feeds, thereby resulting in an overestimate of EBF.

This paper describes alternative calculations of the prevalence of EBF, with the aim of clarifying the standard indicator and describing additional options for reporting EBF prevalence. We use the data from 31 DHS surveys conducted since 2015 that included the relevant questions about breastfeeding and for which data files were available from the DHS website³ by 31 August 2022. For countries that had more than one DHS survey within that interval, we use only the most recent survey.

Methodology

Five concepts are crucial for interpreting estimates of EBF prevalence: current (breastfeeding) status, age, exact age, prevalence of EBF in an age interval, and prevalence of EBF at an exact age.

Current status

Mothers can usually readily say whether a child was ever breastfed or is still breastfeeding (19). However, a mother cannot respond reliably to a question about whether the child was exclusively breastfed from birth until a specific age or time in the past (20). Therefore, the DHS assesses whether the child is exclusively breastfed at the time of the survey with "current status" referring to the 24 h before the interview. Current feeding status is determined in the DHS through multiple questions on whether the child was ever breastfed, and their consumption or not of liquids and foods other than breastmilk in the past 24 h. The variable that is constructed from the DHS data files has been labeled "ebf." It takes the value $ebf = 1$ (yes) if the child consumed only breastmilk during the 24 h prior to the interview, or $ebf = 0$ (no) if the child consumed other liquids or foods in that time interval⁴.

However, $ebf = 1$ does not ensure that the child *never* consumed anything other than breastmilk. While it is recommended that EBF be continuous from birth to the introduction of other liquids and foods at 6 months, it may, in fact, be subject to interruptions. These

¹ Questions about breastfeeding are only asked about the youngest child under 2 years of age who is living with the mother, and modifications are made if the child was part of a multiple birth.

² Surveys in this dataset define prelacteal feeding as anything other than breastmilk given within the first 3 days after delivery. However, future DHS surveys (DHS 8 Model Questionnaire Phase 8) will define prelacteal feeding as anything other than breastmilk given within the first 2 days after delivery. Countries may choose to keep the 3 day definition for continuity in surveys.

³ www.dhsprogram.com

⁴ "EBF," with upper case letters, refers to the general concept of exclusive breastfeeding. "ebf," with lower case letters, refers to the specific binary outcome defined here.

could include prelacteal feeding, subsequent feeding of liquids and foods other than breastmilk prior to the past 24 h and feeding of liquids and foods other than breastmilk by other caregivers without the mother's knowledge. Measurement error is also possible in the classification into $ebf=0$ and $ebf=1$ for the last 24 h and interpretation error occurs if the classification is understood as indicating as continuous EBF since birth.

Age and exact age

The distinction between “age” and “exact age” is important for the measurement of EBF. Exact age is calculated from the elapsed number of days between the reported date of the birth and the date of the interview with the mother. For DHS, “exact age 6 months” refers to exactly 183 days after birth. Age, by contrast, as the term is normally used, refers to an interval. For example, age 0–5 months is a six-month interval extending from birth up to, but not including exact age of 6 months.

Prevalence of EBF in an age interval, and prevalence of EBF at an exact age

The “prevalence of EBF at age 0–5 months” is the number of children in the age interval who are exclusively breastfed during the previous 24 h (the numerator) divided by the total number of children in the age interval (the denominator) times 100. This is what DHS currently calculates and reports. The WHO recommends that children be exclusively breastfed for 6 months, implicitly setting a target of 100% prevalence of EBF at exact age 6 months. This paper argues that the prevalence of 24-h recall of EBF at exact ages can be calculated and reported in much the same way that the prevalence of EBF is estimated for age intervals.

Data from the Nepal 2016 DHS survey (Figure 1) illustrates the difference between estimates based on the two interpretations of the child's age. Nepal was chosen as an example of a country with a high prevalence of EBF at age 0–5 months, but a much lower prevalence of EBF at exactly 6 months. Figure 1 contains two panels; in each, the

vertical axis shows 24-h EBF prevalence, and the horizontal axis shows age in days from birth to 6 months (rounded to the nearest day). The EBF estimate is shown by the blue line and upper and lower bounds of the 95% confidence interval are shown by the red lines.

Figure 1A, the panel on the left, illustrates use of ‘age’ as the variable and shows an EBF prevalence of 66.1% for ages 0–5 months, as indicated in the Nepal DHS report (21). Figure 1B, the panel on the right, illustrates the alternative perspective on prevalence where ‘exact age’ is used and shows that EBF prevalence is highest in the first 2 months, declining to 65.8% (CI 95%: 60.1–71.2%) at 3 months and 32.5% (CI 95%: 22.4–44.6%) at 6 months.

Prevalence of EBF takes only two values (coded $ebf=0$ and $ebf=1$) and is analyzed with logit regression, which adjusts for the survey design (including sample weights, clusters, and stratification) and produces confidence intervals as well as point estimates. The usual estimate of EBF prevalence, corresponding with Figure 1A on the left, is descriptive and uses logit regression to smooth the month-to-month data for children aged 0–5 months with no covariates. The only modification required for specific values of age, as in Figure 1B on the right, is that age in days is included as a linear covariate. Linearity on the logit scale produces a familiar logistic shape on the scale of the prevalence. More details on this are provided in Supplementary File S1.

In addition, the DHS collects data on prelacteal feeding, with a question which asks whether the child was given anything to drink other than breastmilk in the first 3 days after delivery. This demonstrates an important limitation of using 24-h EBF recall alone as a proxy for EBF since birth.

EBF prevalence can be recalculated to take prelacteal feeding into account by assigning $ebf=0$ to children for age 0–5 months who received prelacteal feeding.

Results

This paper presents analyses of the DHS data for 31 countries of prevalence of exclusive breastfeeding in the age interval 0–5 months; EBF at the exact age of 6 months; EBF 0–5 months with children who received prelacteal feeds excluded from the EBF estimate; and EBF at 6 months with children who received prelacteal feeds excluded from the EBF estimate.

Table 1 lists the DHS countries from lowest to highest EBF 0–5 months and provides the numerical values (other than confidence intervals) for the figures below. It also includes the unweighted and weighted number of children used for each estimate. The number of children reflects the sample size and the fertility level in the country. It ranges from 177 in Armenia to 1,636 in Malawi, except for the much larger frequencies of 3,193 in Nigeria and 22,865 in India.

Column B shows exclusive breastfeeding prevalence from 0 to 5 months. This is the estimate that is reported in the DHS. Column G shows the prevalence of exclusive breastfeeding at six completed months of age excluding infants who received prelacteal feeds. This is a more accurate estimate of infants who of the proportion of children who are exclusively breastfed until 6 months of age, as recommended by WHO.

It is worth noting that there are significant variations in the differences between EBF 0–5 m and EBF 6 m, ranging from differences of 13 to 45 percentage points. When prelacteal feeding is taken into

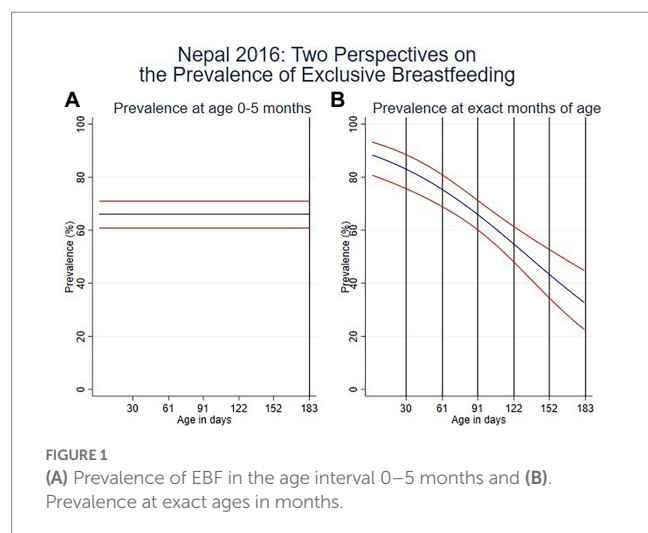


TABLE 1 Estimates of EBF, showing the effects of changing the standard calculation and reporting to one that corresponds with the WHO criterion for age, and adjusting for prelacteal feeding (31 DH surveys conducted since 2015).

A	B	C	D	E	F	G	H	I	J
Survey and date	EBF 0-5 m	EBF at 6 m	Difference (C-B) (EBF 6 m-EBF 0-5 m)	EBF 0-5 m minus prelacteal feeding	Difference (E-B) (EBF 0-5 m minus prelacteal feeding-EBF 0-5 m)	EBF at 6 m minus prelacteal feeding	Difference (G-C) (EBF at 6 m minus prelacteal feeding-EBF at 6 m)	n (unweighted)	n (weighted)
	%	%	%	%	%	%	%		
Albania 2017	36.7	22	-14.8	31.4	-5.3	25.2	-11.5	285	283.7
Angola 2015-16	37.7	10.8	-26.8	36.1	-1.5	10.9	-26.8	1,620	1486.2
Armenia 2015-16	44.5	8	-36.4	42.5	-2	8.4	-36.1	177	172
Bangladesh 2017-18	65	25.9	-39.1	49	-15.9	24	-41	971	953.5
Benin 2017-18	41.7	12	-29.7	37.8	-3.9	11.8	-29.9	1,381	1386.6
Cameroon 2018	40.2	24.5	-15.7	32.7	-7.4	17.6	-22.6	986	1030.2
Ethiopia 2016	57.5	29.5	-28	55.7	-1.7	28.8	-28.7	1,092	1184.9
Gambia 2019-20	53.6	19	-34.6	48.9	-4.7	18.2	-35.4	1,003	896.6
Guinea 2018	33.4	13.2	-20.3	26.6	-6.8	11.2	-22.2	916	912.5
Haiti 2016-17	39.9	7.9	-32	36.2	-3.6	7.9	-31.9	700	660.3
India 2019-21	63.8	42.2	-21.6	55.7	-8.1	38.2	-25.6	22,865	22404.4
Jordan 2017-18	25.6	6.4	-19.2	17.6	-8	4.8	-20.8	1,218	1059.4
Liberia 2019-20	55.2	28.9	-26.3	53.5	-1.7	27.8	-27.5	562	554.8
Madagascar 2021	55.2	16.6	-38.6	44.4	-10.8	16.8	-38.4	1,291	1260.6
Malawi 2015-16	61.2	24.7	-36.4	59.2	-1.9	25.1	-36.1	1,636	1627.4
Maldives 2016-17	63.5	47	-16.5	59.9	-3.6	47.2	-16.3	288	280.8
Mali 2018	40.5	15.2	-25.3	34.5	-6	12.2	-28.3	997	1,087
Mauritania 2019-21	41.1	18.1	-23	34.4	-6.7	13.9	-27.2	1,202	1,250
Nepal 2016	66.1	32.5	-33.6	48.8	-17.2	24	-42.1	467	443.2
Nigeria 2018	28.8	15.6	-13.3	23	-5.9	12.5	-16.3	3,193	3218.7
Pakistan 2017-18	47.5	32.6	-15	15.4	-32.1	9.4	-38.1	1,117	1138.9
Papua New Guinea 2016-18	62.3	25.8	-36.5	56.2	-6.1	20.8	-41.6	886	903
Rwanda 2019-20	80.9	62.5	-18.4	78.8	-2.1	61.8	-19.1	747	781.5
Sierra Leone 2019	54.2	18.9	-35.3	51.4	-2.7	17.4	-36.8	994	968.7
South Africa 2016	31.6	15.8	-15.8	27.1	-4.5	13.7	-17.9	346	345.3
Tajikistan 2017	36.2	10.2	-25.9	31.7	-4.5	9.3	-26.9	553	587.8
Tanzania 2015-16	59.2	14.6	-44.6	52.2	-7	16.9	-42.3	1,015	998.5
Timor-Leste 2016	51.2	29	-22.1	43.9	-7.3	28.2	-23	743	728
Uganda 2016	65.7	32.8	-32.9	51.7	-14.1	31.8	-34	1,482	1443.3
Zambia 2018	70	26.1	-43.9	65.4	-4.5	28.1	-41.9	1,019	1019.7
Zimbabwe 2015	48	11.1	-36.9	45	-3	11.6	-36.3	603	612.1

account, the difference is even larger. Furthermore, 15 out of the 31 countries have not reached the target of 50% EBF 0-5 m. (Table 1 gives the numerical values of the estimates that are shown in Figures 4, 5, and 6, along with the differences from the standard estimates for months 0-5).

The results of the analyses showing the differences between alternative approaches to measuring the prevalence of EBF in the 31 surveys are shown in Figures 2-5.

Figures 2 and 3 present estimates using the two perspectives on age in five graphs. Prevalence is shown on the horizontal axis, with the countries sorted from lowest to highest point estimates. For each

country, a short horizontal line shows the 95% confidence interval, with a dot for the point estimate. **Figure 2** (like **Figure 1A**) shows the prevalence of EBF, as usually presented, in the age interval 0–5 months, ranging from the lowest levels in Jordan (25.6%) and Nigeria (28.8%) to the highest levels in Zambia (70.0%) and Rwanda (80.9%).

Figure 3 includes four panels, showing the prevalence and confidence intervals at exact ages of 3, 4, 5, and 6 months. The four panels all have the same vertical and horizontal axes as **Figure 2**. The countries are sorted by prevalence at 6 months (this is not necessarily the same as the sorted order by 0–5 months in **Figure 2**). The panels in

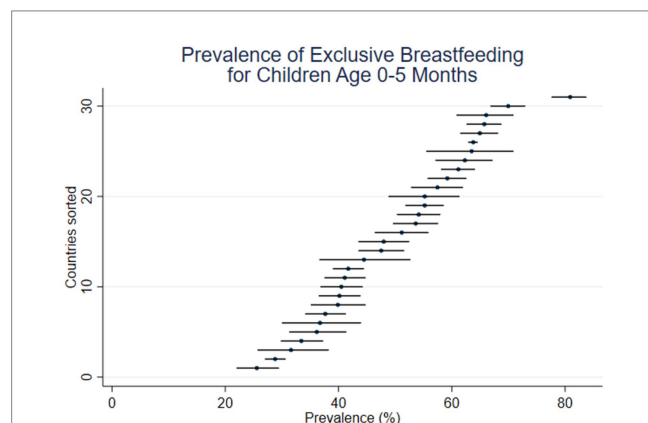


FIGURE 2
Prevalence of EBF in age interval 0–5 months (31 DHS surveys conducted since 2015).

Figure 3 show the steady reduction in EBF prevalence as children get older. Of note, it also shows a gradual reduction, from month to month, in the range of prevalence across countries. By 6 months, the EBF prevalence ranges from the lowest levels in Jordan (6.4%), Haiti (7.9%), and Armenia (8.0%) to the highest levels in India (42.2%) Maldives (47.0%), and Rwanda (62.5%). **Figure 3d**, the bottom right panel (prevalence at exactly 6 months), is a more accurate depiction than **Figure 2** of the achievement of the WHO recommendation that all children be exclusively breastfed for the first six months of life.

Figure 4 is a scatterplot with a red dot for each survey, comparing the estimated prevalence at exactly 6 months (the vertical axis) with the estimated prevalence at 0–5 months (the horizontal axis). The figure includes a straight line representing equality of the two measures; if there were no difference between the two estimates, the red dots would be on the line. The vertical distance between the points and the line is the difference between the two measures. This difference ranges from –13.3% for Nigeria to –44.6% for Tanzania. The difference tends to be greater if the prevalence at 0–5 months is greater. The outlier on the right is Rwanda, which has the highest levels on both axes (also seen in **Figures 2** and **3**). The difference, –18.4%, is relatively small, compared with the other surveys.

Figure 5 is similar to **Figure 3** but compares the adjusted prevalence of EBF, after re-classifying the children who received prelacteal feeding, to the unadjusted prevalence at 0–5 months. For each country, the difference is the vertical distance between the blue line and the red dot for that country. For both axes, the reference age is the interval 0–5 months. For most surveys, the difference is small. However, the difference is 8.0% or more in 7 surveys: Pakistan

Prevalence of Exclusive Breastfeeding for Children at Exact Age 3, 4, 5, or 6 Months

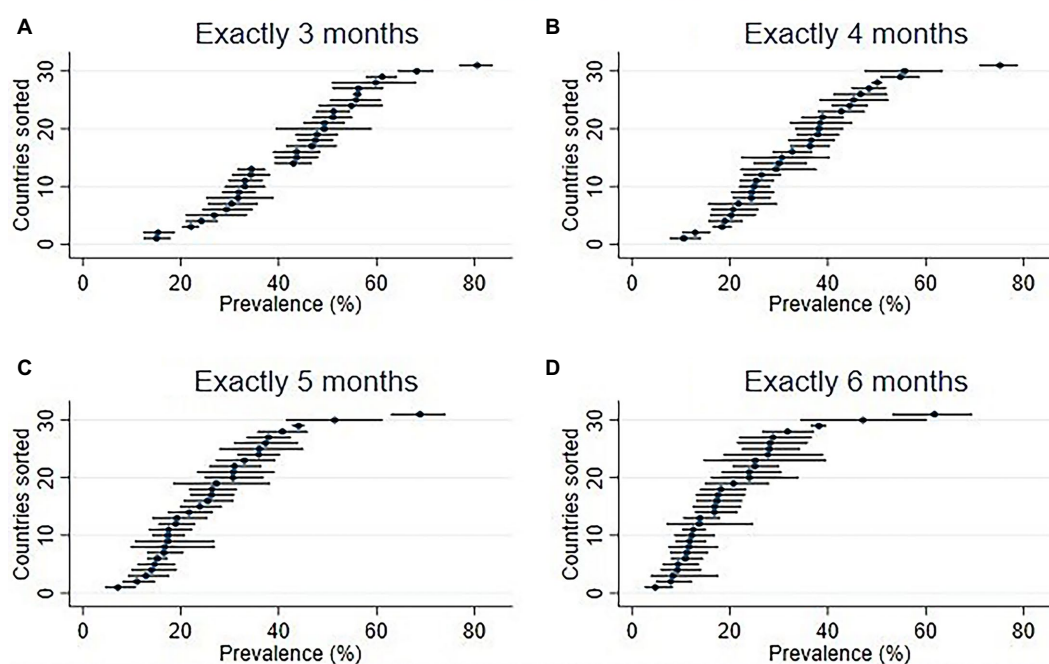
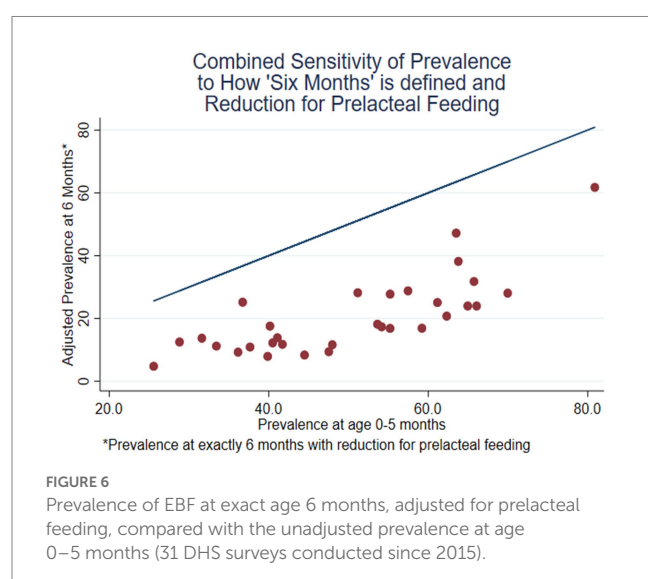
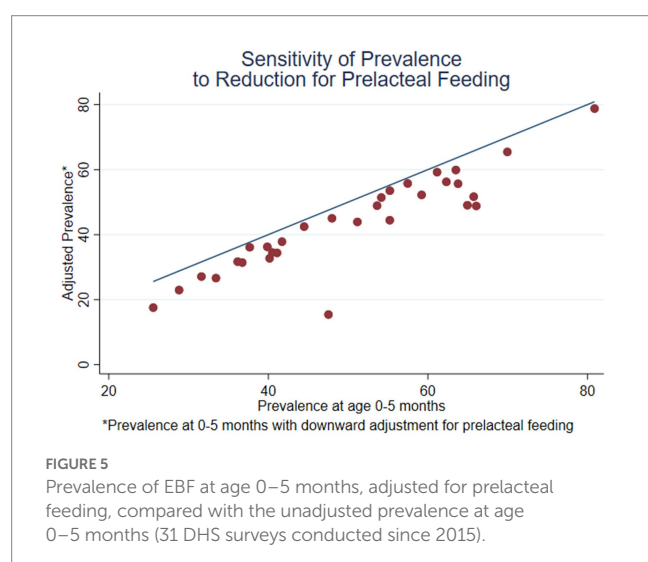
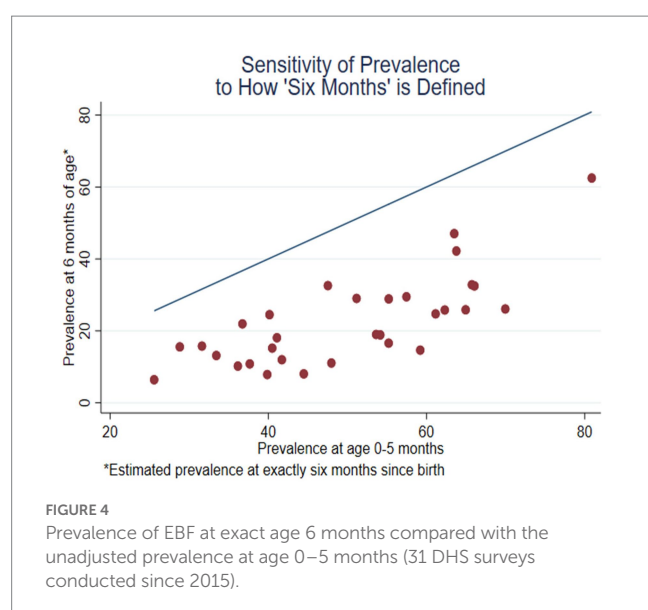


FIGURE 3
Prevalence of EBF at exact ages in months, namely (A). Exactly 3 months, (B). Exactly 4 months, (C). Exactly 5 months, and (D). Exactly 6 months (31 DHS surveys conducted since 2015).



(−32.1%), Nepal (−17.2%), Bangladesh (−15.9%), Uganda (−14.1%), Madagascar (−10.8%), India (−8.1%), and Jordan (−8.0%). This list includes all the surveys that are in South Asia, but it is not limited to South Asia; the effect is greater in Uganda and Madagascar than in India. The outlier at the bottom of the figure represents Pakistan. The effect is about twice as large in Pakistan as in Nepal or Bangladesh.

The combined effect of the two adjustments is shown in Figure 6. The horizontal axis is the usual estimate of EBF prevalence for months 0–5. The vertical axis is the estimate for exact age 6 months, with removal of children who had prelacteal feeding shifted from $ebf=1$ to $ebf=0$. The vertical distance between the line and the point is the net change in the estimate due to the combined adjustment. The two adjustments are usually additive but, in some countries, they offset each other. For example, Pakistan is not an outlier in Figure 6, because its relatively high level of sustained breastfeeding tends to offset its high level of prelacteal feeding.

Limitations

The principal limitation of this study is the potential for recall bias. Highly accurate measurements of exclusive breastfeeding from birth to 6 months can only be carried out prospectively, given the limitations of maternal recall (20). The data for this analysis are based on recall of the three-day interval immediately following the birth (for prelacteal feeding) and on the past 24 h (for exclusive breastfeeding). One study suggested that recall bias in relation to prelacteal feeding might be minimal (16), and where it exists, there is little reason to suspect that there would be differential recall that would affect results (22). Twenty-four hour recall is practical and has low recall bias, but tends to overestimate exclusive breastfeeding (23, 24). However, a mother's recall of intake could still be incorrect, and health workers or other household members may have given the child other liquids or foods without the mother's knowledge. By taking the data at face value, we produce estimates of the duration and prevalence of exclusive breastfeeding that are necessarily biased upwards. Despite the limitations of maternal recall of the first few days following birth and over the past 24-h (25, 26), these measures continue to be used in most large surveys such as the DHS. Thus, the majority of studies that report on exclusive breastfeeding suffer the same limitation. Hence, our estimation of breastfeeding at 6 months of age still gives a more accurate estimate than the standard indicator of the achievement of the recommendation of exclusive breastfeeding until 6 months.

A second limitation is that the procedure to estimate the prevalence of exclusive breastfeeding at exactly 6 months is based on a simplifying assumption that the trajectory during the first 6 months is linear on the logit scale. It is possible that the trajectory is not so simple, but the current status data do not provide sufficient statistical power for fitting a more complex pattern. Again, despite this limitation, our estimation is a more accurate indicator of exclusive breastfeeding until 6 months.

Discussion and conclusions

Prevalence of EBF at 6 months is necessarily less than the prevalence at 0–5 months. The estimates would only be the same if all

children were exclusively breastfed for 6 months, in which case, both would be 100%. Exclusive breastfeeding status in Rwanda comes closest to this, but even there, almost 40% of infants are not exclusively breastfed at 6 months of age. Many other countries show even larger discrepancies when estimating EBF using the alternative methods.

This paper demonstrates the limitations to the standard EBF calculation for the range 0–5 months and shows that a calculation of EBF at exact age of 6 months, and taking prelacteal feeding into account, provides a more accurate assessment of infant feeding practices. EBF prevalence at exactly 6 months is a more accurate indication of how well countries are progressing toward the achievement of the WHO recommendation that infants be exclusively breastfed for 6 months. In addition, taking into account data collected on prelacteal feeding in the DHS would also assist in providing a more accurate assessment of the state of infant feeding practice, particularly for countries where prelacteal feeds are common. For example, the Nepal DHS 2016 reports a prevalence of 66% EBF 0–5 months. However, the actual prevalence of children who are exclusively breastfed, including not receiving prelacteal feeding, until 6 months of age is 24%. Moreover, only one country in the dataset, Rwanda, is even halfway toward meeting the recommendation. It is unlikely that many countries will even reach the much more modest target of 50% EBF in the first 6 months.

This more accurate assessment of whether infants are being fed in accordance with WHO recommendations is essential if adequate resources are to be committed to promoting and protecting breastfeeding, including exclusive breastfeeding.

Based on the analysis of 31 DHS surveys conducted since 2015, we suggest that future monitoring of EBF include two indicators to supplement the estimated prevalence of EBF for children 0–5 months which is currently in use. The additional indicators are the estimated prevalence of EBF at exact age 6 months with a deduction for the prevalence of prelacteal feeding.

The methods suggested in this paper utilize existing DHS questions and data and do not require any additional questions or increase the burden on respondents. The statistical analysis involved in calculating EBF prevalence at exact age and taking prelacteal feeding into account is not onerous.

The suggested modifications will not provide a perfect assessment of EBF. Using 24-h recall has limitations, and more accurate measures of EBF using prospective research are difficult and expensive. However, in order to have sound policy and programming to

contribute to the goal of exclusive breastfeeding for all infants for their first 6 months, it behooves us to have the most accurate estimates possible using the data that we already have. The recommendations in this paper would make a significant contribution toward achieving that goal.

Data availability statement

Publicly available datasets were analyzed in this study. This data can be found here: <https://dhsprogram.com/>

Author contributions

TP and BB conceptualized the study, TP conducted the statistical analysis and drafted the initial version of the manuscript. KG, SM, and BB provided significant additional input. All authors approved the final manuscript.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fnut.2023.1058134/full#supplementary-material>

References

- Lamberti LM, Fischer Walker CL, Noiman A, Victora C, Black RE. Breastfeeding and the risk for diarrhea morbidity and mortality. *BMC Public Health*. (2011) 11:S15–5. doi: 10.1186/1471-2458-11-S3-S15
- Lamberti LM, Zakarija-Grković I, Fischer Walker CL, Theodoratou E, Nair H, Campbell H, et al. Breastfeeding for reducing the risk of pneumonia morbidity and mortality in children under two: A systematic literature review and meta-analysis. *BMC Public Health*. (2013) 13:S18–8. doi: 10.1186/1471-2458-13-S3-S18
- Victora CGP, Bahl R, Barros AJD, França GVA, Horton S, Krasevec J, et al. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *Lancet*. (2016) 387:475–90. doi: 10.1016/S0140-6736(15)01024-7
- Adetola LJ, Stuebe A. Long-term maternal benefits of breastfeeding. *Contemporary OB/GYN*. (2018) 63:26–9.
- Adetola LJ, Stuebe A. Enabling breastfeeding to support lifelong health for mother and child. *Obstet Gynecol Clin N Am*. (2020) 47:363–81. doi: 10.1016/j.jogc.2020.04.001
- Gribble KD. Mechanisms behind Breastmilk's protection against, and artificial baby Milk's facilitation of, Diarrhoeal Illness. *Breastfeed Rev*. (2011) 19:19–26. PMID: 22053500
- Granger CL, Embleton ND, Palmer JM, Lamb CA, Berrington JE, Stewart CJ. Maternal breastmilk, infant gut microbiome and the impact on preterm infant health. *Acta Paediatr*. (2021) 110:450–7. doi: 10.1111/apa.15534
- WHO, UNICEF. *Global Strategy for Infant and Young Child Feeding*. Geneva: World Health Organization (2003).
- WHO. *Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition*. Geneva: World Health Organization (2014).
- Greiner T. Exclusive breastfeeding: measurement and indicators. *Int Breastfeed J*. (2014) 9:18–8. doi: 10.1186/1746-4358-9-18
- WHO, UNICEF. *Meeting Report. In inter-Agency Technical Consultation on Infant and Young Child Feeding Indicators*. Geneva: World Health Organization (2018).

12. Pullum TW. Exclusive breastfeeding: aligning the indicator with the goal. *Glob Health Sci Pract.* (2014) 2:355–6. doi: 10.9745/GHSP-D-14-00061
13. Raina SK, Mengi V, Singh G. Determinants of Prolactal feeding among infants of RS Pura block of Jammu and Kashmir, India. *J Fam Med Prim Care.* (2012) 1:27–9. doi: 10.4103/2249-4863.94446
14. ICF. *Demographic and Health Survey Interviewer's Manual.* Rockville, Maryland: ICF (2020).
15. Brewster D. Prolactal versus early infant feeding and morbidity in Timor-Leste. *J Pediatr Gastroenterol Nutr.* (2014) 59:155–6. doi: 10.1097/MPG.0000000000000435
16. Neves PAR, Vaz JS, Ricardo LIC, Armenta-Paulino NN, Barros AJD, Richter L, et al. Disparities in early initiation of breast feeding and prolactal feeding: a study of low-and middle-income countries. *Paediatr Perinat Epidemiol.* (2022) 36:741–9. doi: 10.1111/ppe.12871
17. Nguyen P, Binns CW, Ha AVV, Chu TK, Nguyen LC, Duong DV, et al. Prolactal and early formula feeding increase risk of infant hospitalisation: a prospective cohort study. *Arch Dis Child.* (2020) 105:122–6. doi: 10.1136/archdischild-2019-316937
18. Patel A, Bucher S, Pusdekar Y, Esamai F, Krebs NF, Goudar SS, et al. Rates and determinants of early initiation of breastfeeding and exclusive breast feeding at 42 days postnatal in six low and middle-income countries: a prospective cohort study. *Reprod Health.* (2015) 12:S10–0. doi: 10.1186/1742-4755-12-S2-S10
19. Launer LJ, Forman MR, Hundt GL, Sarov B, Chang D, Berendes HW, et al. Maternal recall of infant feeding events is accurate. *J Epidemiol Community Health.* (1979) 46:203–6. doi: 10.1136/jech.46.3.203
20. Bland RM, Rollins NC, Solarsh G, van den Broeck J, Coovadia HMChild Health Group. Maternal recall of exclusive breast feeding duration. *Arch Dis Child.* (2003) 88:778–83. doi: 10.1136/adc.88.9.778
21. Ministry of Health. *Nepal Demographic and Health Survey.* Kathmandu, Nepal: Ministry of Health (2016).
22. Nguyen PH, Keithly SC, Nguyen NT, Nguyen TT, Tran LM, Hajeebhoy N. Prolactal feeding practices in Vietnam: challenges and associated factors. *BMC Public Health.* (2013) 13:932–2. doi: 10.1186/1471-2458-13-932
23. Andarge SD, Fenta EH, Gebreyesus SH, Belachew RY. One-week recall period gives a more accurate estimate of exclusive breastfeeding practice than 24-h recall among infants younger than six months of age. *Int Breastfeed J.* (2021) 16:1–65. doi: 10.1186/s13006-021-00411-2
24. Hussein TH, Mgongo M, Katanga J, Uriyo JG, Damian DJ, Stray-Pedersen B, et al. Exclusive breastfeeding rates and factors associated with exclusive breastfeeding practices in northern Tanzania: measurement using two different Methodologies-24 hours recall and recall since birth. *Int J MCH AIDS.* (2019) 8:32–43. doi: 10.21106/ijma.258
25. Li R, Scanlon Kelley S, Serdula Mary K. The validity and reliability of maternal recall of breastfeeding practice. *Nutr Rev.* (2005) 63:103–10. doi: 10.1111/j.1753-4887.2005.tb00128.x
26. Abdel-Hady DM, El-Gilany A-H. Calculating exclusive breastfeeding rates: comparing dietary “24-hour recall” with recall “since birth” methods. *Breastfeed Med.* (2016) 11:514–8. doi: 10.1089/bfm.2016.0032



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The multiple factors of suboptimal early feeding practices among infants aged 0–5months in Indonesia

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Background: Optimal early infant feeding practices are critical to ensure adequate nutrition for infants' growth and development. This study aimed to examine the determinants of suboptimal early feeding practices (i.e., delayed initiation of breastfeeding, prelacteal feeding, and non-exclusive breastfeeding) among infants aged 0–5months in Indonesia.

Methods: We used data collected in the 2012 and 2017 Indonesia Demographic and Health Surveys. Analyses were conducted using information from 3,198 live-born singleton infants aged 0–5months. The primary outcomes used were: (1) delayed initiation of breastfeeding in the first hour after birth, (2) prelacteal feeding in the first 3days, and (3) non-exclusive breastfeeding in the last 24h preceding the survey. Potential predictors analyzed were categorized into the environmental, household, maternal, pregnancy, delivery, and child characteristics. Logistic regression analyses were performed to identify factors significantly associated with each outcome.

Results: Approximately 78.6% of infants aged 0–5months in Indonesia had at least one of the three suboptimal early infant feeding practices. We found a strong association between the three outcome indicators analyzed. The determinants of delayed initiation of breastfeeding included infants from Sumatera region (adjusted odds ratios (aOR)=2.02, $p<0.001$), infants delivered by Cesarean section (aOR=2.78, $p<0.001$), and in non-health facilities (aOR=1.53, $p=0.003$). The determinants of prelacteal feeding in the first 3days included infants living in urban areas (aOR=1.32, $p=0.035$), the first birth-ranked infants (aOR=1.32, $p=0.019$), and infants who had delayed initiation of breastfeeding in the first hour of life (aOR=3.90, $p<0.001$). The determinants of non-exclusive breastfeeding in the last 24h included infants whose mothers worked in non-agricultural fields (aOR=1.52, $p<0.001$), infants delivered by Cesarean section (aOR=1.33, $p=0.044$), and the first birth-ranked infants (aOR=1.28, $p=0.039$).

Conclusion: There was a high percentage of infants aged 0–5months who had suboptimal feeding practices in Indonesia. As we found multiple factors associated with suboptimal early feeding practices among infants, integrated approaches, including health promotion and supportive public policy, are required to ensure infants receive adequate nutrition in the early stages of life.

KEYWORDS

initiation of breastfeeding, prelacteal feeding, exclusive breastfeeding, early infant feeding practices, Indonesia demographic and health survey

1. Introduction

The first 2 years of life are fundamental for a child's growth, development, as well as survival (1). Optimal early infant feeding practices, including early initiation of breastfeeding within 1 hour of birth, no-prelacteal feeds, and exclusive breastfeeding in the first 6 months of life, have vital roles in ensuring adequate nutrition in the early stages of infants' life (2).

The benefits of early initiation of breastfeeding through mother-infant skin-to-skin contact in the first hour of life have been widely acknowledged (3, 4). Mother-infant skin-to-skin contact helps regulate newborn body temperature and allows infants to receive beneficial bacteria from the mother's skin. (3).

One of the suboptimal feeding practices commonly reported in the early infancy period is the practice of prelacteal feeding, i.e., giving newborn food/liquid other than breastmilk, mostly in the first 3 days of life before commencing breastfeeding (5). This practice increases the risk of illness among newborns and prevents them from the protective effects and vital nutrients in the colostrum (6). Regardless of its detrimental effects on health, prelacteal feeding is frequently practiced worldwide, particularly in developing countries, including Indonesia (6, 7).

One of the most crucial feeding practices recommended by The World Health Organization (WHO) in the Global Strategy for Infant and Young Child Feeding is exclusive breastfeeding, defined as the practice of only giving infant breastmilk for the first 6 months of life (8). Infants who were exclusively breastfed had both long- and short-term protective effects, including reduced risk of infections, overweight, and obesity, as well as improved child survival (9–11). According to the WHO, only 44% of infants aged 0–5 months worldwide were exclusively breastfed between 2015 and 2020 (1). This was still below the Global Nutrition Target (at least 50% in 2025 and 70% in 2030) (12, 13).

In Indonesia, considerable progress has been made as the proportion of children exclusively breastfed increased from 32.4% in 2007 (14) to 52.0% in 2017 among children under 2 years old (15). Similarly, early initiation of breastfeeding also showed an increasing trend from 43.9% in 2007 (14) to 56.5% in 2017 (15). Although these numbers showed improved early infant feeding practices, efforts to accelerate them are still required.

Multiple factors have been linked to early initiation of breastfeeding and exclusive breastfeeding, including socioeconomic status (16), parental occupation (16, 17), parents' knowledge and awareness (18), type of attendant at birth (19), place of delivery (16), mode of delivery (16, 19), child's birth weight (19) and family supports (17). Another factor reported to deprive children of receiving valuable nutrients and protection from colostrum and also negatively associated with exclusive breastfeeding is the practice of prelacteal feeding (20).

Using nationally representative data from the 2012 and 2017 Indonesia Demographic and Health Surveys (IDHS), we examined the determinants of delayed breastfeeding initiation in the first hour of life, prelacteal feeding in the first 3 days of life, and non-exclusive breastfeeding practices in the last 24 h preceding each survey. Program managers and policymakers could use our findings to plan and implement programmatic actions to accelerate optimal breastfeeding practices in Indonesia, especially in the first 6 months of life.

2. Methods

2.1. Data source

We used data from the 2012 and 2017 IDHS, national surveys conducted regularly by Statistics Indonesia (*Badan Pusat Statistik*) in partnership with the National Population and Family Planning Board and the Ministry of Health of the Republic of Indonesia (15, 21). The IDHS aims to provide a comprehensive overview of population issues in Indonesia, particularly basic demographic and health indicators.

Four types of structured questionnaires were used in the 2012 and 2017 IDHS: Household, Woman, Currently Married Man, and Never-Married Man Questionnaire (15, 21). Information used in this analysis was derived from the Woman's and Household's Questionnaire. The Women's Questionnaire collected basic demographic and health characteristics of women aged 15–49 years, including their background characteristics and antenatal, delivery, postnatal care, and breastfeeding practices. Detailed information about IDHS sampling methods and fieldwork management has been reported elsewhere (15, 21).

In the 2012 IDHS, a total of 43,852 households (99% response rate) and 45,607 eligible women (95.9% response rate) were interviewed, while in the 2017 IDHS, 47,963 households (99.5% response rates) and 49,627 eligible women (97.8% response rates) were interviewed (15, 21). For this analysis, we used information collected from 3,198 singleton live-born infants aged 0–5 months (1,621 from 2012 and 1,577 from the 2017 IDHS).

2.2. Study outcomes

There were three outcomes of suboptimal early infant feeding practices used in this analysis: (1) delayed breastfeeding initiation in the first hour of life, (2) prelacteal feeding in the first 3 days of life, and (3) non-exclusive breastfeeding in the last 24 h preceding the survey. The first outcome, initiation of breastfeeding, was assessed based on the time when the newborn was placed on the mother's chest immediately after birth for skin-to-skin contact (2). If the respondent answered 1 h or more, the infant was categorized as having a delayed initiation of breastfeeding. The second outcome, prelacteal feeding, refers to the practice of giving infants food/liquid before breastfeeding is initiated (within 3 days of birth) (22). The third outcome, non-exclusive breastfeeding, was defined as infants who reported having consumed any food/liquid other than breastmilk (not including oral rehydration solution, drops, or syrups) in the last 24 h preceding the survey (2).

2.3. Potential predictors

Our analysis used 29 potential predictors of delayed initiation of breastfeeding. These variables were classified into six groups: (1) environmental, (2) household, (3) maternal, (4) pregnancy, (5) delivery, and (6) child characteristics. For prelacteal feeding, we included an additional variable of delayed initiation of breastfeeding. For non-exclusive breastfeeding, two additional variables were included, i.e., delayed initiation of breastfeeding and prelacteal feeding (Figure 1).

Using the principal component analysis method (23), we constructed a household wealth index using 11 housing variables

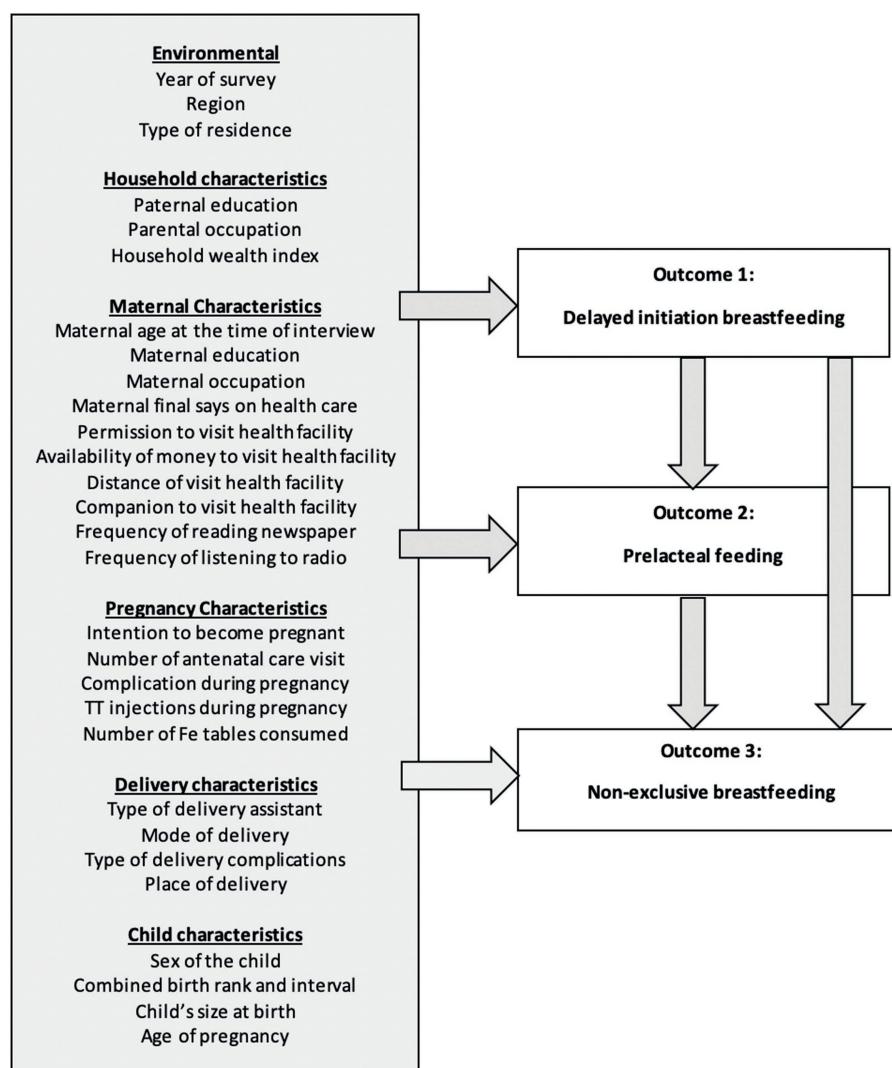


FIGURE 1

Potential predictors analyzed for factors associated with suboptimal early feeding practices in infants aged 0–5months in Indonesia.

and household assets: primary material of the floor and wall, type of toilet, availability of electricity, source of drinking water, and possession of radio, television, fridge, bicycle, motorcycle, and car. This was followed by constructing a five-category household wealth index variable: the poorest, poor, middle, rich, and richest.

The variable of 'maternal final says on health care' was constructed based on respondents' responses about the person who usually decides on the respondent's health care. The answers were grouped into women alone, women with her partner, and partners alone. The variable of 'child size at birth' was used to reflect the maternal subjective assessment of the infant's size, due to the high missing value of birth weight at birth in the IDHS.

2.4. Statistical analysis

Initially, the characteristics of all infants included in this analysis were examined using frequency tabulations. The univariate logistic regression analysis was performed without adjusting for other

covariates to assess the crude association between each potential predictor and study outcome.

The multivariable regression analysis was conducted to investigate the relationship between potential predictors and study outcomes by controlling for other covariates. The backward elimination procedure was employed to select factors significantly associated with each study outcome (significance level of 0.05). All potential predictors were included in the baseline model. We retained all variables significantly associated with study outcomes in the final model in addition to some variables selected *a priori* regardless of their significance level, i.e., the year of IDHS, region, and type of residence (urban/rural). This study calculated odds ratios (ORs) and 95% confidence intervals (CIs). All estimates were weighted by sampling probabilities. STATA/MP version 16.0 was used for all statistical analyses (Stata Corporation, College Station, TX, United States).

This is a secondary analysis of the IDHS data available in the public domain; therefore, ethical approval is not required. The study was conducted according to internationally agreed ethical principles for medical research.

3. Results

Of the 3,198 infants aged 0–5 months analyzed in this study, approximately 78.6% (95% CI: 76.65–80.8) had at least one of the three suboptimal early infant feeding practices evaluated in this study. Approximately 45.77% (95% CI: 43.44–48.11) infants were not put to their mother's breast in the first hour of life; 50.43% (95% CI: 47.98–52.87) infants received prelacteal feeding in the first 3 days of life, and 55.32% (95% CI: 52.99–57.63) were not exclusively breastfed in the last 24 h preceding the survey. There were 20.15% (95% CI: 18.37–22.05) of infants who had all three suboptimal feeding practices. **Figure 2** shows the changes in the three outcome indicators between the 2012 and the 2017 IDHS.

The frequency distribution of variables used in this analysis and their distribution by each outcome variable is presented in **Table 1**. Around 57% of the mothers did not work outside the house, 86% had at least four antenatal visits and 90% were assisted by trained attendants at delivery. **Supplementary Table S1** shows the results of the univariable analysis of factors associated with each study outcome.

Table 2 presents the results of the multivariable analysis of factors associated with each outcome indicator in this analysis. For the delayed initiation of breastfeeding, we found a significant reduction in the odds in **2017 IDHS** compared to 2012 IDHS (aOR = 0.77, 95% CI: 0.62–0.95), infants from **Sumatera Region** (aOR = 2.02, 95% CI: 1.59–2.57), and from **Eastern Indonesia** (aOR = 1.36, 95% CI: 1.07–1.73). In household and maternal level characteristics, infants whose fathers had a high **level of education** had reduced odds. In contrast, infants whose mothers had a high level of education had increased odds of delayed initiation of breastfeeding. Our study also showed increased odds in infants who had less than **four antenatal visits** (aOR = 1.56, 95% CI: 1.16–2.11), delivered by **Cesarean Section** (aOR = 2.78, 95% CI: 2.07–3.73), and **delivered in non-health facilities** (aOR = 1.53, 95% CI: 1.15–2.03). Increased odds were also associated with the **first birth rank infants** (aOR = 1.56, 95% CI: 1.24–1.97).

For the prelacteal feeding practice, similar to the delayed initiation of breastfeeding practice, we found significantly lower odds in **2017 than** in 2012 IDHS (aOR = 0.57, 95% CI: 0.46–0.72) (**Table 2**). Amongst the environmental-level characteristics, increased odds of prelacteal feeding was found in infants living in **Sumatera Region** (aOR = 1.45, 95% CI: 1.10–1.89) and in **urban areas** (aOR = 1.32, 95% CI: 1.02–1.70). Amongst the household-level characteristics, a reduced odds of delayed initiation of breastfeeding was found in infants of **not-working fathers** (aOR = 0.26, 95% CI: 0.11–0.60), while an increased odds was associated with infants born to mothers from **wealthy households**. An increased odds for prelacteal feeding was also associated with the **first birth rank infants** (aOR = 1.32, 95% CI: 1.05–1.66) and infants who reported having **delayed initiation of breastfeeding** in the first hour of life (aOR = 3.90, 95% CI: 3.17–4.79).

For the non-exclusive breastfeeding practice in the last 24 h preceding the survey, our multivariable analysis showed significantly lower odds in **2017** than in 2012 IDHS (aOR = 0.78, 95% CI: 0.63–0.96) (**Table 2**). Among the environmental and household-level characteristics, increased odds was found in infants living in **Sumatera Region** (aOR = 1.29, 95% CI: 1.02–1.63) and **urban areas** (aOR = 1.36, 95% CI: 1.08–1.70). We found reduced odds of non-exclusive breastfeeding amongst infants whose **fathers were educated**, while increased odds were found in mothers from **richer households**. Regarding maternal characteristics, the odds of non-exclusive breastfeeding increased significantly in **mothers working in the non-agricultural field** (aOR = 1.52, 95% CI: 1.21–1.90). Regarding the pregnancy and delivery characteristics, increased odds were associated with mothers attending **less than four antenatal care services** (aOR = 1.80, 95% CI: 1.36–2.38), mothers **delivered by Cesarean section** (aOR = 1.33, 95% CI: 1.01–1.75), and among the **first birth-ranked infants** (aOR = 1.28, 95% CI: 1.01–1.62). An increased odds for non-exclusive breastfeeding in the last 24 h was also associated with infants who had **delayed initiation of breastfeeding** (aOR = 1.47, 95% CI: 1.18–1.82) in the first hour of life and with those who received **prelacteal feeding** in the first 3 days of life (aOR = 1.62, 95% CI: 1.30–2.00).

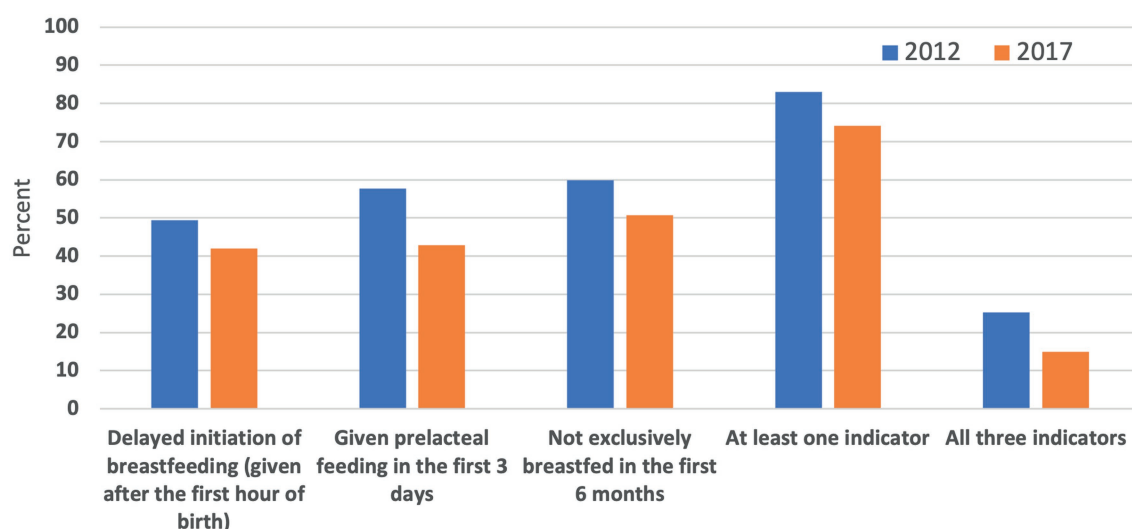


FIGURE 2

The changes in the prevalence of suboptimal early feeding practices in infants aged 0–5 months in Indonesia, The 2012 and 2017 IDHS.

TABLE 1 Frequency distribution of variables analyzed by three suboptimal early infant feeding practices (delayed initiation of breastfeeding, prelacteal feeding, and non-exclusive breastfeeding in the last 24h preceding the survey), The 2012 and 2017 IDHS.

Variable	Frequency		Prevalence		
			Delayed initiation of breastfeeding	Prelacteal Feeding	Non-exclusive breastfeeding in the last 24h
	<i>n</i>	%	%	%	%
Suboptimal infant feeding practice					
Non-exclusive breastfeeding					
No	1428	44.68	35.79	36.44	
Yes	1769	55.32	64.21	63.56	
Prelacteal feeding					
No	1585	49.57	30.95		46.94
Yes	1612	50.43	69.05		63.56
Delayed initiation of breastfeeding					
No	1463	45.77		69.05	35.79
Yes	1734	54.23		34.71	52.17
Environmental characteristics					
Year of survey					
2012	1621	50.68	49.42	57.76	59.82
2017	1577	49.32	42.01	42.89	50.7
Region					
Java-Bali	1711	53.52	41.41	48.33	46.59
Sumatera	759	23.75	57.88	60.03	38.86
Eastern Indonesia	727	22.73	43.37	45.32	46.26
Type of place of residence					
Rural	1532	47.93	46.55	49.19	41.45
Urban	1665	52.07	45.04	51.56	47.64
Household-level characteristics					
Husband's education					
No education	37	1.15	57.15	42.62	33.02
Incomplete primary school	205	6.41	39.56	43.01	48.51
Completed primary school	672	21.01	44.95	48.29	45.35
Incomplete secondary school	753	23.54	45.11	47.98	47.29
Secondary school or above	1482	46.36	47.06	54.42	43.35
Husband's occupation					
Non agriculture	2416	75.56	45.83	51.08	43.69
Agriculture	700	21.90	45.97	50.97	48.98
Not working	28	0.88	47.84	25.57	43.52
Household wealth index					
Poorest	532	16.63	40.5	43.39	49.67
Poorer	642	20.08	46.11	46.8	45.6
Middle	791	24.73	46.66	49.44	44.34
Richer	592	18.51	45.93	54.27	40.13
Richest	485	15.17	47.13	58.91	44.85
Maternal characteristics					
Maternal age at the time of interview					
Less than 20 years old	219	6.86	49.09	56.58	41.2
20–29 years old	1646	51.47	46.32	51.37	44.95
30–39 years old	1169	36.57	44.01	48.5	44.98
40 or more years old	163	5.10	48.25	46.5	44.45

(Continued)

TABLE 1 (Continued)

Variable	Frequency		Prevalence		
			Delayed initiation of breastfeeding	Prelacteal Feeding	Non-exclusive breastfeeding in the last 24h
	<i>n</i>	%	%	%	%
Maternal education					
No education	55	1.71	32.85	27.83	26.36
Incomplete primary school	199	6.23	44.84	41.39	45.82
Completed primary school	609	19.06	42.81	50.41	46.15
Incomplete secondary school	898	28.09	46.86	48.38	44.49
Secondary school or above	1436	44.91	46.96	53.83	44.71
Maternal occupation					
Not working	1831	57.27	44.17	49.53	48.68
Agriculture	210	6.57	43.71	40.43	46.22
Non agriculture	1156	36.16	48.67	53.66	38.05
Maternal final says on health care					
Woman alone	1139	35.63	44.71	49.67	44.32
Woman with partner	1553	48.59	46.21	52.06	45.62
Partner alone	456	14.26	47.74	50.49	43.45
Permission to visit health care facility					
Not concerned	2996	93.70	45.44	50.57	44.53
Concerned	194	6.07	51.08	48.86	45.97
Availability of money to visit health care facility					
Not concerned	2719	85.03	45.51	51.35	44.82
Concerned	470	14.69	47.24	45.28	43.59
Distance to visit health care facility					
Not concerned	2822	88.26	45.37	50.63	44.78
Concerned	366	11.43	48.93	49.28	43.43
Companion to visit health care facility					
Not concerned	2381	74.45	44.56	50.72	45.06
Concerned	808	25.26	49.29	49.65	43.42
Frequency of reading newspaper					
At least once a week	307	9.61	45.82	51.35	35.21
Less than once a week	1134	35.47	48.14	54.11	45.02
Never	1748	54.68	44.21	47.88	46.15
Frequency of listening to radio					
At least once a week		12.57	45.58	53.38	40.17
Less than once a week		32.92	46.52	56.5	43.19
Never		54.49	45.34	46.09	46.6
Pregnancy characteristics					
Intention to become pregnant					
Then	2599	81.29	45.47	51.43	43.71
Later	324	10.12	45.6	44.43	53.91
No more	268	8.37	47.52	49.28	43.95
Antenatal care visit					
Four or more visits	2753	86.11	44.74	51.21	46.27
Less than four visits	444	13.89	52.15	45.55	34.81
Complications during pregnancy					
Without complication	2684	83.95	45.71	50.11	45.25
With complication	513	16.05	46.08	52.08	41.67

(Continued)

TABLE 1 (Continued)

Variable	Frequency		Prevalence		
			Delayed initiation of breastfeeding	Prelacteal Feeding	Non-exclusive breastfeeding in the last 24h
	<i>n</i>	%	%	%	%
Tetanus Toxoid injections during pregnancy					
Never	1090	34.10	49.7	53.19	41.79
One injection	877	27.43	43.1	49.18	49.69
Two or more injections	1180	36.91	43.71	49.35	43.98
Do not know	40	1.26	47.2	45.96	44.35
Number of iron tablets consumed					
None	585	18.30	46.15	47.28	39.23
<90	1219	38.11	46.85	51.67	43.39
90–179	562	17.57	40.04	49.85	49.52
180+	683	21.35	45.27	51.91	51.46
Do not know	105	3.27	57.85	52.53	30.31
Delivery characteristics					
Delivery assistant					
Health professional	2893	90.49	45.76	50.9	44.88
None/traditional birth attendants	288	9.00	45.85	47.54	43.59
Mode of delivery					
Vaginal delivery	2651	82.93	41.99	47.78	46.64
Cesarean Section	546	17.07	64.1	63.3	35.14
Type of delivery complications					
None	1231	38.50	43.5	51.72	43.73
Any complication	1804	56.43	47.2	49.58	45.98
Place of delivery					
Public health facilities	1176	34.27	43.62	46.09	52.72
Private health facilities	1279	37.27	48.94	55.12	59.97
Non-health facilities (e.g., at home or other places outside the health facility)	977	28.47	48.62	50.46	59.16
Child characteristics					
Sex of the child					
Female	1579	49.39	45.31	49.93	46.17
Male	1618	50.61	46.21	50.91	43.22
Combined birth rank and birth interval					
2nd/3rd birth rank, more than 2-years interval	1445	45.20	42.2	48.06	48.06
1st birth rank	1176	36.78	52.53	57.54	38.93
2nd/3rd birth rank, less than or equal 2-years interval	160	5.00	36.36	44.65	56.6
4th birth rank, more than 2-years interval	338	10.57	45.27	42.45	43.61
4th birth rank, less than or equal to 2-years interval	79	2.46	31.43	33.64	48.81
Child's size at birth					
Average	1787	55.88	44.77	50.65	44.35
Smaller than average	397	12.40	52.29	54.03	41.35
Larger than average	937	29.30	44.12	48.94	47.31
Age of pregnancy					
Term	3116	97.47	45.85	50.27	44.93
Preterm	76	2.38	42.31	59.66	36.85

TABLE 2 Factors associated with suboptimal early feeding practices in infants aged 0–5months, The 2012 and 2017 IDHS.

Variable	Delayed initiation of breastfeeding				Prelacteal feeding				Non-exclusive breastfeeding in the last 24h			
	aOR	95% CI		<i>p</i>	aOR	95% CI		<i>p</i>	aOR	95% CI		<i>p</i>
Suboptimal infant feeding practice												
Prelacteal feeding												
No									1.00			
Yes									1.62	1.30	2.00	<0.001
Delayed initiation of breastfeeding												
No					1.00				1.00			
Yes					3.90	3.17	4.79	<0.001	1.47	1.18	1.82	<0.001
Environmental characteristics												
Year of survey												
2012	1.00				1.00				1.00			
2017	0.77	0.62	0.95	0.014	0.57	0.46	0.72	<0.001	0.78	0.63	0.96	0.018
Region												
Java-Bali	1.00				1.00				1.00			
Sumatera	2.02	1.59	2.57	<0.001	1.45	1.10	1.89	0.007	1.29	1.02	1.63	0.033
Eastern Indonesia	1.36	1.07	1.73	0.013	1.00	0.77	1.29	0.975	1.15	0.91	1.45	0.231
Type of place of residence												
Rural	1.00				1.00				1.00			
Urban	0.95	0.74	1.21	0.673	1.32	1.02	1.70	0.035	1.36	1.08	1.70	0.008
Household-level characteristics												
Husband's education												
No education	1.00								1.00			
Incomplete primary school	0.31	0.13	0.73	0.007					0.39	0.19	0.79	0.009
Completed primary school	0.44	0.19	1.01	0.053					0.39	0.20	0.77	0.007
Incomplete secondary school	0.37	0.16	0.85	0.020					0.36	0.18	0.72	0.004
Secondary school or above	0.38	0.17	0.88	0.024					0.32	0.16	0.63	0.001
Husband's occupation												
Non agriculture					1.00							
Agriculture					1.03	0.78	1.36	0.838				
Not working					0.26	0.11	0.60	0.002				
Household wealth index												
Poorest	1.00				1.00				1.00			
Poorer	1.29	0.95	1.76	0.104	1.05	0.75	1.47	0.775	1.27	0.93	1.73	0.136
Middle	1.38	1.00	1.90	0.050	1.26	0.90	1.75	0.172	1.32	0.96	1.80	0.085
Richer	1.37	0.95	1.98	0.092	1.63	1.13	2.36	0.009	1.60	1.14	2.24	0.007
Richest	1.41	0.92	2.14	0.112	2.05	1.34	3.15	0.001	1.21	0.83	1.75	0.322
Maternal characteristics												
Maternal education												
No education	1.00											
Incomplete primary school	2.77	1.14	6.73	0.025								
Completed primary school	2.53	1.13	5.70	0.025								
Incomplete secondary school	2.87	1.27	6.48	0.011								
Secondary school or above	2.60	1.13	6.00	0.025								
Maternal occupation												
Not working									1.00			
Agriculture									1.02	0.69	1.51	0.935
Non agriculture									1.52	1.21	1.90	<0.001

(Continued)

TABLE 2 (Continued)

Variable	Delayed initiation of breastfeeding				Prelacteal feeding				Non-exclusive breastfeeding in the last 24h			
	aOR	95% CI		<i>p</i>	aOR	95% CI		<i>p</i>	aOR	95% CI		<i>p</i>
Pregnancy characteristics												
Antenatal care visit												
Four or more visits	1.00								1.00			
Less than four visits	1.56	1.16	2.11	<0.001					1.80	1.36	2.38	<0.001
Delivery characteristics												
Mode of Delivery												
Vaginal delivery	1.00								1.00			
Cesarean Section	2.78	2.07	3.73	<0.001					1.33	1.01	1.75	0.044
Place of delivery												
Public health facilities	1.00											
Private health facilities	1.24	0.96	1.60	0.098								
Non-health facilities (e.g., at home or other places outside the health facility)	1.53	1.15	2.03	0.003								
Child characteristics												
Combined birth rank and birth interval												
2nd/3rd birth rank, more than 2-years interval	1.00				1.00				1.00			
1st birth rank	1.56	1.24	1.97	<0.001	1.32	1.05	1.66	0.019	1.28	1.01	1.62	0.039
2nd/3rd birth rank, less than or equal 2-years interval	0.68	0.44	1.07	0.093	0.86	0.53	1.40	0.542	0.60	0.38	0.95	0.030
4th birth rank, more than 2-years interval	1.01	0.72	1.40	0.976	0.72	0.52	1.01	0.058	1.11	0.82	1.50	0.494
4th birth rank, less than or equal to 2-years interval	0.54	0.28	1.03	0.060	0.58	0.28	1.21	0.148	0.86	0.46	1.61	0.642

Only variables significantly associated with study outcomes were retained in the final model.

Year of IDHS, region, and type of residence (urban/rural) were selected a priori to be retained in the final model regardless of their significance level.

4. Discussion

4.1. Main findings

Our study showed that approximately three-quarters of the infants aged 0–5 months in Indonesia had at least one of the suboptimal early infant feeding practices examined in this analysis (either delayed initiation of breastfeeding in the first hour of life, prelacteal feeding in the first 3 days of life, or not exclusively breastfed in the past 24h preceding the survey). The determinants of delayed initiation of breastfeeding in the first hour of life were the year of IDHS, the region where infants lived, the father's and mother's level of education, antenatal visit, mode of delivery, place of delivery, and birth rank. Our study also found different factors associated with prelacteal breastfeeding practices in the first 3 days of life, i.e., the year of IDHS, the region where infants lived, type of residence, fathers' occupation, household wealth index, birth rank, and timely initiation of breastfeeding. The predictors of exclusive breastfeeding practice in the last 24 days preceding the survey found in our analysis were the year of IDHS, the region where infants lived, type of residence, fathers' education, household wealth index, mother's occupation, antenatal visits, mode of delivery, birth rank, timely initiation of breastfeeding and prelacteal feeding practices. Our study showed the association between different factors and suboptimal early infant feeding practices.

This could be used by program managers to formulate evidence-based interventions, including programmatic actions to overcome barriers to adopting recommended early infant feeding practices in Indonesia.

4.2. Increasing knowledge and awareness of optimal feeding practice

Our analysis found an increased likelihood for suboptimal early infant feeding practices in infants from Sumatera and the Eastern part of Indonesia, compared to those from the Java-Bali region. Lower access to health care services or health information in Sumatera and the Eastern part of Indonesia could contribute to the suboptimal early infant feeding practices. The disparity in access to and use of health services in those areas was also reported in previous studies (24, 25). Interestingly, although access to services and information is more likely to be limited in rural areas, our findings showed that infants from urban areas were more likely to be fed sub-optimally. An earlier study reported a similar finding showing better feeding practices among infants in rural than urban areas (26). The availability and accessibility of various breastmilk substitutes, heavily marketed in urban areas, could also explain this finding. Additionally, high female participation in the workforce in urban areas (27) may force mothers in cities to feed their infants with breastmilk substitutes.

Furthermore, this analysis found an association between the household wealth index and early infant feeding practices. An increased likelihood of infants having suboptimal early infant feeding practices when their mothers were from a high household wealth index could reflect the household's economic capability to provide prelacteal food and formula milk as breastmilk substitutes. Additionally, as reported in previous literature (28, 29), we found that infants born to mothers with a high educational level were more likely to have suboptimal feeding practices. Mothers with a high education level will be more likely to have a high household wealth index and thus, could afford formula milk. This could further be aggravated by the fact that in some communities, formula milk is considered a marker of prestige (30).

The first birth-rank infants in this study were also more likely to have delayed initiation of breastfeeding, receive prelacteal feeding, and not be exclusively breastfed. This could be attributable to the difference in the knowledge between multiparous and primiparous women. Multiparous mothers were considered more knowledgeable and experienced in breastfeeding than primiparous women (31).

All these findings demonstrated the need for effective health promotion strategies in raising community awareness about the critical role of appropriate infant and young child feeding practices, including during early infancy. The educational intervention should specifically target mothers living in the Sumatera and Eastern part of Indonesia region, from rural areas, with a high household wealth index, high education level, as well as primiparous mothers. Previous literature showed that there were various effective educational interventions that could promote mothers' self-efficacy and optimal breastfeeding practices, including those based on self-efficacy and planned behavior theory or internet technologies (32, 33).

The significant association between the three early infant feeding practices analyzed in this study also emphasizes the need to target women early, for example, during antenatal care services. This was reflected in this analysis as women who attended fewer than four antenatal visits were more likely to delay breastfeeding initiation and not exclusively breastfeed their infants. Various studies also showed a significant association between antenatal care services and optimal breastfeeding practices (34). Mothers with adequate antenatal visits had increased opportunities to receive various health-related education, including lactation guidance and counseling. According to a study conducted in Lao PDR, around half of the mothers intended to purchase infant formula after watching its television advertisements (35). This poses a great challenge to health workers to consistently educate the community to make the most appropriate feeding for infants. Therefore, health workers should possess adequate knowledge and counseling skills to educate mothers and their family members. Health workers should also take advantage of every contact opportunity to promote optimal infant and young child feeding practices.

4.3. Supportive public policy

As breastfeeding requires collective social responsibilities to remove barriers to its practice, our findings highlight the need for a supportive public policy to encourage mothers to have optimal infant feeding practices. Our analysis shows that working mothers were more likely than non-working mothers not exclusively to breastfeed their infants. This was consistent with our previous study using the 2002/2003 and 2017 IDHS (16).

The improved optimal breastfeeding practices between 2012 and 2017 IDHS could reflect some of the supportive policies and regulations the Government of Indonesia has introduced since 2003 (36). This includes the 2003 Labor Law that forces employers to provide 3 months of paid maternity leave and allow breastfeeding breaks for working women. Later in 2009, a Joint Regulation from the Ministry of Women's Empowerment, the Ministry of Manpower and Transmigration, and the Ministry of Health were issued that highlighted the benefits of breastfeeding and endorsed the provision of lactation rooms as well as breastfeeding breaks at workplaces during working hours (37). Furthermore, the government targeted the minimum rate of 50% for early initiation of breastfeeding and exclusive breastfeeding in the Strategic Plan of the Ministry of Health 2015–2019 (38).

However, despite the improvement, there are still challenges encountered in implementing these policies. For example, the maternity leave policy only regulates 13 weeks of paid maternity leave (39). This limits the ability of mothers to exclusively breastfeed their infants for 6 months. It was further reported that this regulation was not yet optimally enforced, as many eligible women still did not receive it (40). At workplaces, unclear policies at the workplace were also reported, for example, whether mothers could use their rest breaks at work to express breastmilk or the unavailability of lactation rooms at work (41). If the guidelines existed, the implementation was sometimes unclear and ineffective (42). Moreover, it is also important to formulate policies protecting women working in informal sectors, which remain unregulated.

One of the most complicated challenges for optimal breastfeeding practice is the aggressive and inappropriate marketing of breastmilk substitutes. Despite the World Health Assembly's (WHA) adoption of the International Code of Marketing of Breastmilk Substitutes (The Code) in 1981, which outlines the international policy framework for protecting breastfeeding from unethical marketing practices (43), many countries continue to face difficulties in incorporating The Code into their legislation (44). A study in Indonesia examining compliance with The Code found violations among breastmilk substitute companies as well as health workers in all studied sites (45). Approximately 72% of women saw breastmilk substitute promotional materials in healthcare facilities. This points to the need for a monitoring system to ensure improved Code compliance and enforcement, as well as to raise awareness among stakeholders, including the general community, health workers, government, and manufacturers.

4.4. Creating supportive environments

An increased likelihood of delayed initiation of breastfeeding or non-exclusive breastfeeding in women who delivered through Cesarean section, as reported in other studies, was confirmed in our analysis (46, 47). This could be related to the problem of lactogenesis due to abdominal surgery. The Cesarean section might disrupt the hormonal pathway that spurs lactogenesis because of maternal stress or lowers oxytocin secretion (48). Delivery complications that were more likely to occur in the first pregnancy could force women to have a Cesarean section. Consequently, mothers could be separated from their infants, leading to delayed breastfeeding initiation in the first hour after delivery (31). Some studies reported that routines care after a Cesarean section interfered with bonding and delayed mothers holding their infants (49). Furthermore, some hospital settings lacked

a specific breastfeeding protocol and were not Baby Friendly Initiatives certified (50). This shows that supportive care should begin immediately after delivery and continue until the early postpartum period for mothers with Cesarean sections. The availability and access to trained lactation consultants and other breastfeeding support are critical to promoting early initiation of breastfeeding and long-term breastfeeding success.

Furthermore, we found an increased likelihood of delayed breastfeeding initiation among those delivered in non-health facilities. In Indonesia, although more than 20% of deliveries in Indonesia still occurred at home, more than 90% of deliveries were already attended by skilled birth attendants (15). This shows the need for skilled birth attendants to continually promote optimal breastfeeding practices, including for mothers delivered outside health facilities.

4.5. Strengths and limitations of the study

The study had several strengths. First, this study used two nationally representative survey datasets with a large sample size to investigate the role of various predictors of early feeding practices in infants aged 0–5 months. Second, the IDHS also used a standardized questionnaire and methods that could be used to compare results across years of surveys and countries. However, when interpreting the findings of this study, several limitations should be considered. We used 24 h recall data for exclusive breastfeeding; therefore, the rate of exclusive breastfeeding might be overestimated. Some recall bias might occur, as mothers of older infants might forget details in their infants' early days of life. However, our analysis used information only from mothers of infants aged 0–5 months, which could minimize the bias. The information provided in this study was not validated as in other cross-sectional surveys. Nevertheless, these limitations did not affect the validity of our results.

4.6. Conclusion

Our study found a high percentage of infants aged 0–5 months who had suboptimal feeding practices in Indonesia. There was a significant association between environmental, household, maternal, pregnancy, delivery, and child characteristics with delayed initiation of breastfeeding in the first hour of life, prelacteal feeding in the first 3 days of life, and non-exclusive breastfeeding in the last 24 h preceding the survey. This highlights the importance of an integrated approach to ensure that infants receive adequate nutrition for their health, growth, and development in their early years. Effective health education interventions, using different channels of communication as well as through antenatal care services, are critical in raising mothers, other family members, and the general community's awareness and understanding of the importance of optimal early infant feeding practices. Consequently, improving health workers' awareness, knowledge, and skills is critical to conduct effective counseling and other health promotion strategies. Moreover, efforts to create supportive public policies, such as maternal leave regulations or the implementation of the International Code of Marketing of Breastmilk Substitutes, should be accompanied by continuous monitoring and rigorous enforcement. Furthermore, breastfeeding protocol and Baby Friendly Hospital Initiatives could be continuously promoted at health facilities to better support breastfeeding practices in Indonesia.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number (s) can be found below: The DHS Program (<https://dhsprogram.com/data/available-datasets.cfm>).

Ethics statement

Ethical approval was not provided for this study on human participants because this is a secondary analysis of the Indonesia Demographic and Health Survey (IDHS) data available in the public domain; therefore, ethical approval is not required. The study was conducted according to internationally agreed ethical principles for medical research. The patients/participants provided their written informed consent to participate in this study.

Author contributions

CT and RW conceived the study. CT, AM, and IA conducted data analysis. CT drafted the manuscript. RW and IA contributed to the literature review and provided advice on the data analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fnut.2023.1080727/full#supplementary-material>

References

- World Health Organization. Infant and young child feeding: key facts Geneva: World Health Organization (2021). Available at: <https://www.who.int/news-room/fact-sheets/detail/infant-and-young-child-feeding> (Accessed September 15, 2022).
- World Health Organization and UNICEF. Indicators for assessing infant and young child feeding practices: definitions and measurement methods: CC BY-NC-SA 3.0 IGO. Available at: <https://creativecommons.org/licenses/by-nc-sa/3.0/igo/> (2021).
- Rollins NC, Bhandari N, Hajeebhoy N, Horton S, Lutter CK, Martines JC, et al. Why invest, and what it will take to improve breastfeeding practices? *Lancet*. (2016) 387:491–504. Epub 2016/02/13. doi: 10.1016/s0140-6736(15)01044-2
- Smith ER, Hurt L, Chowdhury R, Sinha B, Fawzi W, Edmond KM, et al. Delayed breastfeeding initiation and infant survival: a systematic review and meta-analysis. *PLoS One*. (2017) 12:e0180722. doi: 10.1371/journal.pone.0180722
- World Health Organization. Infant and young child feeding: model chapter for textbooks for medical students and allied health professionals In: *Infant and Young Child Feeding: Model Chapter for Textbooks for Medical Students and Allied Health Professionals*. Geneva: World Health Organization (2009)
- Adem A, Assefa N, Deresa M, Yuya M, Ayana GM, Negash B, et al. Prelacteal feeding practices and its associated factors among mother of children less than 2 years of age in Kersa District, eastern Ethiopia. *Global. Pediatr Health*. (2021) 8:2333794X211018321. doi: 10.1177/2333794x211018321
- Birhan TY, Birhan NA, Alene M. Pooled prevalence and determinants of Prelacteal feeding practice in eastern Africa evidence from demographic and health survey data: a multilevel study. *Risk Manag Healthc Policy*. (2021) 14:1085–1095. Epub 14:1085–95. doi: 10.2147/rmhp.S297564
- World Health Organization, and Unicef. *Global Strategy for Infant and Young Child Feeding*. Geneva: World Health Organization (2003).
- Horta BL, Victora CG. *Long-Term Effects of Breastfeeding: A Systematic Review*. Geneva: World Health Organization (2013).
- Horta BL, Victora CG. *Short-Term Effects of Breastfeeding: Systematic Review on the Benefits of Breastfeeding on Diarrhoea and Pneumonia Mortality*. Geneva: World Health Organization (2013).
- Victora CG, Bahl R, Barros AJD, França GVA, Horton S, Krasevec J, et al. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *Lancet*. (2016) 387:475–90. doi: 10.1016/S0140-6736(15)01024-7
- World Health Organization. *Global nutrition targets 2025: Policy brief series (WHO/NMH/NHD/14.2)*. Geneva: World Health Organization (2014).
- World Health Organization. *WHO/UNICEF Discussion Paper: The Extension of the 2025 Maternal, Infant and Young Child Nutrition Targets to 2030*. Geneva: World Health Organization (2019).
- Statistics Indonesia, National Family Planning Coordinating Board, Ministry of Health Republic of Indonesia, and ORC Macro. Indonesia Demographic and Health Survey. *Calverton*. Maryland: BPS and ORC Macro (2007). 2008 p.
- Statistics Indonesia, National Family Planning Coordinating Board, Ministry of Health Republic of Indonesia, and Macro, O. Indonesia Demographic and Health Survey. *Calverton*. Maryland: BPS and ORC Macro (2017). 2017 p.
- Titaley CR, Loh PC, Prasetyo S, Ariawan I, Shankar AH. Socioeconomic factors and use of maternal health services are associated with delayed initiation and non-exclusive breastfeeding in Indonesia: secondary analysis of Indonesia demographic and health surveys 2002/2003 and 2007. *Asia Pac J Clin Nutr*. (2014) 23:91–104. Epub 2014/02/25. doi: 10.6133/apjcn.2014.23.1.18
- Tan KL. Factors associated with exclusive breastfeeding among infants under six months of age in peninsular Malaysia. *Int Breastfeed J*. (2011) 6:2. doi: 10.1186/1746-4358-6-2
- Sorrie MB, Amaje E, Gebremeskel F. Pre-lacteal feeding practices and associated factors among mothers of children aged less than 12 months in Jinka town, South Ethiopia, 2018/19. *PLoS One*. (2020) 15:e0240583. Epub 2020/10/14. doi: 10.1371/journal.pone.0240583
- Khanal V, Scott JA, Lee AH, Karkee R, Binns CW. Factors associated with early initiation of breastfeeding in Western Nepal. *Int J Environ Res Public Health*. (2015) 12:9562–74. doi: 10.3390/ijerph120809562
- Lakati AS, Makokha OA, Binns CW, Kombe Y. The effect of pre-lacteal feeding on full breastfeeding in Nairobi. *Kenya East Afr J Public Health*. (2010) 7:258–62. Epub 2011/04/27. doi: 10.4314/eajph.v7i3.64737
- Statistics Indonesia, National Family Planning Coordinating Board, Ministry of Health Republic of Indonesia, and Macro, O. Indonesia Demographic and Health Survey. *Calverton*. Maryland: BPS and ORC Macro (2012). 2013 p.
- USAID, Davies, U, WHO, UNICEF, and IFPRI. Indicators for assessing infant and young child feeding practices. Part 1. Definitions. (2008). Available at: www.enonline.net/iyfcindicators
- Filmer D, Pritchett LH. Estimating wealth effects without expenditure data--or tears: an application to educational enrollments in states of India. *Demography*. (2001) 38:115–32. doi: 10.1353/dem.2001.0003
- Nababan HY, Hasan M, Marthias T, Dhital R, Rahman A, Anwar I. Trends and inequities in use of maternal health care services in Indonesia, 1986–2012. *Int J Women's Health*. (2018) 10:11–24. doi: 10.2147/IJWH.S144828
- Laksono AD, Rukmini R, Wulandari RD. Regional disparities in antenatal care utilization in Indonesia. *PLoS One*. (2020) 15:e0224006. doi: 10.1371/journal.pone.0224006
- Wallenborn JT, Valera CB, Kounnavong S, Sayasone S, Odermatt P, Fink G. Urban-rural gaps in breastfeeding practices: evidence from Lao People's Democratic Republic. *Int J Public Health*. (2021) 66:1604062. doi: 10.3389/ijph.2021.1604062
- Green M, Pries AM, Hadihardjono DN, Izwardy D, Zehner E, Moran VH. Breastfeeding and breastmilk substitute use and feeding motivations among mothers in Bandung City, Indonesia. *Matern Child Nutr*. (2021) 17:e13189. doi: 10.1111/mcn.13189
- Kiwango F, Mboya IB, John B, Hashim T, Msuya SE, Mgongo M. Prevalence and factors associated with timely initiation of breastfeeding in Kilimanjaro region, northern Tanzania: a cross-sectional study. *BMC Pregnancy Childbirth*. (2020) 20:505. doi: 10.1186/s12884-020-03209-y
- Islam MA, Mamun A, Hossain MM, Bharati P, Saw A, Lestrel PE, et al. Prevalence and factors associated with early initiation of breastfeeding among Bangladeshi mothers: a nationwide cross-sectional study. *PLoS One*. (2019) 14, 14:e0215733. doi: 10.1371/journal.pone.0215733
- Deubel TF, Miller EM, Hernandez I, Boyer M, Louis-Jacques A. Perceptions and practices of infant feeding among African American women. *Ecol Food Nutr*. (2019) 58:301–16. doi: 10.1080/03670244.2019.1598977
- Mukora-Mutseyekwa F, Gunguwo H, Mandigo RG, Mundagowa P. Predictors of early initiation of breastfeeding among Zimbabwean women: secondary analysis of ZDHS 2015. *Matern Health Neonatol Perinatol*. (2019) 5:2. doi: 10.1186/s40748-018-0097-x
- Chipojola R, Chiu H-Y, Huda MH, Lin Y-M, Kuo S-Y. Effectiveness of theory-based educational interventions on breastfeeding self-efficacy and exclusive breastfeeding: a systematic review and meta-analysis. *Int J Nurs Stud*. (2020) 109:103675. doi: 10.1016/j.ijnurstu.2020.103675
- Almohanna AA, Win KT, Meedya S. Effectiveness of internet-based electronic technology interventions on breastfeeding outcomes: systematic review. *J Med Internet Res*. (2020) 22:e17361. doi: 10.2196/17361
- Habtewold TD, Sharew NT, Alemu SM. Evidence on the effect of gender of newborn, antenatal care and postnatal care on breastfeeding practices in Ethiopia: a meta-analysis and meta-regression analysis of observational studies. *BMJ Open*. (2019) 9:e023956. doi: 10.1136/bmjopen-2018-023956
- Lee HMH, Durham J, Booth J, Sychareun V. A qualitative study on the breastfeeding experiences of first-time mothers in Vientiane, Lao PDR. *BMC Pregnancy Childbirth*. (2013) 13:223. doi: 10.1186/1471-2393-13-223
- Saputri NS, Spagnoletti BRM, Morgan A, Wilopo SA, Singh A, McPake B, et al. Progress towards reducing sociodemographic disparities in breastfeeding outcomes in Indonesia: a trend analysis from 2002 to 2017. *BMC Public Health*. (2020) 20:1112. doi: 10.1186/s12889-020-09194-3
- Ministry of Women's Empowerment Republic of Indonesia, Ministry of Manpower and Transmigration Republic of Indonesia, and Ministry of Health Republic of Indonesia, joint regulation on increasing breastfeeding in the workplace [Peraturan Bersama Peningkatan Pemberian air Susu Ibu Di Tempat Kerja] In: *Ministry of Women's empowerment Republic of Indonesia, Ministry of Manpower and Transmigration Republic of Indonesia, and Ministry of Health Republic of Indonesia*. Jakarta: (2008)
- Ministry of Health Republic of Indonesia. *Ministry of Health Republic of Indonesia. Strategic plan of Ministry of Health Republic of Indonesia, year 2015–2019 [Rencana Strategis Kementerian Kesehatan Tahun 2015–2019]*. Jakarta: Ministry of Health Republic of Indonesia (2015).
- Ministry of Manpower and Transmigration Republic of Indonesia. *Law No. 13/2003 concerning Manpower [Undang-undang No. 13/2003 tentang Ketenagakerjaan]*. Jakarta: (2003).
- Addati L, Cassirer N, Gilchrist K eds. *Maternity and Paternity at Work: Law and Practice Across the World*. Geneva: International Labour Organization (ILO) (2016).
- Sari Y. *Lack of Exclusive Breastfeeding Among Working Mothers in Indonesia*. Kesmas: Jurnal Kesehatan Masyarakat Nasional (2016) 11.
- Shetty P. Indonesia's breastfeeding challenge is echoed the world over. *Bull World Health Organ*. (2014) 92:234–5. doi: 10.2471/blt.14.020414
- World Health Organization. International code of marketing of breastmilk substitutes: World Health Organization (1981). Available at: <https://apps.who.int/iris/handle/10665/40382>
- Michaud-Létourneau I, Gayard M, Pelletier DL. Translating the international code of Marketing of Breastmilk Substitutes into national measures in nine countries. *Matern Child Nutr*. (2019) 15:e12730. doi: 10.1111/mcn.12730

45. Hidayana I, Februhartanty J, Parady VA. Violations of the international code of Marketing of Breastmilk Substitutes: Indonesia context. *Public Health Nutr.* (2017) 20:165–73. doi: 10.1017/s1368980016001567
46. Gayatri M, Dasvarma GL. Predictors of early initiation of breastfeeding in Indonesia: a population-based cross-sectional survey. *PLoS One.* (2020) 15:e0239446:15. doi: 10.1371/journal.pone.0239446
47. Hobbs AJ, Mannion CA, McDonald SW, Brockway M, Tough SC. The impact of caesarean section on breastfeeding initiation, duration and difficulties in the first four months postpartum. *BMC Pregnancy Childbirth.* (2016) 16:90. doi: 10.1186/s12884-016-0876-1
48. Hyde MJ, Mostyn A, Modi N, Kemp PR. The health implications of birth by caesarean section. *Biol Rev Camb Philos Soc.* (2012) 87:87. doi: 10.1111/j.1469-185X.2011.00195.x, 229, 243
49. Prior E, Santhakumaran S, Gale C, Philipps LH, Modi N, Hyde MJ. Breastfeeding after cesarean delivery: a systematic review and meta-analysis of world literature. *Am J Clin Nutr.* (2012) 95:1113–35. doi: 10.3945/ajcn.111.030254
50. Fair FJ, Morrison A, Soltani H. The impact of baby friendly initiative accreditation: an overview of systematic reviews. *Matern Child Nutr.* (2021) 17:e13216. doi: 10.1111/mcn.13216



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Women's perspectives on human milk banking in Ghana: results from a cross-sectional study

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Background: Although political and academic interest exists in Ghana to include human milk banks (HMB) into current maternal and child health programs, efforts to establish a HMB have not yet been subjected to any real empirical inspection with the view toward implementation. Furthermore, views toward the establishment of a HMB in Ghana have not been assessed among Ghanaian women. The aims of the current study were to examine Ghanaian women's views about HMB, and to investigate women's willingness to donate to a HMB.

Methods: Quantitative and qualitative responses were received from Ghanaian females ($n = 1,270$) aged 18+ years. Excluding outliers and missing data ($n = 321$), a final sample of 949 was retained for final analysis. Chi-square tests and logistic regression analysis were computed on quantitative data; Thematic analysis was performed on the qualitative responses.

Results: In our sample, 64.7% of respondents indicated that Ghana is ready for a HMB. The majority (77.2%) were willing to donate milk, and 69.4% believed that donating to the HMB would favor their child. The main concerns for the unwillingness to donate excess milk included: (i) the idea of HMBs as strange/bizarre ($n = 47$), (ii) fear of infections ($n = 15$), (iii) religious beliefs ($n = 9$), and (iv) insufficient information ($n = 24$). This study serves as the first step toward the development of a HMB in Ghana.

Conclusions: Overall, Ghanaian women support the building of a HMB to enhance infant nutrition and reduce childhood morbidity and mortality.

KEYWORDS

human milk banking, Ghana, quantitative and qualitative analysis, population needs assessment, health

1. Introduction

Despite progress made on reducing infant morbidity and mortality, infant deaths remain a major global health concern, especially in low-income settings. Recent data on infant mortality (2023) estimates global infant deaths at 26 per 1000 live births (1). In terms of neonatal deaths globally, an estimated 2.3 million newborn deaths occurred in 2021, which translates to 6,400 neonates dying each day (2). There are great disparities in these deaths, where children born in Sub-Saharan Africa (SSA) are ten times more likely to die in the first

4 weeks after birth compared to those born in high-resource settings (3). In Ghana, infant mortality (2023) is estimated at 30.8 deaths per 1000 live births (4), with the national neonatal mortality rate (2021) being 23 per 1,000 live births (5). About 48% of under-five mortality in the country is attributed to neonatal mortality (6), and to illustrate, it is reported that a newborn dies every 15 min in the country (7–9) which accounts for up to 70 newborn deaths a day (10). Premature birth is a leading cause of newborn death (10, 11) with one in seven babies born before 37 weeks of gestation (12).

Evidence from the Ghana Demographic and Health Survey (2014) reports a 10% rate of low birthweight (LBW) in Ghanaian newborns (6, 13). However, the prevalence of LBW in parts of the country appears to be higher. For instance, 26% LBW was reported in a sample of 419 Ghanaian infant-mother pairs in Northern Ghana (14) and 21% LBW was reported in the Ashanti region of Ghana (15). To our knowledge, there is no available national data on the prevalence of preterm delivery (13) however, some existing studies shed light on the rates of premature births in the country. A study conducted in Ho (Volta Region) examining 680 health records of Ghanaian women estimated preterm delivery at 14.1% (13). Another retrospective descriptive study carried out in Korle-Bu Teaching Hospital in Accra (Ghana's Capital) examined 7,801 birth records of Ghanaian women who delivered between January 1 and December 31 2015 (16). The researchers report 18.9% occurrence of preterm delivery in their sample. Further, a study by Afeke et al. (17) examined 8,279 delivery records from the pediatrics unit of the Volta Regional Hospital spanning the time periods November 2011 to June 2016 (17). Low birthweight in the sample was 10.7%; the study showed that preterm babies had a 4% chance of survival within 7 days of birth compared to the 96% survival rate for term babies (17). Moreover, a prospective cohort study conducted at the Kinatampo Health Research center serving 4 district hospitals and 69 health facilities investigated neonatal mortality in a sample of 22, 906 records (18). The study revealed 16% low birthweight and 30.5 neonatal deaths per 1000 live births (18).

In response to the alarming rates of neonatal mortality globally and locally, researchers have uncovered the crucial benefits of human breastmilk for neonatal survival. Breastmilk has been shown to prevent infant deaths due to its capacity to mitigate newborn infections and malnutrition that are among the main causes of infant deaths in resource-poor settings. In this regard, evidence suggests that current feeding practices for infants in Ghanaian NICU's involves the mother expressing milk or directly breastfeeding the infant, if possible (12, 19). Because feeding NICU babies in Ghana relies predominantly on the availability of mother's breastmilk, this presents as a challenge for mothers who experience delayed lactation and low breastmilk supply (12). Further, newborns whose mothers have died through childbirth or shortly after delivery lack access to mother's breastmilk. In Ghana, an estimated 776 mothers passed away during childbirth or died as a result of childbirth related complications in 2020, and 838 maternal deaths were reported in 2019 (20). In light of these challenges, some women and families turn to milk sharing or wet-nursing to fulfill the need for breastmilk. A recent study examining milk sharing practices among Ghanaian women reports that 8% of

the sample ($n = 1050$) indicated that they had ever shared milk with another lactating mother (21).

Recommendations and guidelines set forth by the World Health Organization (WHO) support the use of donor human milk (DHM) in the absence of mothers' own milk (MOM), especially for preterm infants and newborns with low birth weight (22). Thus, in situations where a mother's own milk is not available, such as in the event of low maternal supply, maternal death, illness, medication, disability or delayed lactation, human donor milk has been proved as the best substitute for infant feeding (23). Results from a clinical study after giving donor breastmilk to premature infants (under 37 weeks) at a hospital in Colombia revealed that those who did not receive the human milk had 4 times a greater chance of being intubated (OR 4.05; 95% CI 1.80–9.11). Again, it was found that receiving donor milk early- before the seventh day of life – reduced one's risk of developing necrotizing enterocolitis, intraventricular hemorrhage and sepsis (24).

Human milk banks (HMB) collect milk, process, screen, store, and distribute human milk to meet infants' specific needs. These banks are essential in the prevention of infant mortality and morbidity, especially, in low-income settings. Unfortunately, human milk banks have been established, primarily, in high-resourced settings, and areas most in need have limited access to such milk. Also, human milk banks have not been systematically scaled up (25), leading to important human milk availability and implementation gap(s). While human milk bank systems have been implemented in some low-and middle-income countries with great success in decreasing infant mortality and morbidity (26–28), efforts in Sub-Saharan Africa (SSA) have been limited despite the high rate of infant mortality and morbidity in countries in the sub-region. Currently, milk banks are available in two Sub-Saharan African countries, Kenya (29) and South Africa (30).

Ghana has implemented several maternal and child health programs to improve overall infant mortality rates, with specific attention toward promoting exclusive breastfeeding through the adoption of policies like Baby-Friendly Hospital Initiative (BFHI), National Breastfeeding Policy and Breastfeeding Promotion Regulation (31). It is imperative that healthcare professionals continue to advocate for exclusive breastfeeding and the use of human milk among mothers of infants with very low birth weight (VLBW). Research indicates that VLBW infants who receive breastmilk during the NICU hospitalization period have reduced incidence of preventable morbidities and re-hospitalization (32–34). It can also help children with developmental problems in infancy and childhood to overcome issues associated with developmental delays (35). However, there is still the need for DHM to support preterm babies and babies who may have lost their mothers during or after childbirth as well as mothers who are unable to generate their own breast milk after the birth of their babies.

In view of the above discussion, there is academic and political interest to incorporate human milk banks into the existing breastfeeding efforts. Hence, the purpose of the current study was to assess Ghanaian women's perspectives on HMB and their willingness to donate if one became available in the country.

2. Methods

2.1. Study design and participants

This mixed methods study recruited Ghanaian women aged 18 years and older to find out about the studied participants' views on Human Milk banking needs in Ghana. Based on the purpose of the current study, recruitment and data collection focused on the primary stakeholders, Ghanaian women both current and prospective mothers, who are involved in infant feeding. Stakeholders involved in infant feeding refers to currently pregnant women, lactating women, mothers with past breastfeeding experience, prospective mothers and women whose occupation involved the provision of any type of infant feeding support and counseling of Ghanaian women. The study was approved by the Indiana University institutional review board in April 2022 and the Cape Coast Teaching Hospital Ethical Review Committee (CCTHERC) in Ghana in June 2022. The lead author developed the research questions after attending a workshop on establishing human milk banks, authoring papers on breastfeeding and conducting extensive review of literature review on human milk banking (see reference section 24–30).

Two data collection methods were used: (A) Paper and pencil method was used where trained research personnel helped with the distribution of the study questionnaire to participants to complete. (B) An online survey method was used and distributed via an anonymous link to the study Qualtrics survey using social media platforms such as an “all-female Ghanaian support group”, “Tell It Moms” and other Facebook groups. We recruited additional participants through the snowball sampling method, where respondents who had completed the survey were asked to help recruit additional participants within their social networks. All surveys were in English, the official language of Ghana. We used a two-pronged strategy to ensure maximum reach of respondents. First, owing to the relative flexibility that online platforms offer, we were able to recruit from all 14 regions of the country using online web-driven mechanism. Additionally, recognizing the limitations of web-only recruitment efforts that excludes respondents without access to internet, we used paper and pencil approaches to facilitate the inclusion of additional voices. Thus, our sample was diverse in composition and was representative of the Ghanaian population. The questionnaire was pilot tested with twenty respondents and minor changes that did not affect the content were made to the questionnaire.

Respondents of the study were enlightened about the study and received clear explanation of the purpose of the study. No incentive was given for participating in the study. Closed and open-ended questions that inquire about the possibility of establishing a Human Milk Bank, willingness to donate breastmilk to the bank if one was established, the benefit of the human milk to children as well as the benefit of donating human milk were used in the study.

2.2. Data collection

Three of the authors and two research assistants administered the questionnaire. We received a total of 1,270 ($n = 1270$)

responses. The questionnaires were collated and coded. Data screening was done to identify missing values (incomplete answers to all the questions) as well as outliers; missing data and outliers were excluded from data analysis ($n = 321$). We retained a final sample of nine hundred and forty-nine ($n = 949$) complete responses to the variables of interest and subsequent open-ended follow-up items.

For the quantitative analysis, six variables were included in this study. Specifically, we assessed participants' educational level (education), respondent willingness to donate to the Human Milk Bank (donate), feasibility of donating excess milk to the bank (feasible), perceptions that human milk banking will improve infant feeding (feeding), opinions on whether human milk banking will favor respondent's child (favor child) and respondents' perceptions on whether Ghana is ready for a human milk bank (ready).

2.3. Assessment measures

2.3.1. Dependent variables (ready and donate)

The current study examined associations between 4 predictor variables on 2 out-comes: *Ready and Donate*. Both outcome variables were treated as binary variables. Thus, we asked the questions:

- i. In Africa, human milk banks are located in Kenya and South Africa. In your view, do you think Ghana is ready to have Human Milk Bank?
- ii. Do you think you will be willing to donate breastmilk to the Milk Bank in case there is one in your community?

Response options were “yes” coded as 1 and “No” coded as 0. Respondents were presented with a brief definition of human milk banks prior to being presented with questions. Further, participants were asked to provide explanations for their response choices. A text box option was provided to accommodate respondent explanations.

2.3.2. Independent variables

We assessed associations for participant education, feasibility of milk donation, if human milk banks will improve infant feeding and whether human milk banking will favor one's child. These factors have been shown to be associated with perceptions about human milk banking in previous studies (36, 37).

2.3.3. Statistical analysis (quantitative data analysis)

We computed frequencies and proportions for each of the study variables. We additionally conducted Pearson chi-square tests to examine if there were significant differences in responses for participants who responded YES or NO to the question (a) Is Ghana ready for a Human Milk Bank? And for participants who responded YES or NO to the question (b) Do you think you will be willing to donate breastmilk to the Milk Bank? Pearson chi-square tests were conducted between each independent study variable i.e. education, feasible, feeding, favor child and the two study outcome

variables i.e., ready and donate. Logistic regression analysis was used to examine the independent associations between the outcome variables (ready and donate) and all the independent variables in the model. The threshold for declaring statistical significance is a p -value < 0.05 . All analyses were performed in R version 4.2.1 (R Core team, 2022; Boston, MA, USA).

2.4. Data analysis of the text (qualitative analysis)

Using an inductive and semantic approach, the researchers allowed the data to determine the themes by analyzing plainly the content of the data. The thematic analysis was performed following Braun and Clarke's (38) six steps of reading and re-reading the text to become familiar with the data, generating initial codes, searching for themes, re-viewing of themes, defining the themes and finally writing-up the report (38). Coding was done by two of the authors. Determination of inter-coder reliability was done using Holsti (39) coefficient (39). All the cases were coded by the two coders and because the quotes were short and straight forward, there was no disagreement between the coders. We therefore achieved an inter-coder reliability of one (1) which is a complete agreement between the coders indicating a very good reliability (39). To establish trustworthiness of the study, an external auditor who is an expert in qualitative research confirmed the research process as well as the results in order to ensure credibility and dependability. Detailed description of the research process has also been provided to ensure transferability. It is important to note that even though two or three excerpts may be cited to exemplify or elucidate a theme or sub-theme, such excerpts are chosen from many similar excerpts or occurrences in the data and thus have functional validity for the entire data.

3. Results

3.1. Quantitative results

Characteristics of the study sample are presented in Table 1. Overall, 64.7% of the study sample responded that Ghana is ready for a human milk bank. More than 70% of respondents were willing to donate their milk and about 69% believed that donating to the milk bank would favor their child. Additional characteristics are shown in Table 1.

At the bivariate level, respondent education ($p = 0.002$), feasibility to donate milk ($p < 0.001$), perception that donating to HMB will favor their child ($p < 0.001$), and the belief that HMB will address infant feeding ($p < 0.001$) were significantly associated with the outcome variables ready and donate (Table 2).

3.1.1. Is Ghana ready for HMB

Logistic regression results revealed no statistical differences between the 3 groups of respondent educational level regarding opinions about whether Ghana is ready for a human milk bank (Table 3). Respondents who reported that it is feasible to donate to HMB (OR, 2.36, CI 1.45, 3.88; $p < 0.001$), donating to HMB

TABLE 1 Characteristics of the study sample showing proportions and percentages for participants' education level, feasibility and benefits of milk donation, willingness to donate milk and Ghana's readiness for a HMB ($n = 949$).

	Overall n (%)
Is Ghana ready for a HMB?	
Yes	614 (64.7)
No	335 (35.3)
Willing to donate milk to HMB	
Yes	733 (77.2)
No	216 (22.8)
Education	
High school or less	219 (23.1)
College-level	541 (57.0)
Graduate	189 (19.9)
Feasible to donate to HMB	
Yes	818 (86.2)
No	131 (13.8)
Donating to HMB will favor my child	
Yes	659 (69.4)
No	290 (30.6)
HMB will address infant feeding	
Yes	779 (82.1)
No	170 (17.9)

All values are expressed as n (%). (%), Percent; HMB, Human Milk Bank.

would favor child (OR, 1.92, CI 1.37, 2.68; $p < 0.001$) and HMB would address infant feeding (OR, 5.71, CI 3.81, 8.69; $p < 0.001$) all had higher odds of thinking that Ghana is ready for HMB (Table 3).

3.1.2. Willing to donate milk to HMB

On willingness to donate milk to a HMB if such a bank was established, respondents who have college level education (OR, 4.97, CI 3.23, 7.72; $p < 0.001$) and graduate education (OR, 7.20, CI 3.99, 13.49; $p < 0.001$) were more likely to be willing to donate to HMB. Women who believe it is feasible to donate to HMB (OR, 3.46, CI 2.10, 5.73; $p < 0.001$), donating to HMB will favor child (OR, 5.76, CI 3.84, 8.72; $p < 0.001$) and HMB will address infant feeding (OR, 2.33, CI 1.46, 3.69; $p < 0.001$) all had higher odds of willingness to donate milk to the bank compared with respondents who indicated "no" in each variable (Table 3).

3.2. Qualitative results

In our sample, Six hundred and twenty-two (622) respondents provided explanations of their willingness to donate breastmilk to the milk bank. Ninety-four (94) respondents provided their explanations for their unwillingness to donate breastmilk to the

TABLE 2 Bivariate results showing associations between participants' education level, feasibility and benefits of milk donation with willingness to donate milk and Ghana's readiness for a HMB ($n = 949$).

	Is Ghana ready for a HMB			Willing to donate milk to HMB		
	Yes n (%)	No n (%)	p	Yes n (%)	No n (%)	p
Education			0.002*			<0.001**
High school or less	120 (19.5)	99 (29.6)		108 (14.7)	111 (51.4)	
College-level	320 (59.0)	179 (53.4)		458 (62.5)	83 (38.4)	
Graduate	132 (21.5)	57 (17.0)		167 (22.8)	22 (10.23)	
Feasible to donate to HMB			<0.001**			<0.001**
Yes	576 (93.8)	242 (72.2)		694 (94.7)	124 (57.4)	
No	38 (6.2)	93 (27.8)		39 (5.3)	92 (42.6)	
Donating to HMB will favor my child			<0.001**			<0.001**
Yes	484 (78.8)	175 (52.2)		588 (80.2)	71 (32.9)	
No	130 (21.2)	160 (47.8)		145 (19.8)	153 (67.1)	
HMB will address infant feeding			<0.001**			<0.001**
Yes	573 (93.3)	206 (61.5)		655 (89.4)	124 (57.4)	
No	41 (6.7)	129 (38.5)		78 (10.6)	92 (42.6)	

All values are expressed as n (%). (%), Percent; HMB, Human Milk Bank. P -values are derived from Pearson's Chi-square test * $p < 0.05$; ** $p < 0.01$.

TABLE 3 Predictors of Ghana's readiness for and willingness to donate toward a HMB ($n = 949$).

	Is Ghana ready for a HMB		Willing to donate milk to HMB	
	OR (95% CI)	P	OR (95% CI)	P
Education				
High school or less	Reference		Reference	
College-level	0.99 (0.67, 1.45)	0.956	4.97 (3.23, 7.72)	<0.001**
Graduate	1.14 (0.71, 1.84)	0.577	7.20 (3.99, 13.49)	<0.001**
Feasible to donate to HMB				
Yes	2.36 (1.45, 3.88)	<0.001**	3.46 (2.10, 5.73)	<0.001**
No	Reference		Reference	
Donating to HMB will favor my child				
Yes	1.92 (1.37, 2.68)	<0.001**	5.76 (3.84, 8.72)	<0.001**
No	Reference		Reference	
HMB will address infant feeding				
Yes	5.71 (3.81, 8.69)	<0.001**	2.33 (1.46, 3.69)	<0.001**
No	Reference		Reference	

All values are expressed as n (%). (%), Percent; HMB, Human Milk Bank; OR, Odds Ratio; CI, Confidence Interval. * $p < 0.05$; ** $p < 0.01$.

milk bank. Four hundred and fifty-six (456) respondents believed that donating breast milk to a Human milk Bank would favor their children whereas one hundred and fifty-eight (158) respondents believed that donating breast milk to a Human milk Bank would not favor their children.

Item: You indicated you would be willing to donate breastmilk to the milk bank. Please share why you chose this option. Six hundred and twenty two (622) respondents provided their explanations.

3.2.1. Reasons for willingness to donate to HMB

Respondents who indicated their willingness to donate breast milk to the Milk Bank in case there is one in their community to help preterm babies and babies whose mothers may have passed away were asked to provide their reasons. Four themes emerged as the reasons for indicating their willingness to donate: Breast milk being the best food for babies, Opportunity to help, Milk bank Project being good, and Formula being expensive.

i. Breast milk being the best food for babies

Most of the respondents acknowledged the important role breast milk plays in the growth of babies. Two excerpts are cited below for exemplification:

“Breast milk is the best food for all babies but unfortunately not all babies get to have it. Some lose their mothers; some mothers are not able to breastfeed so they end up giving formula feeds. A breast milk bank will help solve this problem”.

“Artificial formula at early stages of a child’s life is not the best. To me, breast milk is God’s own natural way and it is the best of the best”.

ii. Opportunity to help

Respondents also ascribed their willingness to donate to a milk bank to the opportunity they will get to be of help to humanity. Three such excerpts are cited below:

“[I will donate] because I get to help someone, which feels good”

“[I will donate], if I am capable of helping another human to survive, why not”

“If at that particular time I am lactating, donating breast milk for a baby to be fed will be a joy and will be fulfilling to know a child is fed because I could provide it”.

iii. Project being good

Some respondents also indicated that they were willing to donate because they believed a human milk bank is a good project. Some shared these:

“At least it’s a good project that will help save life”.

“[I will donate] because when I gave birth, at the initial state my breast milk was not available. So, I would have been happy if that option [of a human milk bank] existed or was available in Ghana”.

iv. Formula being expensive

Some respondents also felt that donating to a milk bank will be helpful because the baby formula is expensive. Two studied participants shared these:

“[I will donate] because my baby was at the neonatal intensive care unit and I saw how preterm babies and some twins that lost their mother after birth suffered. The formula was too expensive for their family to afford”.

“[I will donate] because there are babies who are suffering from acute malnutrition just because they lost their mothers at birth and family are unable to afford baby food or not able to mix the food in the right texture”.

Item: You indicated you would not be willing to donate breastmilk to the milk bank. Please share why you chose this option. Ninety-four respondents provided their explanations.

3.2.2. Reasons for not willing to donate to HMB

Even though a majority of the respondents were willing to donate to a milk bank, those respondents who indicated that they were not willing to donate to a human milk bank also provided

their reasons and four themes emerged. The themes are: Human Milk Bank concept being strange and/or bizarre, Fear of infections, Religious beliefs and Insufficient information.

i. Human Milk Bank concept being strange and/or bizarre

The major reasons provided revolved around participant discomfort with human milk banks. Participants perceived HMB as strange and bizarre. Three respondents’ responses are cited below:

“It just seems weird, I have never thought of that. It would take effort for me to do that”.

“For now, it sounds weird”.

“It is just a bit awkward and new. It will need sometime for people to get used to the idea”.

ii. Fear of infections

Some of the respondents expressed fear and concerns about the risk of infection from a donated human milk and its consequences. Three respondents noted:

“[I will not donate] due to risk of infections. Moreover, there are other alternatives”.

“I believe that whatever that is in it [the breast milk] will be transferred to the child”.

“I am worried about hygienic conditions and knowing how what one eats affects the quality of breast milk production”.

iii. Religious beliefs

Some respondents linked their religious beliefs as the reason why they were neither able nor willing to donate to a milk bank. There excerpts are cited below for exemplification:

“Per my religion any child you breastfeed with same breast milk they automatically become brothers or sisters. They are not allowed to marry and how will I know who takes my breast milk”.

“It is for spiritual reasons”.

“It’s against my beliefs”.

iv. Not much information

Some respondents also indicated that they were not willing to donate human milk to the human milk bank because they did not know much about the idea of a human milk bank. The following are some of their narratives:

“I do not have much information on this”.

“Am afraid and I do not know the implications”.

“I would want to read more on it”.

Item: You indicated that you believe donating breast milk to a Human milk Bank will favor your child. Please explain why you chose this option. Four hundred and fifty-six (456) respondents provided their explanations.

3.2.3. Reasons for believing that donating to HMB will favor your child

Respondents were asked to explain why they indicated that they believed donating to a Human milk bank will favor their child. Out of the various reasons provided, two main themes emerged. The

themes were: Abundance of available breastmilk to feed infants and Readily available breast milk.

i. Abundance of available breastmilk

Most of the respondents ascribed their reason for believing that donating to the milk bank will favor their child to the fact that there will be more production of milk for their child to feed on. Two had this to say:

"I would have to express more milk in order to be able to donate. The more I express, the more I get, so my baby will have more to feed".

"Breastfeeding is a demand and supply kind of. The more I express some down, the more I produce milk for my baby".

ii. Readily available breast milk

Some of the respondents indicated that due to an unforeseen event that could prevent them from continuing to breast-feed their children, by donating milk to the milk bank, there would be readily available breast milk for their child to benefit from. Two studied participants shared these:

"Because at any point in time if due to health reasons am not able to breastfeed, there will always be a readily available alternative which is the human milk bank".

"Because in future when I do not have enough [breast milk], I can always reach out to the milk bank for support".

Item: You indicated that you DO NOT believe that donating breast milk to a Human milk Bank will favor your child. Please explain why you chose this option. One hundred and fifty eight (158) respondents provided some explanations.

3.2.4. Reasons for believing that donating to HMB will NOT favor your child

Respondents were asked to explain why they indicated that they believed donating to a Human milk bank will not favor their child. Two themes emerged: No direct effect on them for donating to the HMB; and Donation to the HMB leading to reduced amounts of breastmilk for their child(ren).

3.3. No direct effect

Respondents in this category felt that donating to a milk bank will not have any direct favor on their child. Two study participants shared the excerpts below:

"Because donating my breast milk has no direct effect on him [my child]."

"My child doesn't stand to benefit from the milk I've donated in anyways unless it generates income for me".

3.4. Reduced supply

Some of the respondents explained that they did not believe they would have enough breastmilk for their own child when they

donate to the milk bank. Two excerpts shared by two of the studied participants are cited below:

"If it is after 6 months when I am done with exclusive breastfeeding I could try, other than that I will not want to reduce the supply for my baby".

"I do not produce too much milk at a time so donating while breastfeeding may leave just a little milk for my child".

4. Discussion

The findings of the current study indicate that majority of the respondents are in favor of having a milk bank in their country. These findings support the use of donor human milk as the best substitute for mother's own milk when the latter is unavailable. We learn further, that, respondents saw the HMB proposition as an opportunity to engage in a humanitarian act such as helping preterm babies and babies who may have lost their mothers after birth and hence an opportunity to assist less fortunate infants. In addition, the respondents viewed HMBs as lifesaving for infants cognizant of the fact that access to donor milk will help mitigate or eliminate morbidity and mortality associated to lack of efficacious infant nutrition. This finding is consistent with those of several other studies that document the benefits of donor human milk on newborns' development (23, 40). For example, breastfeeding and the use of human milk has been shown to have the best impact on child survival (41). Furthermore, in Brazil, breastfeeding promotion and support, including the use of donor human milk from human milk banks, has contributed substantially to reduce its infant mortality (26).

From our findings, respondents believed that donating to HMB will create abundance of breastmilk for their own children given the fact that increased breastmilk production was a result of constant and consistent breastmilk expression (42). The implication of this finding is that it sends a positive signal about the likelihood that breastfeeding mothers who are able to produce breastmilk in high volumes will be willing to donate freely to HMB when they are established in Ghana. Respondents also counted on breast milk becoming readily available at the HMB if they and others donate to the bank. Thus, they saw donating to HMB as a win-win situation, first for themselves in terms of increased breastmilk production, and donor breastmilk being available at the NICU in the event that they delivered a preterm or low birthweight infant.

The findings suggest that attaining a higher educational level (college and graduate education) resulted in a possible acceptance and willingness to donate breastmilk to HMB which is supported by previous related studies (43, 44). Nevertheless, we observed that some respondents reported having limited information about HMB. Again, responses provided by women who expressed their unwillingness to donate breastmilk due to the perception of a reduction in supply for their own baby is an indication that some women lack understanding of how milk production works. This creates an opportunity to scale up lactation and breastfeeding education for women of all educational levels. Lactation education focusing on the benefits of increasing milk production is important, not only for the purpose of donating to the HMB, but for the babies of the donating mothers themselves. To this effect, existing

breastfeeding campaigns must invest in educational programs that target lactating mothers at postnatal care or child welfare centers. Information presented at these educational programs should be evidence-based, stemming from rigorous studies that have established the benefits of breast milk production for baby and milk donation for other vulnerable infants.

The reasons given for unwillingness to donate to HMB such as the concept being strange and/or bizarre and religious beliefs is supported by previous studies (45). This finding may be indicative of the need to explore further the socio-cultural factors and religious concerns that could act as barriers to the acceptability of HMB. The fear of possible risk of infections being transmitted to babies, a reason given by some respondents not willingly to donate breastmilk to HMB corroborates with reports from similar studies (36, 46–48). These findings imply that more sensitization and health education programs may be required to allay the fears of the general population. Campaigns must use culturally acceptable forms of communication and appropriate communication channels such as popular media and key community leaders to gain member buy-in (49). Additionally, using gender-inclusive language which promotes human milk banking as integral to exclusive breastfeeding and a strategy that facilitates the wellbeing of the entire family, not just the prerogative of women and children is key (49). Again, our findings suggest that some Ghanaian mothers would be willingly to donate their milk when there is an assurance of addressing logistics challenges in health facilities in the event of establishing HMBs in Ghana. Addressing logistic constraints include measures to ensure the safe handling and screening of donated breastmilk, effective storage/preservation processes to guarantee that the nutritional quality and microbiological safety requirements are met in HMBs.

4.1. Limitations

This study is not without some limitations. Our study participants were recruited through the snowball method where recruited participants helped to recruit others for the study. This recruitment strategy meant participants may have likely recruited co-workers, family members, and friends who might have similar experiences and beliefs. However, the benefit of gaining access to the population and gaining their trust was worth the use of this research methodology. Another limitation stems from the study questionnaire being provided in English only, and this may have deterred potential participants who could not read and write in English from participating. Additionally, participants who used the paper and pencil method of completing the survey received translation and interpretation. This approach may have subjected participant responses to social desirability bias compared to the participants who used the online Qualtrics survey where respondents received no translation. Further, our survey did not provide participants a detailed description of what donating breastmilk to the HMB would entail. This may have influenced participant responses due to limited information to make an informed decision about HMB. Another limitation of the study is the high number of missing data and outliers. There was a large number of respondents who answered parts of the survey but did

not complete the entire questionnaire. The missing responses could have impacted the outcome of the study. Furthermore, a potential limitation of the current study stems from the inclusion of women who had no prior experience with breastfeeding. This strategy however ensured that we gained prevailing perceptions of HMB among Ghanaian women from representative of the entire female population. Despite these limitations, this research is important as it sheds light on acceptance of a Human Milk Banking system in Ghana to help improve childhood nutrition.

4.2. Implications of the current study

While majority of our respondents support human milk bank and are willing to donate to the breast milk bank if one exists in their community, some respondents expressed concerns about fear of possible infection due to improper hygiene. Coutoudis et al. (50) reports that in regions where HIV is prevalent, infant feeding choices are often stigmatized and feared due to the association with the disease (50). There is no doubt that proper screening of donated milk will minimize the risk of infection associated with donated milk. Other respondents additionally commented on the religious implications of feeding donated milk to their children. This finding is also reported by other scholars in which they noted that religious considerations prohibit siblings (children receiving breastmilk from same mother) from “intermarriage” in the Islam religion; this also presents a challenge to donating and receiving donor human milk (51, 52). The implications of the findings underscores the need to keep a record of milk donors and recipients to effectively address the religious concerns (52). Another suggestions is to incorporate a system of single donor networks, where the donor and recipients know each other’s identities (52). Furthermore, findings from our research are supported by findings from other studies that show that some African women and health professionals lack information on HMB and have little or no knowledge about it (36, 53–55). The lack of knowledge suggests that it is important to engage in a mass education of the Ghanaian public when establishing the human milk bank; this is because with proper education will come acceptance and support from mothers and the public.

From this study, we identified gaps that need to be filled in order to take definitive steps toward establishing a human milk bank in Ghana. First, there is no nationally available data on the proportion of preterm deliveries occurring annually (13). Again, there is little information about how preterm and low birthweight babies in the NICU are fed. Further, in situations of delayed maternal lactation or maternal death, data is lacking on breastfeeding practices for orphaned babies. While there is evidence of peer to peer (informal) milk donation and wet nursing among Ghanaian women (21), there is no published data on whether sick, preterm and LBW neonates are fed donated human milk in the NICU. Obtaining this information will be critical to fully assess the need for establishing HMB in the country.

In this regard, we suggest that futures studies investigate the current feeding practices in Ghanaian NICUs. The Ghana Statistical Service, together with the ministry of Health, must invest in developing a comprehensive surveillance system where

national estimates of preterm deliveries and (very) low birthweight neonates are recorded and monitored. Again, future studies may explore the practice of wet-nursing/ informal milk sharing in the Ghanaian community to augment breastfeeding rates and human milk feeding for newborns.

Other studies may investigate women's preferences between HMB and wet-nursing/direct milk sharing, with specific focus on uncovering myths and misconceptions to be used during targeted breastfeeding and human milk educational campaigns.

5. Conclusion

In conclusion, this study has shown support for the building of HMB; an initiative that research has shown to be good for preterm babies and babies who may have lost their mothers during or after childbirth (as noted in the qualitative responses) as well as mothers who are unable to generate their own breast milk after the birth of their babies. HMB can be used as a short-term passage for mothers to build up their own milk that is appropriate for their own child. Thus, the studied Ghanaian citizens' perspectives to have a Human Milk Bank will enable stakeholders to make Human Milk banking an essential part of the ongoing breastfeeding promotion in Ghana. This will help to reduce infant mortality rate in preterm and low-birthweight infants.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the Indiana University Institutional Review Board and

the Cape Coast Teaching Hospital Ethical Review Committee. The patients/participants provided their written informed consent to participate in this study.

Author contributions

CO: conceptualized the study. CO, FJ, SA-E, CN-A, CP, IG, and EO-G: drafted the initial version of the manuscript, data analysis, and data curation was done by CO. SA-E, CN-A, and FJ: editing and review was performed by CO, FJ, and EO-G. CO, FJ, SA-E, CN-A, CP, IG, and EO-G reviewed the final draft of the manuscript. All authors read and approved the final manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

1. Macrotrends. *World Infant Mortality Rate 1950-2023*. (2023). Available online at: <https://www.macrotrends.net/countries/WLD/world/infant-mortality-rate> (accessed March 30, 2023).
2. UNICEF. *Neonatal mortality*. UNICEF DATA. (2023). Available online at: <https://data.unicef.org/topic/child-survival/neonatal-mortality> (accessed March 30, 2023).
3. World Health Organization. *Newborn Mortality*. (2022). Available online at: <https://www.who.int/news-room/fact-sheets/detail/levels-and-trends-in-child-mortality-report-2021> (accessed July 18, 2023).
4. Macrotrends. *Ghana Infant Mortality Rate 1950-2023*. (2022). Available online at: <https://www.macrotrends.net/countries/GHA/ghana/infant-mortality-rate> (accessed March 30, 2023).
5. UNICEF. *Ghana (GHA) - Demographics, Health & Infant Mortality*. UNICEF DATA. (2022). Available online at: <https://data.unicef.org/country/gha> (accessed September 6, 2023).
6. Ghana Statistical Service. *Demographic and Health Survey 2014*. Rockville, Maryland, USA: Ghana Health Service (GHS) and ICF International. (2015). Available online at: <https://dhsprogram.com/pubs/pdf/fr307/fr307.pdf> (accessed August 6, 2023).
7. Adjei G, Darteh EKM, Netey OEA, Doku DT. Neonatal mortality in the central districts of Ghana: analysis of community and composition factors. *BMC Public Health*. (2021) 21:173. doi: 10.1186/s12889-021-10156-6
8. Healthy Newborn Network. *Ghana launches a national newborn health strategy and action plan to speed up the reduction of newborn deaths*. Healthy Newborn Network. (2014). Available online at: <https://www.healthynetwork.org/blog/ghana-launches-national-newborn-health-strategy-action-plan-speed-reduction-new-born-deaths/> (accessed November 4, 2022).
9. Diedrich CM. *Neonatal Mortality in Ghana*. (2016). Available online at: <https://scholarworks.gvsu.edu/cgi/viewcontent.cgi?article=1493&context=honorsprojects> (accessed November 4, 2022).
10. UNICEF. *Newborn Health*. (2016). Available online at: <https://www.unicef.org/ghana/newborn-health> (accessed November 4, 2022).
11. Dare S, Oduro AR, Owusu-Agyei S, Mackay DF, Gruer L, Manyeh AK, et al. Neonatal mortality rates, characteristics, and risk factors for neonatal deaths in Ghana: analyses of data from two health and demographic surveillance systems. *Glob. Health Action*. (2021) 14:1938871. doi: 10.1080/16549716.2021.1938871
12. Bliss K. *Improving Newborn health in Ghana. Strengthening Services in the Center and Periphery*. CSIS Global Health Policy Center. (2016). Available online at: <https://vision2017.csis.org/strengthening-services-center-periphery-improve-newborn->

health-ghana/.../strengthening-services-center-periphery-improve-newborn-health-ghana/index.html (accessed November 4, 2022).

13. Axame WK, Binka FN, Kweku M. Prevalence and factors associated with low birth weight and preterm delivery in the ho municipality of Ghana. *Adv public health*. (2022) 2022:e3955869. doi: 10.1155/2022/3955869
14. Abubakari A, Kynast-Wolf G, Jahn A. Maternal determinants of birth weight in northern Ghana. *PLoS ONE*. (2015) 10:e0135641. doi: 10.1371/journal.pone.0135641
15. Fosu MO, Abdul-Rahaman I, Yekeen R. Maternal risk factors for low birth weight in a District Hospital in Ashanti Region of Ghana. *Res Obstet Gynaecol*. (2013) 2:48–54.
16. Adu-Bonsaffoh K, Gyamfi-Bannerman C, Oppong SA, Seffah JD. Determinants and outcomes of preterm births at a tertiary hospital in Ghana. *Placenta*. (2019) 79:62–7. doi: 10.1016/j.placenta.2019.01.007
17. Afeke I, Mac-Ankrah L, Jamfaru I, Amegan-Aho KH, Mbroh HK, Lokpo SY, et al. Maternal age, low birth weight and early neonatal death in tertiary hospital in the volta region of Ghana. *Open J Pediatr*. (2017) 7:254. doi: 10.4236/ojped.2017.74029
18. O'Leary M, Edmond K, Floyd S, Newton S, Thomas G, Thomas SL, et al. cohort study of low birth weight and health outcomes in the first year of life, Ghana. *Bull World Health Organ*. (2017) 95:574–83. doi: 10.2471/BLT.16.180273
19. Vesel L, Manu A, Lohela TJ, Gabrysch S, Okyere E, Asbroek AHA, et al. Quality of newborn care: a health facility assessment in rural Ghana using survey, vignette and surveillance data. *BMJ Open*. (2013) 3:e002326. doi: 10.1136/bmjopen-2012-002326
20. World Health Organization Ghana. *Ghana holds Conference on Maternal, Child Health and Nutrition. WHO | Regional Office for Africa*. (2021). Available online at: <https://www.afro.who.int/news/ghana-holds-conference-maternal-child-health-and-nutrition> (accessed March 30, 2023).
21. Obeng C, Jackson F, Nsiah-Asamoah C, Amissah-Essel S, Obeng-Gyasi B, Perry CA, et al. Human milk for vulnerable infants: breastfeeding and milk sharing practice among Ghanaian women. *Int J Environ Res Public Health*. (2022) 19:16560. doi: 10.3390/ijerph192416560
22. World Health Organization, UNICEF. *Global strategy for infant and young child feeding*. Geneva: WHO. (2003). Available online at: [https://apps.who.int/iris/bitstream/handle/10665/42590/9241562218.pdf;jsessionid=\\$6F7537A2B82ED3775BE5F7A4DD406C8A?sequence=\\$1](https://apps.who.int/iris/bitstream/handle/10665/42590/9241562218.pdf;jsessionid=$6F7537A2B82ED3775BE5F7A4DD406C8A?sequence=$1) (accessed November 7, 2023).
23. Haiden N, Ziegler EE. Human Milk Banking. *Ann Nutr Metab*. (2016) 69:7–15. doi: 10.1159/000452821
24. Torres-Muñoz J, Jimenez-Fernandez CA, Murillo-Alvarado J, Torres-Figueroa S, Castro JP. Clinical results of the implementation of a breast milk bank in premature infants (under 37 weeks) at the hospital universitario del valle 2018–2020. *Nutrients*. (2021) 13:2187. doi: 10.3390/nu13072187
25. Demarchis A, Israel-Ballard K, Mansen K, Engmann C. Establishing an integrated human milk banking approach to strengthen newborn care. *J Perinatol*. (2016) 10:37. doi: 10.1038/jp.2016.198
26. Pimenteira Thomaz AC, Maia Loureiro IV, da Silva Oliveira T, de Mendonça Furtado Montenegro NC, Dantas Almeida Júnior E, Fernando Rodrigues Soriano C, et al. The human milk donation experience: motives, influencing factors, and regular donation. *J Hum Lact*. (2008) 24:69–76. doi: 10.1177/0890334407310580
27. Bhasin M, Nangia S, Goel S. Role of human milk banks amid COVID 19: perspective from a milk bank in India. *Int Breastfeed J*. (2020) 15:104. doi: 10.1186/s13006-020-00346-0
28. *Human Milk Bank Network Southeast Asia. Minimum Standards for the Establishment and Operation of Human Milk Banks in Southeast Asia*. (2021). Available online at: <http://www.aliveandthrive.org/en/resources/minimum-standards-for-the-establishment-and-operation-of-human-milk-banks-in-southeast-asia> (accessed July 19, 2022).
29. *County Innovation Challenge Fund. Helping Babies thrive: Establishing the first Integrated Human Milk Banking System in Kenya*. (2019). Available online at: https://options.co.uk/sites/default/files/helping_babies_thrive_hmb.pdf (accessed July 19, 2022)
30. Biggs C. Talking the Talk but not walking the walk: donating to human milk banks in South Africa. *J Hum Lact*. (2021) 37:105–13. doi: 10.1177/0890334420970495
31. Aryeetey R, Harding K, Hromi-Fiedler A, Pérez-Escamilla R. Analysis of stakeholder networks for breastfeeding policies and programs in Ghana. *Int Breastfeed J*. (2020) 15:74. doi: 10.1186/s13006-020-00311-x
32. Corpeleijn WE, Kouwenhoven SMP, Paap MC, Vliet I. van, Scheerder I, Muizer Y, et al. Intake of own mother's milk during the first days of life is associated with decreased morbidity and mortality in very low birth weight infants during the first 60 days of life. *Neonatology*. (2012) 102:276–81. doi: 10.1159/000341335
33. Vohr BR, Poindexter BB, Dusick AM, McKinley LT, Higgins RD, Langer JC, et al. Persistent beneficial effects of breast milk ingested in the neonatal intensive care unit on outcomes of extremely low birth weight infants at 30 months of age. *Pediatrics*. (2007) 120:e953–9. doi: 10.1542/peds.2006-3227
34. Patel AL, Johnson TJ, Engstrom JL, Fogg LF, Jegier BJ, Bigger HR, et al. Impact of early human milk on sepsis and health-care costs in very low birth weight infants. *J Perinatol*. (2013) 33:514–9. doi: 10.1038/jp.2013.2
35. Spiegler J, Preuß M, Gebauer C, Bendiks M, Herting E, Göpel W, et al. Does breastmilk influence the development of bronchopulmonary dysplasia? *J Pediatr*. (2016) 169:76–80. doi: 10.1016/j.jpeds.2015.10.080
36. Kimani-Murage EW, Wanjohi MN, Kamande EW, Macharia TN, Mwaniki E, Zerfu T, et al. Perceptions on donated human milk and human milk banking in Nairobi, Kenya. *Matern Child Nutr*. (2019) 15:e12842. doi: 10.1111/mcn.12842
37. African Population and Health Research Center. *Integrating Human Milk Banking with Breastfeeding Promotion and Newborn Care: is Kenya Ready?* (2022). Available online at: <https://aphrc.org/wp-content/uploads/2019/07/Human-Milk-Bank-Project-Briefing-Paper-APHRC.pdf> (accessed August 22, 2022).
38. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. (2006) 3:77–101. doi: 10.1191/1478088706qp0630a
39. Holsti OR. *Content analysis for the social sciences and humanities*. Reading, Mass. London: Addison-Wesley Pub Co. (1969).
40. Simmer K. The knowns and unknowns of human milk banking early nutrition: impact on short- and long-term health. *Nutr Inst Workshop Ser Pediatr program*. (2011) 68:49–64. doi: 10.1159/000325659
41. Victora CG, Bahl R, Barros AJD, França GVA, Horton S, Krasevec J, et al. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *Lancet*. (2016) 387:475–90. doi: 10.1016/S0140-6736(15)01024-7
42. Kent JC. How Breastfeeding Works. *J Midwifery Womens Health*. (2007) 52:564–70. doi: 10.1016/j.jmwh.2007.04.007
43. Esquerre-Zwiers A, Rossman B, Meier P, Engstrom J, Janes J, Patel A. "It's somebody else's milk": unraveling the tension in mothers of preterm infants who provide consent for pasteurized donor human milk. *J Hum Lact*. (2016) 32:95–102. doi: 10.1177/0890334415617939
44. Jang HL, Cho JY, Kim M, Kim EJ, Park EY, Park SA, et al. The experience of human milk banking for 8 years: korean perspective. *J Korean Med Sci*. (2016) 31:1775–83. doi: 10.3346/jkms.2016.31.11.1775
45. Karadag A, Ozdemir R, Ak M, Ozer A, Dogan DG, Elkiran O. Human milk banking and milk kinship: Perspectives of mothers in a Muslim country. *J Trop Pediatr*. (2015) 61:188–96. doi: 10.1093/tropej/fmv018
46. Chagwena DT, Mugariri F, Sithole B, Mataga SF, Danda R, Matsungu TM, et al. Acceptability of donor breastmilk banking among health workers: a cross-sectional survey in Zimbabwean urban settings. *Int Breastfeed J*. (2020) 15:37. doi: 10.1186/s13006-020-00283-y
47. Magowan S, Burgoine K, Ogara C, Ditai J, Gladstone M. Exploring the barriers and facilitators to the acceptability of donor human milk in eastern Uganda - a qualitative study. *Int Breastfeed J*. (2020) 15:28. doi: 10.1186/s13006-020-00272-1
48. Mondkar J, Chugh Sachdeva R, Shanbhag S, Khan A, Manuhar Sinha M, Dasgupta R, et al. Understanding barriers and facilitators for human milk banking among service providers, mothers, and influencers of preterm and sick neonates admitted at two health facilities in a metropolitan city in India. *Breastfeed Med*. (2018) 13:694–701. doi: 10.1089/bfm.2018.0103
49. Dutta T, Agley J, Lin HC, Xiao Y. Gender-responsive language in the National Policy Guidelines for Immunization in Kenya and changes in prevalence of tetanus vaccination among women, 2008–09 to 2014: A mixed methods study. *Womens Stud Int Forum*. (2021) 86:102476. doi: 10.1016/j.wsf.2021.102476
50. Coutsooudis I, Petrites A, Coutsooudis A. Acceptability of donated breast milk in a resource limited South African setting. *Int Breastfeed J*. (2011) 6:3. doi: 10.1186/1746-4358-6-3
51. Ozdemir R, Ak M, Karatas M, Ozer A, Dogan DG, Karadag A. Human milk banking and milk kinship: perspectives of religious officers in a Muslim country. *J Perinatol*. (2015) 35:137–41. doi: 10.1038/jp.2014.177
52. Khalil A, Buffin R, Sanlaville D, Picard JC. Milk kinship is not an obstacle to using donor human milk to feed preterm infants in Muslim countries. *Acta Paediatr*. (2016) 105:462–7. doi: 10.1111/apa.13308
53. Doshmangir L, Naghshi M, Khabiri R. Factors influencing donations to human milk bank: a systematic review of facilitators and barriers. *Breastfeed Med*. (2019) 21:14. doi: 10.1089/bfm.2019.0002
54. Abhulimhen-Iyoha BI, Okonkwo IR, Ideh RC, Okolo AA. Mothers' perception of the use of banked human milk for feeding of the infants. *Niger J Paediatr*. (2015) 42:223–7. doi: 10.4314/njp.v42i3.10
55. Gelano TF, Bacha YD, Assefa N, Motumma A, Roba AA, Ayele Y, et al. Acceptability of donor breast milk banking, its use for feeding infants, and associated factors among mothers in eastern Ethiopia. *Int. Breastfeed. J*. (2018) 13:23. Available online at: <https://doi-org.proxyiub.uits.iu.edu/10.1186/s13006-018-0163-z>



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Promoting and supporting breastfeeding in a protracted emergency setting—Caregivers' and health workers' perceptions from North-East Nigeria

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Background: Breastfeeding (BF) should be protected, promoted, and supported for all infants in humanitarian settings. The re-establishment of exclusive BF is also a central part of the management of acutely malnourished infants under 6 months (<6 m). Médecins Sans Frontières (MSF) runs a nutrition project in Maiduguri, a protracted emergency setting in North-East Nigeria. This study aimed to explore caregivers' (CGs) and health workers' (HWs) perceptions of BF practice, promotion, and support among CGs with infants <6 m in this setting.

Methods: We conducted a qualitative study using in-depth interviews and focus group discussions combined with non-participant observations. Participants included CGs of young infants enrolled in MSF nutritional programs or who attended health promotion activities in a displacement camp. MSF HWs were involved at different levels in BF promotion and support. Data were collected involving a local translator and analyzed using reflexive thematic analysis directly from audio recordings.

Results: Participants described how feeding practices are shaped by family, community, and traditional beliefs. The perception of breastmilk insufficiency was common and led to early supplementary feeding with inexpensive but unsuitable products. Participants often linked insufficient breastmilk production with poor maternal nutrition and stress, in a context shaped by conflict and food insecurity. BF promotion was generally well received but could be improved if tailored to address specific barriers to exclusive BF. Interviewed CGs positively valued BF support received as part of the comprehensive treatment for infant malnutrition. One of the main challenges identified was the length of stay at the facility. Some participants perceived that improvements in BF were at risk of being lost after discharge if CGs lacked an enabling environment for BF.

Conclusion: This study corroborates the strong influence of household and contextual factors on the practice, promotion, and support of BF. Despite identified challenges, the provision of BF support contributes to improvements in BF practice and was positively perceived by CGs in the studied setting. Greater attention should be directed toward providing support and follow-up for infants <6 m and their CGs in the community.

KEYWORDS

breastfeeding support, infant malnutrition, humanitarian settings, breastfeeding, North-East Nigeria

1. Introduction

Infants aged <6 months of age (<6 m), with unique food and fluid requirements and an immature immune system, are increasingly vulnerable during humanitarian emergencies (1, 2). Non-breastfed and partially breastfed infants are at higher risk of morbidity and mortality, especially where access to safe breastmilk substitutes, potable water, hygiene, and healthcare services is limited (3–5).

The Operational Guidance for Infant and Young Child Feeding in Emergencies recommends the early initiation of breastfeeding (BF) in all newborns, the transition from mixed to exclusive BF, and the continuation of exclusive BF until 6 months of age. For non-breastfed infants, the guidelines advise considering alternative options such as relactation, wet nursing, or the use of donor human milk. In cases where mothers cannot breastfeed temporarily or definitively, the decision to provide infant formula should be individually assessed and include a package of support for artificial feeding (6).

The re-establishment of exclusive BF is also considered a central part of the management of malnourished infants <6 m, although current recommendations are based on limited and low-quality evidence (7). Increased knowledge of prevention and treatment options is needed, including effective ways to support the re-establishment of BF (8–11).

Considerable barriers can hinder the uptake of BF during humanitarian emergencies. They include the deterioration of maternal wellbeing (due to displacement, stress, and gender-based violence), a lack of privacy or access to lactation support, and the inappropriate distribution of infant formula (8, 12–14). In addition, supporting BF can be challenging for health professionals regardless of their specialization, as they face a demand that requires knowledge, practical skills, and cultural sensitivity, for which they may not feel properly prepared (15).

Unfortunately, scarce literature informs the feasibility, acceptability, and effectiveness of different strategies to promote and support BF during humanitarian emergencies (13, 16, 17). The impact of BF counseling on stressed, traumatized, or malnourished mothers and infants also remains unstudied (18).

For more than a decade, the population in North-East Nigeria has been affected by an ongoing humanitarian emergency driven by a conflict involving Nigerian government forces and armed opposition groups. Nearly 2.2 million people were internally displaced there in mid-2021, a region also exposed to

drought, flooding, and disease outbreaks. The loss of livelihoods and food security was further exacerbated by the COVID-19 pandemic (19). Between January and December 2022, over 1.3 million children under 5 years were expected to suffer from acute malnutrition in North-East Nigeria (including over 300,000 cases of severe malnutrition) and more than 152,000 pregnant and lactating women could be acutely malnourished and needing nutrition support (20). The international medical humanitarian organization, Médecins Sans Frontières (MSF), runs a project in Maiduguri, North-East Nigeria, providing nutrition and health support to displaced and host populations in the area.

This study aimed to explore caregivers' (CGs) and health workers' (HWs) experiences and perceptions of BF practice, promotion, and support among infants <6 m in North-East Nigeria. The results can contribute to a strategy for BF promotion and support among CGs with healthy and malnourished infants <6 m in this context.

2. Materials and methods

This qualitative study followed the approach of reflexive thematic analysis proposed by Braun and Clarke, situated within an interpretive qualitative paradigm. This method, increasingly used for applied qualitative health research, respects and expresses the subjectivity of participants' accounts, while acknowledging the reflexive influence of researchers' interpretations (21–23). We adopted a critical orientation to examine how the wider social context may have shaped people's constructed meanings (24). This article adheres to the consolidated criteria for reporting qualitative research (COREQ) checklist (25).

2.1. Study setting

Borno is one of the states in North-East Nigeria, predominantly inhabited by Kanuri, Hausa, Fulani, Babur, Shuwa, and Marghi ethnic groups. Most of the population are Muslim, with smaller Christian and traditionalist minorities. Households are commonly headed by men, and polygyny is estimated to be present in approximately 23% of households (26).

This study took place in an MSF project run in Maiduguri, the capital of Borno State. The project focuses on nutrition and health

support for internally displaced people (IDP), mainly providing the following services:

- Ambulatory therapeutic feeding center (ATFC): the center has the capacity for 150 consultations/day, managing severely malnourished children without medical complications and following up with malnourished infants <6 m after discharge.
- Inpatient therapeutic feeding center (ITFC): the center has a 120-bed capacity, including a dedicated ward for infants <6 m (approximately 15 beds).
- Outreach activities covered 10 informal IDP camps providing ATFC, outpatient consultations, sexual and reproductive health, water and sanitation, health promotion, mental healthcare, disease surveillance, and a referral system.

BF promotion targets CGs of both malnourished and non-malnourished infants. It takes place in the community (during outreach health promotion activities) and at the hospital (in waiting areas and hospitalization wards), as part of the general health promotion strategy including other topics. Community health educators and health promoters undertake BF promotion through individual or group talks using pre-determined messaging, flipcharts, or educational videos. During admission to the ITFC ward for malnourished infants <6 m, comprehensive BF support is provided to mothers or wet nurses aiming to re-establish exclusive BF. Discharge from the ITFC depends, in part, on achieving and maintaining weight gain on exclusive BF. Specific support includes frequent encouragement of BF, assistance on BF technique (correct positioning and latching), and breastmilk stimulation through supplementary suckling technique while ensuring appropriate maternal nutrition and rest. Mental health support and psycho-stimulation are provided by mental health counselors in the ward as well as in private dedicated spaces when needed. A team of three health workers is dedicated to this ward in each shift, normally comprising one nurse, one midwife, and one nutritional assistant. Doctors perform daily ward rounds and follow up with infants when necessary.

2.2. Participant selection and recruitment

We purposively selected CGs of infants <6 m (mothers, wet nurses, and close family members) attending the MSF hospital for ATFC follow-up visits or admitted at the ITFC, and during health promotion activities at Mashidimami II, an informal IDP camp. We also selected HWs employed at the MSF project, directly involved in BF promotion or support for CGs with infants <6 m or supervising those activities. Study participants were selected aiming to include different socio-demographic characteristics and job profiles and according to logistical feasibility (availability to participate in the study during the data collection period).

Eligible participants were approached in person by the first author (NAC), and a translator when needed, to explain the study purpose and data collection process and to ask if they would like to participate voluntarily. All invited participants agreed to take part in the study (Figure 1). The recruitment of participants continued until the saturation of salient concepts was observed (27).

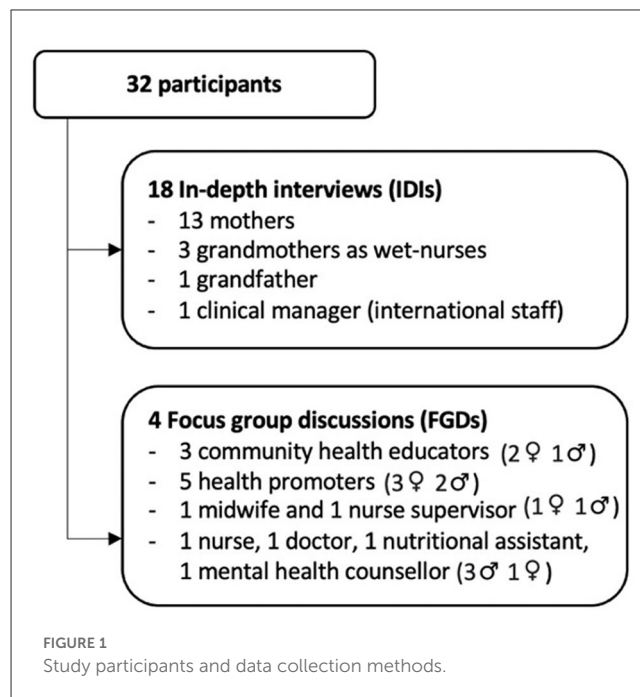


TABLE 1 Phases of reflexive thematic analysis [adapted from Braun and Clarke (34)].

Phases	Description of the process
1. Familiarization with the data	Listening and re-listening to audio recordings and noting down initial ideas
2. Generating codes	Open coding relevant features of the data on a systematic fashion across the entire dataset
3. Searching for themes	Collating codes into potential themes and subthemes
4. Reviewing themes	Checking if the themes work in relation to the coded extracts and the entire data set
5. Defining and naming themes	Refine the specificities of each theme, and the overall story the analysis tells
6. Producing the report	Selecting and transcribing meaningful examples from the data, final analysis of selected extracts, relating the analysis to the research question

2.3. Data collection

Data were collected in March 2022 by NAC with the support of a local translator and a young female community health educator. She was trained for the study and was involved in the preparation of in-depth interviews (IDIs) and revision of audio recordings, to check the consistency of translation and discuss methodological reflexivity within the process (28). A sample of her translations was also assessed by another research team member to ensure translation accuracy.

To favor a confidential environment for more in-depth answers, we choose to conduct IDIs with CGs. Before starting IDIs, basic socio-demographic information was collected from participants and documented on a written form. We used an interview guide with questions and probes (Supplementary material 1), which was tested on two participants;

TABLE 2 Characteristics of caregivers participating in the study.

Participant	Age*	IDP status	Education level	No. children*	Interview setting	Days ITFC**	Infant feeding practice before reaching MSF services
Mother 1	30–35	Non-IDP	Illiterate	5–7	ITFC	6	EBF (inadequate)
Mother 2	30–35	Non-IDP	Basic education	8–10	ITFC	19	BF + powdered milk (cup)
Mother 3	25–30	IDP	Illiterate	4–6	ITFC	4	BF + formula with cereals (cup+spoon)
Mother 4	35–40	Non-IDP	Illiterate	8–10	ITFC	17	BF + powdered milk (cup)
Mother 5	35–40	Non-IDP	Illiterate	5–7	ITFC	6	BF + powdered milk (cup)
Mother 6	25–30	Non-IDP	Basic education	2–4	ITFC	19	Powdered milk (cup)
Grandmother 1 (wet-nurse)	40–45	Non-IDP	Illiterate	5–7	ITFC	4	BF + fresh cow milk (bottle)
Mother 7	30–35	Non-IDP	Illiterate	5–7	ITFC	6	BF + infant formula (bottle)
Mother 8	35–40	IDP	Illiterate	8–10	ATFC		BF + powdered milk
Mother 9	20–25	Non-IDP	Basic education	2–4	ATFC		BF + infant formula
Grandmother 2 (wet-nurse)	45–50	IDP	Illiterate	8–10	ATFC		BF + powdered milk + Porridge
Grandmother 3 (wet-nurse)	45–50	IDP	Illiterate	8–10	ATFC		BF + powdered milk + Porridge
Mother 10	35–40	IDP	Illiterate	5–7	IDP camp		EBF (inadequate)
Mother 11	20–25	IDP	Illiterate	2–4	IDP camp		EBF
Mother 12	35–40	IDP	Illiterate	5–7	IDP camp		BF + water
Mother 13	30–35	IDP	Illiterate	5–7	IDP camp		EBF
Grandfather	50–55	IDP	Primary level	5–7	IDP camp		-

BF, breastfeeding; EBF, exclusive breastfeeding; ITFC, Inpatient Therapeutic Feeding Center; IDP, internally displaced people.

*Intervals are shown for age and number of children.

**Number of days admitted at ITFC when interviewed.

some questions were added as a result. The guide contained questions about infant feeding practices, barriers and enablers to BF, experiences receiving BF promotion and support, and preferences/suggestions for feeding support. The IDIs lasted from 20 to 45 min, were conducted in either Hausa or Kanuri languages, and took place at a private area within the MSF hospital and the informal IDP camp.

Four focus group discussions (FGDs) were organized to explore HWs' experiences and perspectives. Discussions were in English, led by NAC at the MSF hospital, and took from 45 to 80 min. The FGDs were guided by a script containing five key questions with probes comprising: perceptions about common feeding practices; perceived barriers to BF; experiences promoting and supporting BF; barriers to BF promotion and support; perceptions on how BF promotion and support could be improved (Supplementary material 1). An IDI was conducted with one clinical manager to get more in-depth information. The data collection process is summarized in Figure 1. All IDIs and FGDs were audio-recorded with prior authorization from interviewees.

During the data collection period, NAC was immersed in project activities, especially in the ITFC ward dedicated to infants <6 m. She recorded her observations of contextual and personal dynamics in field notes according to recommendations by Phillippi and Lauderdale (29). Notes of non-verbal information

and impressions during IDIs and FGDs were not taken during the interviews but were written afterward. At the end of each day, NAC listened to audio-recording samples and revised and expanded the field notes with more thoughtful perceptions (reflective journaling). Most prominent answers were discussed with other field workers involved in the study to gather their views and adjust the data collection process if needed (adding new probes to the IDI guide or FGD script).

2.4. Data analysis

We performed direct analysis from the audio recordings, which included original data in English and the recorded translations from Hausa/Kanuri to English. Direct coding from audio files can provide a high level of detail and the ability to capture intonations while reducing coding time (30, 31). Rapid qualitative techniques have been found suitable for complex humanitarian settings to enable the timely acquisition of data during operations (32, 33).

As shown in Table 1, reflexive thematic analysis followed the recommended steps (21, 34). Data were open-coded by NAC, mostly inductively, to best represent its meaning as communicated by the participants. A deductive approach ensured that themes were

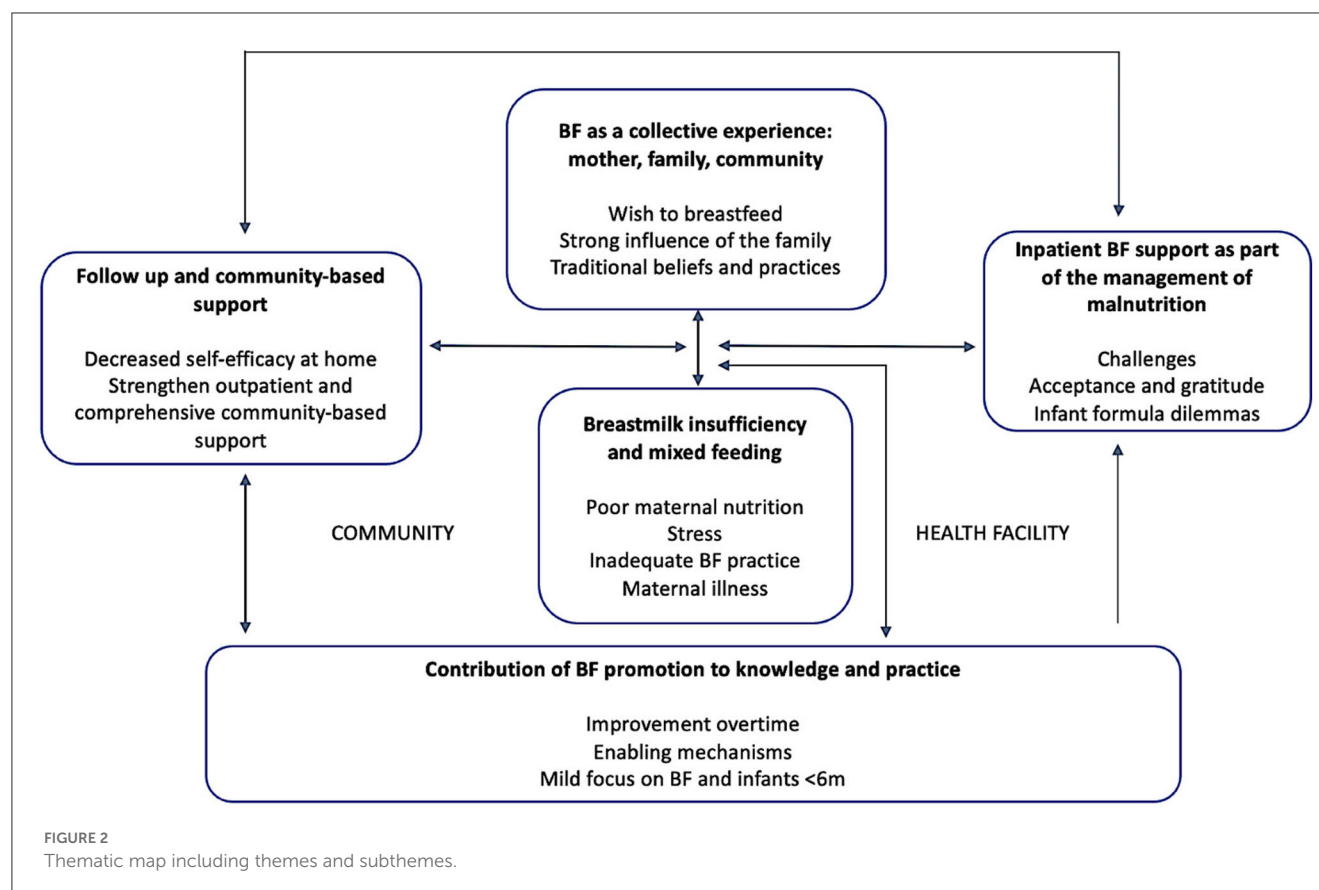


FIGURE 2
Thematic map including themes and subthemes.

relevant to answer research questions and objectives (21). Semantic (more explicit) and latent (underlying) meanings were considered, and sometimes extracts were coded twice. Microsoft OneNote was used to code the data from audio files and combine it with field notes (35).

Audio files, field notes, and the coding matrix were shared among a subgroup of researchers, who helped to refine the themes and subthemes. The results were discussed in a consultative meeting that included the study team members and MSF staff at different levels.

We strived for the trustworthiness of findings by following several steps throughout all phases of reflexive thematic analysis (thick descriptions, prolonged data engagement, reflective journaling, and peer debriefing) as suggested by Nowell et al. (36).

2.5. Research team reflexivity

NAC is a female nurse and PhD student from Europe, with some previous experience in qualitative research and humanitarian fieldwork. She is also a mother. Both NAC and the translator were female, which favored trust building with female participants during data collection. The study was conditioned by being conducted within the frame of a project run by an international NGO providing free healthcare. Socio-cultural differences between the principal investigator and the study participants were noteworthy but partly balanced by the

presence and inputs of the translator and the inclusion of local colleagues within the research team who could better grasp contextual nuances.

2.6. Ethics considerations

Ethics approval was granted by the MSF Ethics Review Board (ID 2207) and the Borno State Health Research Ethics Committee, Nigeria (Approval No. 113/2022). All study participants granted their written, informed consent before data collection. For illiterate participants, we read the consent form in Hausa or Kanuri languages, and consent was recorded using a thumbprint, witnessed by the translator. We offered in-kind compensation for CGs after they participated in the study. The audio recordings and the signed informed consent forms are stored in a password-protected folder on an MSF server, where they will be kept for 10 years before being deleted.

3. Results

The characteristics of CGs participating in the study are summarized in Table 2. Most mothers were grand multipara, with a median age of 30 years (IQR = 26–39) and seven children (IQR = 4–7). Only four mothers declared to be exclusively BF at the time of the interview, but two of them reported BF difficulties. Regarding HWs, half of the participants were female, aged between

TABLE 3 Summary of perceived enabling and disabling factors for BF practice, promotion, and support.

Enabling factors	Disabling factors
Individual and community level	
<ul style="list-style-type: none"> - Mothers' wish to breastfeed, BF culturally considered a maternal duty - Family support and encouragement - Acceptability of wet nursing by grandmothers - Motivation to re-establish BF when understood as part of the treatment for malnourished infants - BF promotion at different levels (media, antenatal care, NGOs) 	<ul style="list-style-type: none"> - Maternal death or medical conditions, multiple births - Lack of BF skills - Certain traditional beliefs, discouraging messages from traditional healers - Unsupportive family members - Hot and dry weather conditions - Frequent perception of breastmilk insufficiency due to food insecurity and stress - Lack of initiative to seek skilled BF support when BF difficulties encountered
Program level	
<ul style="list-style-type: none"> - BF promotion inclusive of family members, community leaders and traditional medicine providers - Identification of positive examples (healthy infants exclusively breastfed) - Comprehensive inpatient care, including appropriate nutrition, rest, and skilled BF support - Frequent involvement of mental health counselors - Peer encouragement and support 	<ul style="list-style-type: none"> - Generic health promotion messaging not addressing specific BF difficulties/barriers - Limited capacities for lactation support by health promoters or community health educators - CGs expectation to receive formula milk from humanitarian organizations - Cultural or gender differences between CGs and HWs - HWs overemphasis on the need for appropriate nutrition among lactating mothers - Reluctance for a long length of hospital stay - Outpatient and community support poorly adapted for infants <6m

20 and 40 years, and most had worked on the project for more than 2 years.

The results were grouped into five overarching themes with subthemes (Figure 2) and are described below with illustrative quotes from study participants. To ensure the confidentiality and anonymity of the HWs, quotes were identified as coming from health promoters (referring to health promoters, community health educators, or mental health counselors) or clinical staff (referring to doctors, nurses, midwives, or nutritional assistants).

3.1. BF collective experience: mother, family, and community

Overall, there was a positive perception of BF; it was seen as a natural part of motherhood and women felt as if it was a duty. Mothers expressed their wish to breastfeed their babies even if they encountered difficulties. On the other hand, HWs identified a small percentage of mothers who preferred not to breastfeed for different reasons, such as the impact of BF on body image or the assumed

superiority of other animal milk (cow or goat), infant formula, or therapeutic milk.

"I feel happy whenever I breastfeed the baby, and breastfeeding is very good... I don't see the reason why I would give birth and I cannot breastfeed the baby." Mother 3

"Some women do not want to breastfeed because [they say]: we feel that when we breastfeed our breasts fall down, so it's no more attractive to the husband." Clinical staff

In contrast to the mothers' wishes, HWs perceived infant feeding practices, and health-seeking behaviors were frequently determined by the elder members of the family or by the husband. When a mother's and family's preferences contradicted each other, the preferences of the family were usually followed. In some cases, the family enabled and encouraged exclusive BF. The main support for BF expected from husbands was the provision of extra food for mothers while lactating. From the HW's perspective, marital dynamics such as polygyny, early marriage, or domestic violence also shaped mothers' ability and desire to breastfeed.

"The tradition here is that you have to go with what the husband wants or what the mother-in-law wants. So even if you as a mother want to do exclusive breastfeeding, if the husband say no or his mother say no, you cannot do it." Health promotor [sic]

Infant feeding practices seemed to be greatly influenced by specific **traditions and beliefs**, which differed among different communities and ethnic groups. Several traditional practices contributed to the delayed start of BF. Traditional medicine and traditional healers were well-rooted inside communities, and they were the first choice for most participants with health concerns including BF. If there was no improvement following traditional healers' advice or the health issues were perceived to be more serious, people sought care in hospitals or formal healthcare facilities. Sometimes traditional healers discouraged exclusive BF or advised them to stop BF.

"In our tradition, if a baby is born, she will not be breastfed till after 3 days. On the fourth day, they will start breastfeeding the baby. (...) we give cow milk, fresh milk, and water during these 3 days." Grandmother 1

"I had enough breastmilk but when I went to traditional healers, they told me that I had enough breast, but the breast is not that nutritious that can be sufficient for the baby." Mother 3

Two grandmothers explained how they tried to breastfeed a grandchild for the first days of life, while the baby's mother was sick post-partum. In both cases, the mother died, and grandmothers became the main CGs and wet nurses who could partially breastfeed. However, wet nursing appears to be accepted only when a mother has died and when the wet nurse is the grandmother or some other close relative (a sister or a sister-in-law). In other cases, wet nursing was rarely considered.

"In my culture is not accepted, for me to give the baby to nursing mother to breastfeed." Mother 9 (mother with twins on formula feeding) [sic]

"They will not agree [a family member to wet-nurse her baby]. My sisters have their own children so I don't think they will agree to breastfeed my baby." Mother5

3.2. Breastmilk insufficiency and mixed feeding

Even when mothers initially wished to breastfeed, they commonly felt they could not produce enough breastmilk to feed their children appropriately. This perception of breastmilk insufficiency was driven by cues like babies frequently crying, not falling asleep after BF, or not gaining weight as expected. As a solution, mothers' families provided unsuitable products for infant feeding that were available and affordable to them. Most families could not afford infant formula, so they often used sachets of powdered milk ("Cowbell" commercial name), or a porridge called "pap".

"The breastmilk is not enough for the baby, because he is crying all the time, day and night, and I do not have money to buy infant formula, so I decided to buy Cowbell milk, which is the one that adults use." Mother4

There was also a belief that breastmilk was not sufficient for the baby and that other supplements must be added, especially water, due to the extreme weather conditions (very hot and dry). In this setting of food insecurity, all CGs and HWs strongly believed that maternal nutrition critically influenced breastmilk production and its quality. This was the most commonly described issue among CGs and HWs and shaped BF beliefs, experiences, and support.

"When I gave birth, I didn't have enough breastmilk and the father didn't have money to supply food that can make the breast enough the children." Mother 8 [sic]

"Sometimes you will go to an IDP camp, and you come across a mother and her children, eating some leaves, just only those leaves (...) You cannot say this mother is able to provide enough breastmilk for a baby." Health promotor

CGs sensed that emotional stress affected breastmilk production and hampered BF, and HWs perceived that stress negatively affected mothers' ability to breastfeed. Participants often verbalized how stress affected them as a result of conflict, displacement, and loss of livelihoods in the context of increasing poverty.

"I think what makes my breastmilk not flowing is emotional stress because I think a lot... I am thinking how can I breastfeed this baby till 6 months, how can I get food for the rest of the family." Mother 2

"This Boko Haram crisis caused a lot of poverty and displacement of people from their homes. So, people that initially, maybe they are not rich, but they used to farm and provide to eat. Now, because of the displacement they live no longer in their villages, they don't have anything." Clinical staff

From HWs' observations, breastmilk insufficiency was sometimes caused by inadequate BF practices in terms of positioning, latching, or frequency, even among multipara mothers. Mothers recognized their lack of knowledge of appropriate practices but did not identify this as a factor leading to breastmilk insufficiency.

"Some do have breastmilk, but the method and the way they position, or the way they latch the baby or the times they take to breastfeed are normally the issues." Clinical staff

Another issue affecting BF was maternal medical conditions, including those affecting the breasts or the nipples. In some cases, mothers were discouraged from BF, for instance, when known to be HIV positive or presenting mastitis. When mothers had experienced previous neonatal or infant mortality, the death of the child is usually attributed to "poisonous" breastmilk, and normally mothers refused or were pushed to give up BF for further children. Most of the mothers interviewed were grand multipara. Some mothers felt their ability to BF changed over time, decreasing with older age and higher parity, since they were able to breastfeed their first children but experienced difficulties with later ones.

"They believe if they give their child the breastmilk, the child may end up dying. Because already they are told that the breastmilk is bad. We use to face this challenge. And it is very difficult to convince the mother that the milk has no problem." Health promotor

3.3. Contribution of BF promotion to knowledge and practice

There was a shared perception that infant feeding practices were slowly improving over time. This change was due to the exposure of mothers to encouragement about exclusive BF through the radio, during antenatal care, promotion by NGOs, or after hospital delivery. It was perceived that communities were generally open to BF promotion messaging, and some families were willing to follow recommended practices.

"Here in our community before we did not get the knowledge of breastfeeding babies only with breastmilk, so we breastfeed, we give water and also "pap" after 2 or 3 months. But now we have the knowledge of exclusive breastfeeding." Grandfather

"They really understand and like the messages. Because there are some mothers that when they gave birth, I advised them about exclusive breastfeeding. And those mothers followed what I educate them, and they successfully breastfed their children until 6 months without giving water. And later they are appreciating... they never fed a child like this" Health promotor

HWs identified several mechanisms contributing to the uptake of recommended feeding practices. One was the inclusion of key community members and traditional healers, as well as an open invitation to health promotion talks, including elderly family members. Another was the identification of cases that serve as an example of the positive result of promoted practices, following the idea that, “seeing is believing”.

“Our people, they mostly believe in their traditional things. So that’s why we used to include traditional healers and traditional birth attendants in our programs, so that we get more trust from the community.” Health promotor.

“I have a granddaughter who is living with me now, she has been fed only with breastmilk for the first 6 months. And from my observations, her health is different [better] from the other children who are fed with water, “pap” and breastmilk.” Grandfather (encouraging exclusive BF within his community)

The **fear** of infants getting infectious diseases or developing malnutrition also guided the change in feeding practice, as BF promotion messages emphasized the risks of infants who were not breastfed.

“They [at health facilities] are showing us pictures of malnourished babies as a result of giving formula and water for babies less than six... this led them to malnutrition and some other diseases (...) Everybody is afraid of disease, so that’s why we decide to follow exclusive breastfeeding.” Mother 11

Although mothers may have accepted the recommended practices, they often lacked the practical skills, self-confidence, or support to adhere to them. In those situations, the perceptions of breastmilk insufficiency prevailed over general BF promotion messages.

“Giving the breastmilk only is the best way but most of the women are not able to produce enough breastmilk for the baby, so that’s why we decided to introduce formula.” Mother 3 [sic]

“The best way to feed an under 6 months old baby is exclusive breastfeeding, but if the breast is not enough for the baby, I will introduce other milk for the baby, because the baby will be malnourished if the breastmilk is not enough.” Mother 10

The general strategy for health promotion within this MSF project included messaging on BF but it was not the main focus. HWs believed that general health messages did not always target the specific issues and multifactorial causes of lactation failure. HWs proposed several solutions to integrate BF support during health promotion activities more effectively. Proposed solutions included increasing the emphasis on BF physiology and practical skills, tailored messaging, and additional training for health promoters to enable them to provide this type of information and support.

“If we send general messages, I don’t think we will be able to make the connection with the women. (...) I am not convinced that they receive the messages that they need to know how to

increase the milk production. Because I am not sure how much is focused on the timelines, how often they should feed...” Clinical staff [sic]

3.4. Inpatient BF support as part of the management of malnutrition

3.4.1. Challenges

CGs with infants <6 m normally came to the MSF nutrition project to seek care for malnourished or sick infants. On admission, most reported suboptimal feeding practices and complained of insufficient breast milk. However, their **expectation** was not to re-establish exclusive BF but to receive medical treatment for the infant, obtain free infant formula, or get a short medical treatment that could improve their breastmilk production.

“They don’t get the full picture that there is no medical intervention. It’s just to eat well, drink a lot of fluids, then keep breastfeeding, and then child will improve slowly (...) The point is to help them produce milk, so that we can discharge on breastmilk only. But maybe they don’t understand the whole idea of double suckling to increase stimulation and all that.” Clinical staff [sic]

Before being admitted, CGs received explanations about the treatment, and they were also informed about a possible long length of stay. While feeling a bit overwhelmed by this change from initial expectations, staff clarifications, and reassurance helped them to adhere to treatment. Although CGs generally expressed their wish to stay admitted as long as needed to re-establish exclusive BF, they also raised concerns associated with a long stay. HWs pointed out that the duration of stay was a major problem in the care of infants <6 m. The willingness to stay decreased over time; as the health status of the infant improved, the CGs saw no reason to stay.

“The issue is I left my children with my neighbor and my husband has travelled (...). I would like my baby to feel better early so I am discharged and go home to take care of my own children.” Mother 1

“Once the child is still on medication, they are normally ok, there is a treatment going, so they are ok. But once the medication finishes, and then they are still staying, the child is not sick, he is not having anything, they feel like. ‘why are we still here?’.” Clinical staff [sic]

The mothers interviewed for this study were supported by their families, who encouraged them to stay and comply with the treatment at the ITFC. While many of their husbands were absent, they agreed for them to stay. However, HWs reported that this was not always the case. CGs sometimes felt distressed or powerless when admitted since they had left their family back home. Moreover, many CGs were emotionally unstable on arrival to the facility, given the vulnerability of the post-partum period,

and the worries associated with infant feeding difficulties, sickness, or malnutrition.

“To think about home is something we can’t stop it, but they [MSF staff] always advise us to reduce it, because if it becomes much, it will affect us and the baby.” Mother 7 [sic]

HWs perceived a certain reluctance from women to accept direct BF support from male staff, due to a lack of trust in talking about “female issues”. CGs did accept care from male staff, although it reflected the differences and barriers between men and women in this culture.

“The male and the female are different, so women feel more comfortable with the female staff than the male, and the male also sometimes doesn’t feel comfortable because caregiver is a female, that’s why there are feeling shy to come very close.” Mother 7 [sic]

“They won’t say they disagree, but then you know, facial expression matters a lot. Some don’t relax, they don’t tend to feel comfortable when is a male trying to assist them. While others don’t care whoever it is.” Clinical staff (male)

Acknowledging the numerous ethnic groups in the area, **cultural differences** between CGs and HWs—including the language barrier—also shaped the provision of BF support. When facing communication difficulties, HWs normally identified staff at the facility who could translate. Sometimes HWs felt frustrated and found it difficult to understand CGs’ behaviors, practices, and decisions; this was a barrier to effectively engage with them.

“She would tell you that she is so worried, but yet she doesn’t want to breastfeed. If you are too concerned about your child’s illness, or his condition, at least breastfeed him, but she won’t.” Clinical staff

While admitted, CGs demonstrated incorrect BF practices that sometimes the staff were not able to recognize (signs of ineffective suckling or BF only from one breast) or did not address for some time. From their viewpoint, this was due to a lack of time and knowledge. HWs reflected on possible solutions to improve staff capacities and practical BF support. They included the provision of practical, bedside training on different techniques. There was little engagement of nutritional assistants in direct BF support, so this could be addressed by training them for this purpose. Tools to assess BF practice and records of the progress could be better used to ensure a more systematic approach to BF support.

3.4.2. Acceptance and gratitude

Despite initial expectations that were not met and the challenges in inpatient BF support, CGs gradually adapted to the routine at the facility and most accepted and complied with the recommendations to increase breastmilk production. The uptake of supplementary suckling technique was good overall and CGs and infants slowly demonstrated improved BF practice while hospitalized.

“It’s strange for me to give the breast together with the tube for the baby, but I am not finding difficulties to do it.” Grandmother 1

“I think it really helped my baby because if I would use a cup for my baby, I think half of the milk will pour down. But by using the tube, the baby will take almost all the milk.” Mother 7

Different enablers contributed to this acceptance. The **role of mental health counselors seemed crucial** for BF support in this context. Their support was constantly required by other clinical staff, as they—as well as some health promoters—were the ones who were able to effectively encourage GCs to follow advice. They followed a culturally sensitive approach and supported women emotionally by listening to them, talking to them calmly, and encouraging them with positive examples.

“Maybe sometimes the doctor wants to do some important, but because of the refusal they have to stop (...) But if there’s maybe a HP or counsellor to help them, they are very comfortable... What can you do? You cannot deny culture” Clinical staff

CGs also supported each other and encouraged other CGs to follow recommendations, after seeing the improvements with their infants.

“Caregivers also encourage themselves. Even when they are depressed and one says ‘I don’t have breastmilk’, they use themselves as examples, to tell them ‘When I came in, I didn’t have milk, but due to the counseling, and the treatment doctors, nutrition assistants, the nurses, everybody... the support, and then the milk comes out.’ Clinical staff

At the same time, BF support was included in the overall comprehensive treatment provided—rest, appropriate nutrition, and care for the infants—and mothers felt well treated and comfortable at the facility; this is an enabling environment to breastfeed. Above all, CGs saw improvements in infants’ health and nutritional status, and also for themselves. All interviewed mothers felt grateful for the services provided and were willing to recommend the uptake of BF to other CGs.

“The women feel comfortable being at the ward and we use to sit down and have a chat, breastfeed our children... sometimes we are even with the staff” Mother 7

“When I was admitted I received a lot of support and guide from the staff. I feel comfortable with them and... there are meals, there are food, everything in the facility is ok. When I went back home my family were happy to see how I have changed.” Grandmother 3 [sic]

3.4.3. Dilemmas of infant formula demand and supply

On admission, CGs are told that accepting BF support is part of the treatment process during hospitalization and that infant

formula is not provided upon the mother's desire. HWs highlighted a lack of a straightforward solution for mothers not wishing to breastfeed. Yet, they thought that a more flexible approach to formula provision will cause an increase in formula feeding demand and consumption—and a subsequent increase in risks of artificial feeding. Infant formula in this context is an expensive product and HWs reported how some CGs obtained it for free then sold it to get money; this also happens with other therapeutic supplements given at the facility. HWs described a few scenarios that frequently lead to formula supply after BF support, such as wet nursing or multiple births. They perceived that there was a lack of unified criteria for formula provision in some cases, for example, when mothers were not achieving exclusive BF after a period of BF support.

"We know all the advantages of breastfeeding... we know that it's free, we know that it's hygienic. So I would rather improve our services [BF support] than to make infant formula a convenient option (...) I think there should be a clearly defined criteria when to switch to formula" Clinical staff [sic]

3.5. Follow-up and community-based support

When discharged, infants were followed up weekly at ATFC until they recovered. Some CGs and HWs feared that BF practices would decrease or stop after discharge since CGs lacked access to appropriate food, staff encouragement, and support at home. Both CGs and HWs strongly believed that maternal nutrition was crucial for an adequate supply of breastmilk, something that was not often possible at home.

"For the purpose of their care in the facility, they will breastfeed, because we encourage them, and we do psycho-education... so they do it. But when they are being discharged home, and when they come up for follow-up, we find that the child has already stopped." Clinical staff [sic]

"When I was in admission in the facility, they gave us food (...) so it helped the breast to start producing breastmilk. But immediately when I went back home because I can't afford to buy this kind of food and eat, the supply of the milk is going down." Grandmother 3 (attending for follow-up at ATFC) [sic]

It was perceived that ATFC services, traditionally targeting only older children, were not including BF promotion or support during follow-up visits but were focused on following up on weight changes or general health status. HWs suggested that BF promotion and support should be included in a stronger community-based approach to ensure sustainability after the hospital interventions.

"When they come, we treat and then they go back, but there is still a gap, so it should be community-based (...) This is where we should start these cultural beliefs... If we don't do it, no matter what you do, they'll come back." Clinical staff [sic]

4. Discussion

The experiences and perspectives shared by participants portray a setting in which BF is practiced by most mothers, but the uptake of exclusive BF seems low. In a survey exploring infant feeding practices in Borno State, only 33% of caregivers reported having fed their children only with breastmilk for the first 6 months of life (37). Available reports suggest an increase in exclusive BF rates over time, as perceived by participants in this study (38–40).

This study exposes enabling and disabling factors for BF practice and support perceived by CGs and HWs in the studied context, which are summarized in Table 3. Yet, many of these perceived factors have also been identified in other humanitarian and low-middle-income settings and among mothers and infants globally (18, 41). While medical humanitarian organizations may not directly tackle structural barriers—such as household dynamics, traditional beliefs, displacement, and food insecurity—these factors should be recognized and addressed when developing strategies to promote and support BF. At the program level, BF promotion messages and support activities should be adapted to the common barriers to BF reported in this specific context. There is a need to strengthen HWs' capacities for lactation support while providing them with knowledge and skills to effectively counsel women so they can gain confidence in their ability to breastfeed despite being stressed or having poor nutrition. Staff training should also be enlarged to a wider range of healthcare roles, such as nutritional assistants or health promoters. Specific areas for improvement are mentioned throughout this discussion.

Interviewed mothers were generally disempowered by infant feeding decisions or healthcare-seeking behaviors. This has been already shown in other studies looking at social norms in Borno state (42) or focusing on African cultures (43). This limitation of mothers' autonomy should be considered when providing BF messages and support, by involving key family members, when possible. In this setting, we found grandmothers who were willing to wet nurse accepted to be hospitalized with their grandchildren to receive inpatient BF support as part of the treatment for infant malnutrition. However, there was a perception that wet nurses seldom achieved exclusive BF despite support. Future studies should assess the outcomes of BF support among wet nurses, including infant nutritional recovery. Similarly, there is a need to increase staff capacities and explore strategies to provide enhanced support for wet nurses, acknowledging the high maternal mortality ratio observed in Nigeria and other humanitarian settings (44).

The conflict and displacement in Maiduguri have augmented the risk of acute malnutrition among infants and reduced dietary availability for mothers (2). Food insecurity can impact BF practice through various pathways. It can compromise maternal nutrition, not only affecting mothers' wellbeing but also leading to the perception of insufficient breastmilk and resulting in mixed feeding or premature cessation of BF. Additionally, food insecurity can induce stress or depression, often triggered by the inability to provide enough food for the family (45–49). Stress does not directly affect breast milk production. However, it can temporarily delay breastmilk release through reduced oxytocin secretion and reduced maternal self-confidence, as well as impact mother–infant behaviors (e.g., maternal anxious behavior

subsequently increasing infants' irritability during feeds) (50–52). These mechanisms potentially affecting BF practice could be overcome when providing holistic support and reassurance. Offering mental and psychosocial support for lactating mothers is particularly relevant to promoting maternal wellbeing and protecting and enabling BF in humanitarian settings, where stressors likely increase (20, 53).

Generally, CGs thought reduced breastmilk production and flow were irreversible and felt powerless to change that situation. To reverse this perception, sensitive counseling can provide information and support to reinforce maternal self-efficacy and lead to improvements in BF (18). Messages should focus on the mechanisms of breastmilk production and how it can be increased (49). CGs and HWs should improve their understanding and management of certain infant behaviors, such as fussiness or crying, that often led to direct feeding supplementation and discontinuation of BF (54).

In this context, HWs strongly emphasize the importance to increase the intake of fluids and nutritious food for lactating mothers. It has been previously documented how these messages can undermine BF practice in contexts where mothers cannot reach the recommended intake (53). Up to now, there is not enough evidence suggesting the need to increase fluid intake beyond what lactating women require to meet their physiological needs (55). Breastmilk production and macronutrient composition seem to be little affected by maternal intake although maternal micronutrient deficiencies appear more reflected in breastmilk. In the case of severely malnourished mothers, BF can be extra challenged by energy depletion and the mother feeling unwell. While mothers can maintain lactation even when having a poor diet and nutritional status, more research is needed to investigate the extent of the influence of these factors on infant growth (56–59). Nonetheless, in resource-limited settings, exclusive BF likely remains the most complete and safe option for infants <6 m and should be strongly promoted and supported (60). The messages encouraging a healthy diet among lactating mothers should be delivered sensitively, in coherence with mothers' access to food, and coupled with maternal nutritional support when possible. At the same time, maternal nutritional status should be assessed and considered to better support mothers and infants.

The Operational Guidance for Infant Feeding in Emergencies outlines the limited circumstances when infant formula should be provided in emergencies (6). These recommendations arise with the purpose to protect mothers and infants from a wide distribution of formula, which may discourage mothers from re-establishing BF and undermine overall BF practice in the community (61, 62). However, as previously documented, the guidance is sometimes not understood or difficult to follow by those translating recommendations into practice. For instance, HWs may feel they are dismissing maternal autonomy or may hesitate to decide when BF support is considered ineffective and infant formula should be provided in those cases (8, 14). Staff training sessions should encourage discussions around the practical application of guidelines in a specific context, acknowledging HWs' dilemmas and experiences. Further research should also focus on identifying the best ways to support non-breastfed infants in emergencies.

Within this project, inpatient BF support worked effectively to help achieve partial and exclusive BF. CGs generally accepted the use of supplementary suckling techniques and the advice to stimulate BF (e.g., frequent suckling and bedding-in). The acceptability and outcomes of relactation support can vary widely among contexts (46, 63). The success in the studied setting was likely linked to peer support and the constant encouragement by HWs in a clinical setting where the use of supplementary suckling was well established. One of the main issues challenging BF support in the facility was the prolonged length of stay in some cases. This was also mentioned by CGs receiving relactation support in Kenya (46). As proposed by HWs, the feasibility and outcomes of outpatient support or intermittent admission—allowing mothers to go home for a few days and return to continue BF support—could be considered in this context. This study highlighted several reasons to consider a community-based approach for the management of malnourished infants <6 m. The Community Management of At-risk Mothers and Infants under 6 months of age (C-MAMI) care pathway, already supports and guides this approach, although its practical applicability and impact are being evaluated (64).

Several study limitations should be considered. Participant CGs had already accepted treatment at the facility. Hence, CGs who refused MSF treatment, who may have had different views, were not included in the sample. We recruited participants reachable at the facility or IDP camp during the limited data collection period, which did not allow interviewing other GCs (e.g., father and adolescent mother). A degree of social desirability bias must be considered in the answers recorded. HWs may have had a sense of performance evaluation that might have changed their opinions. CGs were receiving free care from MSF and were also offered an incentive for their participation in the study. This bias was mitigated by triangulating information from different sources, researchers' observations, and discussions among the research team in the field (65). Finally, the results of this study captured findings in a particular setting and time, so that they may not be generalizable to other contexts or more acute emergencies.

Since this operational research study aimed to create evidence-based practice, the authors disseminated the results among MSF field staff and managers in the Maiduguri project. It was hoped that this information would contribute to improving infant feeding support in this specific context (Supplementary material 2). These operational recommendations could be applied in other similar humanitarian contexts.

5. Conclusion

This study re-emphasizes that the practice of BF does not only depend on mothers' wishes, knowledge, and skills but it is strongly influenced by household and contextual factors. The perception of breastmilk insufficiency linked to poor maternal nutrition is one of the most common barriers to BF in this setting and should be particularly addressed during BF promotion and support. Within the studied project, BF support seems to contribute to improvements in BF practice, and it is positively valued by CGs, despite challenges and areas for improvement in HWs' capacities. A key factor enabling the

acceptance of BF support was its integration as part of the comprehensive care provided to CGs and malnourished infants during admission. A greater focus should be placed on providing targeted support and follow-up for infants <6 m and their CGs in the community.

Data availability statement

Data could be available upon reasonable request and with permission from Medecins Sans Frontiers. Requests to access the datasets should be directed to nieves.amat.camacho@ki.se.

Ethics statement

The studies involving human participants were reviewed and approved by MSF Ethics Review Board (ID 2207) and the Borno State Health Research Ethics Committee, Nigeria (Approval No. 113/2022). The patients/participants provided their written informed consent to participate in this study.

Author contributions

NAC, EB, AC, TS, JVS, OK, and UP contributed to study design. HK, FH, AC, and CB supported data collection process. NAC collected and analyzed the data with contributions from AC, EB, UP, and TS. NAC drafted the first version of the article. All authors contributed to the discussion of results and read and approved the manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpubh.2023.1077068/full#supplementary-material>

References

- Gasseer NA, Dresden E, Keeney GB, Warren N. Status of women and infants in complex humanitarian emergencies. *J Midwifery Women S Heal.* (2004) 49:7–13. doi: 10.1016/j.jmwh.2004.05.001
- Iacoella F, Tirivayi N. Child nutrition during conflict and displacement: evidence from areas affected by the Boko Haram insurgency in Nigeria. *Public Health.* (2020) 183:132–7. doi: 10.1016/j.puhe.2020.03.012
- Lamberti LM, Walker CLF, Noiman A, Victora C, Black RE. Breastfeeding and the risk for diarrhea morbidity and mortality. *BMC Public Health.* (2011) 11:S15. doi: 10.1186/1471-2458-11-S3-S15
- Sankar MJ, Sinha B, Chowdhury R, Bhandari N, Taneja S, Martinez J, et al. Optimal breastfeeding practices and infant and child mortality: A systematic review and meta-analysis. *Acta Paediatrica Int J Paediatrics.* (2015) 104:3–13. doi: 10.1111/apa.13147
- Black RE, Allen LH, Bhutta ZA, Caulfield LE, Onis M de, Ezzi M, et al. Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet.* (2008) 371:243–60. doi: 10.1016/S0140-6736(07)61690-0
- IFE Core Group. *Operational Guidance on Infant Feeding in Emergencies (OG-IFE) version 3.0.* Emergency Nutrition Network; ENN Online. (2017). Available online at: <https://www.enonline.net/operationalguidance-v3-2017>
- World Health Organization. *Updates on the Management of Severe Acute Malnutrition in Infants and Children.* World Health Organization (2013).
- Haidar MK, Farhat JB, Saim M, Morton N, Defourny I. Severe malnutrition in infants displaced from Mosul, Iraq. *Lancet Global Heal.* (2017) 5:e1188. doi: 10.1016/S2214-109X(17)30417-5
- Dureab F, Al-Falahi E, Ismail O, Al-Marhali L, Jawaldeh AA, Nuri NN, et al. An overview on acute malnutrition and food insecurity among children during the conflict in Yemen. *Children.* (2019) 6:77. doi: 10.3390/children6060077
- Grijalva-Eternod CS, Kerac M, McGrath M, Wilkinson C, Hirsch JC, Delchevalerie P, et al. Admission profile and discharge outcomes for infants aged less than 6 months admitted to inpatient therapeutic care in 10 countries. A secondary data analysis. *Maternal Child Nutr.* (2017) 13:3. doi: 10.1111/mcn.12345
- Kerac M, James PT, McGrath MG, Brennan E, Opondo C, Frison S. Infant malnutrition in low- and middle-income countries: assessment and prevalence of small and nutritionally at-risk infants aged under 6 months in 54 Demographic & Health Survey datasets. *Medrxiv.* (2021) 12.23.21268306. doi: 10.1101/2021.12.23.21268306
- Hwang CH, Iellamo A, Ververs M. Barriers and challenges of infant feeding in disasters in middle- and high-income countries. *Int Breastfeed J.* (2021) 16:62. doi: 10.1186/s13006-021-00398-w
- Hirani SAA, Richter S, Salami BO, Vallianatos H. Breastfeeding in disaster relief camps. *Adv Nurs Sci.* (2019) 42:E1–12. doi: 10.1097/ANS.0000000000000231

14. Gribble KD, Palmquist AEL. "We make a mistake with shoes [that's no problem] but... not with baby milk": facilitators of good and poor practice in distribution of infant formula in the 2014–2016 refugee crisis in Europe. *Maternal Child Nutr.* (2021) 18:e13282. doi: 10.1111/mcn.13282
15. Almeida JM de, Luz S de AB, Ued F da V. Support of breastfeeding by health professionals: integrative review of the literature. *Revista Paulista De Pediatria Engl Ed.* (2015) 33:355–62. doi: 10.1016/j.rppede.2015.06.016
16. Rabbani A, Padhani ZA, Siddiqui FA, Das JK, Bhutta Z. Systematic review of infant and young child feeding practices in conflict areas: what the evidence advocates. *BMJ Open.* (2020) 10:e036757. doi: 10.1136/bmjopen-2020-036757
17. Dall'Oglio I, Marchetti F, Mascolo R, Amadio P, Gawronski O, Clemente M, et al. Breastfeeding protection, promotion, and support in humanitarian emergencies: a systematic review of literature. *J Hum Lact.* (2020) 36:687–98. doi: 10.1177/0890334419900151
18. Group IC, ENN, Aid I. *Operational Guidance: Breastfeeding Counselling in Emergencies.* (2021). Available online at: <https://www.enonline.net/breastfeedingcounsellinginemergencies> (accessed May 2, 2023).
19. Committee IR. *Emergency Watchlist.* (2022). Available online at: https://www.rescue.org/report/2022-emergency-watchlist?gclid=Cj0KCQjwhsmaBhCvARIsAIBebH763Qbn4F6N1r7As3YF8NLFCxB_7alRzX_IzJg9eMxhGWuImfpNsaAlsLEALw_wCB (accessed May 2, 2023).
20. Unit IGS. *Ipc Acute Malnutrition Analysis January – December 2022 [Internet].* (2022). Available online at: <https://reliefweb.int/report/nigeria/nigeria-ipc-acute-food-insecurity-and-acute-malnutrition-analysis-january-december-2022-published-june-23-2022>
21. Byrne D. A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Qual Quant.* (2021) 2021:1–22. doi: 10.1007/s11355-021-01182-y
22. Campbell K, Orr E, Durepos P, Nguyen L, Li L, Whitmore C, et al. Reflexive thematic analysis for applied qualitative health research. *Qual Rep.* (2021) 26:6. doi: 10.46743/2160-3715/2021.5010
23. Braun V, Clarke V. What can "thematic analysis" offer health and wellbeing researchers? *Int J Qual Stud Heal.* (2014) 9:26152. doi: 10.3402/qhw.v9.26152
24. Braun V, Clarke V. Thematic analysis. In: Association AP, editor. *APA Handbook of Research Methods in Psychology, Research Designs.* Washington: American Psychological Association. (2012) p. 57–71. doi: 10.1037/13620-004
25. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health C.* (2007) 19:349–57. doi: 10.1093/intqhc/mzm042
26. Amare M, Arndt C, Mahrt K, Mavrotas G. Polygynous family structure and child undernutrition in Nigeria. *J Dev Stud.* (2021) 57:1–22. doi: 10.1080/00220388.2021.1898591
27. Weller SC, Vickers B, Bernard HR, Blackburn AM, Borgatti S, Gravlee CC, et al. Open-ended interview questions and saturation. *PLoS ONE.* (2018) 13:e0198606. doi: 10.1371/journal.pone.0198606
28. Caretta MA. Situated knowledge in cross-cultural, cross-language research: a collaborative reflexive analysis of researcher, assistant and participant subjectivities. *Qual Res.* (2015) 15:489–505. doi: 10.1177/1468794114543404
29. Phillippi J, Lauderdale J, A. Guide to field notes for qualitative research: context and conversation. *Qual Health Res.* (2018) 28:381–8. doi: 10.1177/1049732317697102
30. Halcomb EJ, Davidson PM. Is verbatim transcription of interview data always necessary? *Applied Nurs Res.* (2006) 19:38–42. doi: 10.1016/j.apnr.2005.06.001
31. Neal JW, Neal ZP, VanDyke E, Kornbluh M. Expediting the analysis of qualitative data in evaluation: a procedure for the rapid identification of themes from audio recordings (RITA). *Am J Evaluation.* (2015) 36:118–32. doi: 10.1177/109821401536601
32. Johnson GA, Vindrola-Padros C. Rapid qualitative research methods during complex health emergencies: a systematic review of the literature. *Soc Sci Med.* (2017) 189:63–75. doi: 10.1016/j.socscimed.2017.07.029
33. Vindrola-Padros C, Johnson GA. Rapid techniques in qualitative research: a critical review of the literature. *Qual Health Res.* (2020) 30:1596–604. doi: 10.1177/1049732320921835
34. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol.* (2006) 3:77–101. doi: 10.1191/1478088706qp063oa
35. Tessier S. From field notes, to transcripts, to tape recordings: evolution or combination? *Int J Qual Meth.* (2012) 11:446–60. doi: 10.1177/160940691201100410
36. Nowell LS, Norris JM, White DE, Moules NJ. Thematic analysis: striving to meet the trustworthiness criteria. *Int J Qual Meth.* (2017) 16:1609406917733847. doi: 10.1177/1609406917733847
37. FHI. Borno State Health, WASH & Nutrition KAP Survey Report. *Integrated Humanitarian Assistance to North-East Nigeria Project.* Family Health International (2018). Available online at: <https://reliefweb.int/report/nigeria/borno-state-health-wash-nutrition-kap-survey-report-integrated-humanitarian> (accessed May 2, 2023).
38. Save The Children. *Maternal and Young Child Feeding, WASH and Child Protection KAP Survey Report: Jere, Konduga, Mafa, and MMC.* Save the Children (2020). Available online at: <https://www.humanitarianresponse.info/fr/operations/nigeria/assessment/maternal-and-young-child-feeding-wash-and-child-protection-kap-survey> (accessed May 2, 2023).
39. Benova L, Siddiqi M, Abejirinde IOO, Badejo O. Time trends and determinants of breastfeeding practices among adolescents and young women in Nigeria, 2003–2018. *BMJ Global Heal.* (2020) 5:e002516. doi: 10.1136/bmjgh-2020-002516
40. Onubogu CU, Onyeka IN, Esangbedo DO, Ndiokwelu C, Okolo SN, Ngwu EK, et al. Changes in breastfeeding and nutritional status of Nigerian children between 1990 and 2008, and variations by region, area of residence and maternal education and occupation. *Paediatr Int Child H.* (2016) 36:248–59. doi: 10.1179/2046905515Y.0000000048
41. Rollins NC, Bhandari N, Hajeerhoy N, Horton S, Lutter CK, Martines JC, et al. Why invest, and what it will take to improve breastfeeding practices? *Lancet.* (2016) 387:491–504. doi: 10.1016/S0140-6736(15)01044-2
42. Nigeria Learning Collaborative. *Borno State Snapshot: Social Norms and Women's Economic Empowerment in Nigeria.* (2021). Available online at: <https://www.alignplatform.org/resources/borno-state-snapshot-social-norms-and-womens-economic-empowerment-nigeria> (accessed May 2, 2023).
43. Oyelana O, Kamanzi J, Richter S, A. critical look at exclusive breastfeeding in Africa: through the lens of diffusion of innovation theory. *Int J Afr Nurs Sci.* (2020) 14:100267. doi: 10.1016/j.ijans.2020.100267
44. UNFPA. *Maternal Mortality In Humanitarian Crises And In Fragile Settings.* (2015). Available online at: https://www.unfpa.org/sites/default/files/resource-pdf/MMR_in_humanitarian_settings-final4_0.pdf (accessed May 2, 2023).
45. Webb-Girard A, Cherobon A, Mbugua S, Kamau-Mbuthia E, Amin A, Sellen DW. Food insecurity is associated with attitudes towards exclusive breastfeeding among women in urban Kenya. *Maternal Child Nutr.* (2012) 8:199–214. doi: 10.1111/j.1740-8709.2010.00272.x
46. Kahindi J, Jones C, Berkley JA, Mwangome M. Establishing exclusive breastfeeding among in-patient malnourished infants in a rural Kenyan hospital: mothers' experiences of a peer supporter intervention. *Int Breastfeed J.* (2020) 15:40. doi: 10.1186/s13006-020-00278-9
47. Gatti L. Maternal perceptions of insufficient milk supply in breastfeeding. *J Nurs Scholarship.* (2008) 4:40. doi: 10.1111/j.1547-5069.2008.00234.x
48. Huang Y, Liu Y, Yu X, Zeng T. The rates and factors of perceived insufficient milk supply: a systematic review. *Maternal Child Nutr.* (2021) 18:e13255. doi: 10.1111/mcn.13255
49. Piccolo O, Kinshella MLW, Salimu S, Vidler M, Banda M, Dube Q, et al. Healthcare worker perspectives on mother's insufficient milk supply in Malawi. *Int Breastfeed J.* (2022) 17:14. doi: 10.1186/s13006-022-00460-1
50. Uvnäs-Moberg K, Ekström-Bergström A, Buckley S, Massarotti C, Pajalic Z, Luegmair K, et al. Maternal plasma levels of oxytocin during breastfeeding—a systematic review. *PLoS One.* (2020) 15:e0235806. doi: 10.1371/journal.pone.0235806
51. Walter MH, Abele H, Plappert CF. The role of oxytocin and the effect of stress during childbirth: neurobiological basics and implications for mother and child. *Front Endocrinol.* (2021) 12:742236. doi: 10.3389/fendo.2021.742236
52. Nagel EM, Howland MA, Pando C, Stang J, Mason SM, Fields DA, et al. Maternal psychological distress and lactation and breastfeeding outcomes: a narrative review. *Clin Ther.* (2022) 44:215–27. doi: 10.1016/j.clinthera.2021.11.007
53. Greiner T. *Maternal protein-energy malnutrition and breastfeeding.* SCN News. (1994) 11:28–30.
54. Segura-Pérez S, Richter L, Rhodes EC, Hromi-Fiedler A, Vilar-Compte M, Adnew M, et al. Risk factors for self-reported insufficient milk during the first 6 months of life: A systematic review. *Maternal Child Nutr.* (2022) 2022:e13353. doi: 10.1111/mcn.13353
55. Ndiikom CM, Fawole B, Ilesanmi RE. Extra fluids for breastfeeding mothers for increasing milk production. *Cochrane Db Syst Rev.* (2014) (6):CD008758. doi: 10.1002/14651858.CD008758.pub2
56. Daniel AI, Shama S, Ismail S, Bourdon C, Kiss A, Mwangome M, et al. Maternal BMI is positively associated with human milk fat: a systematic review and meta-regression analysis. *Am J Clin Nutrition.* (2021) 113:1009–22. doi: 10.1093/ajcn/nqaa410
57. Bravi F, Wiens F, Decarli A, Pont AD, Agostoni C, Ferraroni M. Impact of maternal nutrition on breast-milk composition: a systematic review. *Am J Clin Nutrition.* (2016) 104:646–62. doi: 10.3945/ajcn.115.120881
58. Samuel TM, Zhou Q, Giuffrida F, Munblit D, Verhasselt V, Thakkar SK. Nutritional and non-nutritional composition of human milk is modulated by maternal, infant, and methodological factors. *Frontiers Nutrition.* (2020) 7:576133. doi: 10.3389/fnut.2020.576133
59. Dror DK, Allen LH. Overview of nutrients in human milk. *Adv Nutr.* (2018) 9:278S–294S. doi: 10.1093/advances/nmy022

60. World Health Organization. *Infant and Young Child Feeding: Model Chapter for Textbooks for Medical Students and Allied Health Professionals*. Geneva: World Health Organization (2009).
61. Gribble K, Fernandes C. Considerations regarding the use of infant formula products in infant and young child feeding in emergencies (IYCF-E) programs. *World Nutr.* (2018) 9:261–83. doi: 10.26596/wn.201893261-283
62. Gribble KD, McGrath M, MacLaine A, Lhotska L. Supporting breastfeeding in emergencies: protecting women's reproductive rights and maternal and infant health. *Disasters.* (2011) 35:720–38. doi: 10.1111/j.1467-7717.2011.01239.x
63. Camacho NA, Schreeb J, Corte FD, Kolokotroni O. Interventions to support the re-establishment of breastfeeding and their application in humanitarian settings: a systematic review. *Maternal Child Nutrition.* (2023) 19:e13440. doi: 10.1111/mcn.13440
64. Network EN. *MAMI Care Pathway Package, Version 3.* (2021). Available online at: <https://www.enonline.net/mamicarepathway>
65. Bergen N, Labonté R. Everything is perfect, and we have no problems?: detecting and limiting social desirability bias in qualitative research. *Qual Health Res.* (2020) 30:783–92. doi: 10.1177/1049732319889354



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Protecting, promoting and supporting breastfeeding in all policies: reframing the narrative

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Recent research highlights the importance of breastfeeding to health across the lifecourse, yet inadequate investment to facilitate breastfeeding according to World Health Organization recommendations threatens to undermine breastfeeding's protective effects. Western media narratives often fail to convey the significance of breastfeeding, and such narratives can hinder efforts to direct sufficient resources to scaling up effective systems and generating policy change. Delayed action disproportionately harms poor and marginalized communities. The urgency of making these investments in an era of rapidly intensifying climate change and other crises is clear. Reframing the narrative is needed to better appreciate the significance of breastfeeding as well as to recognize and address extensive efforts of undermine it. Evidence-based scientific, health professional and media discussions are necessary to recognize breastfeeding as foundational to food and health security and to enact change so that protecting, promoting and supporting breastfeeding is integrated across all policies.

KEYWORDS

breastfeeding, food security, health security, climate change, infant and young child feeding in emergencies (IYCF-E), disasters, health policy, commercial milk formula marketing

Introduction

Contemporary Western debates frequently frame breastfeeding in the context of individual, highly moralized decisions (1, 2). While similar tropes may be increasingly common elsewhere, narrative frameworks in Western settings have an outsize influence because these wealthy nations assert considerable power in policy decisions that allocate global funding resources as well as over the regulatory environment that shapes infant feeding decisions. These moralized media debates, however, are often misguided and do not reflect the everyday realities of breastfeeding decisions. Nearly half of families globally live in poverty (3), and continue to experience inadequate structural and interpersonal support pre- and postnatally for breastfeeding (4, 5) while simultaneously subjected to aggressive, predatory marketing of the commercial milk formula (CMF) industry (6). Models estimate that over 800,000 infants and young children die each year due to not being appropriately breastfed, and over 100,000 mothers annually die of ovarian and breast cancers, and experience substantial additional morbidity due to suboptimal breastfeeding (7, 8). While the toll of suboptimal breastfeeding affects populations across high, middle, and low-income settings, poor and marginalized populations are disproportionately harmed by the inadequacy of supports for breastfeeding; they bear most of the burden of infant and maternal death and long-term health consequences (5, 7). In a time of increasing inequality and rapidly accelerating crises (9–12), a significant reorientation of media narratives is necessary

to reframe the protection, promotion and support of breastfeeding as foundational to food and health security (13, 14) and as a policy priority across multiple sectors ranging from food and health systems, to emergency preparedness and climate mitigation. This warrants significant scale-up of national and international investment.

Breastfeeding's evolutionary roots and contemporary public health significance

Recent research has shown that the significance and scope of impacts of breastfeeding on health and human development is far greater than even previously recognized (5). These impacts are grounded in evolutionary adaptations that underlie lactation, some of which predate mammals (15). Contemporary human lactation adaptations reflect specific mammalian reproductive and infant care strategies that are characteristic of primate species but also have unique elements because of our own human evolutionary history. All primates give birth to large-brained infants that require close contact, frequent nursing, and an extended period of postnatal care. Humans, however, are born in an exceptionally immature state and have an even longer postnatal period of brain maturation that requires intensive bodily contact and caregiving (16, 17). Humans have a series of biocultural adaptations to accommodate these needs, including multiple caregivers in the community, some of whom may also serve as alloparents and may also engage in cooperative lactation practices (18). The biological adaptations within this lactation system are far reaching—ranging from cardiac, thermoregulatory, metabolic, circadian, and psychosocial co-regulation to a sophisticated system of immunological communication within which the infant's immune system matures over time (5). These adaptations have played—and continue to play—a crucial role in ensuring survival and facilitating development in a vast array of environments in which humans live. Public health research demonstrates the far-reaching effects of breastfeeding in providing protection from malnutrition, dehydration, infectious and non-communicable diseases as well as in shaping cognition and development (5).

Historical decline in breastfeeding

As a biocultural process, successful lactation relies on an enabling social environment that is a product of a number of intersecting forces. While we know that breastfeeding has deep evolutionary roots and has been the historical norm across populations, its practice and duration have varied across populations (19). The greatest shift in infant feeding practices, however, came about relatively recently as a part of enormous social changes driven by the rise of colonialism and racial capitalism, and accompanying medicalization (15). Racial capitalism, as introduced by Robinson, refers to the inextricably linked systems of the accumulation of wealth in capitalism and racial oppression and exploitation (2). These violent, extractive systems caused profound disruptions to entire lifeways across the globe. They uprooted Indigenous systems of knowledge and increasingly replaced them with biomedicalized systems rooted in Western, white, elite cultural assumptions of infant care. These systems aimed to regulate women's productive and reproductive capacities and regiment infant care, including feeding and sleep (15). For instance, in the 1930s

Belgian colonizers were concerned with shortening the duration of lactation and reducing responsive breastfeeding in the Congo because they viewed these practices as “uncivilized” and because they wanted to reduce birth spacing and increase fertility to be able to extract more labor from the colony (20). Coupled with increasingly aggressive efforts to market commercial milk formulas (CMF), and the consolidation of medical authority in medically-supervised births, there was a profound decline in breastfeeding that reached its nadir in the middle of the 20th century. While global efforts in the second half of the 20th century have rallied in advocacy and support for breastfeeding within global public health and biomedical guidance, material investment in structural changes has lagged behind and continues to threaten breastfeeding globally (5).

The historical role of the CMF industry in undermining breastfeeding

The CMF industry has played a powerful role in shaping nutritional science and policies. From its origins in the 19th century, the industry preyed on existing cultural concerns about infant feeding and the rapidly changing social circumstances that families faced during the acceleration of industrialization, urban migration, and increasingly challenging labor conditions (2, 21, 22). Additionally, CMF marketing tactics drew on the scientific authority of male health professionals and scientists who argued that these milk products solve concerns about the adequacy of breastfeeding and breastmilk and were superior to breastfeeding. These arguments were aggressively pursued in marketing campaigns in Europe. Increasingly, however, these products were incorporated into colonial and later post-colonial economic systems (20, 21, 23, 24). In the 1950s Nestlé, for instance, aggressively promoted formula as a solution to address malnutrition across Africa, particularly through establishing relationships with colonial medical professionals as well as NGOs. These efforts paid off handsomely for the company as it shaped the malnutrition research agenda and exploited it as part of its marketing efforts (24, 25). The distribution of CMF became part of the course for governmental public health efforts that aimed to “improve” nutrition, particularly for Indigenous populations. The Canadian government, for instance, targeted Indigenous breastfeeding practices within public health systems and instructed scheduled feedings with CMF (26). These efforts were part of large-scale settler colonial efforts to undermine and erase Indigenous cultural and childcare practices, which included the forced removal of children to residential schools (26). Only after the devastating increases in mortality were documented did the government reverse course (26).

Some of the most aggressive tactics in poorer settings later gained media attention, galvanized by physicians, nutritionists, and community activists who witnessed severe illness and consequent death (2, 21, 27). The scandals were prompted by aggressive marketing tactics, including egregious examples of health professionals, and even sales representatives dressed as health professionals, providing formula samples and extolling the virtues of CMF to new mothers in maternity wards (2). The immediate impacts were visible and large scale, crystallized in The Baby Killer report published in 1974 (21). Observers described bottle-fed babies sickened primarily from contaminated water, lack of infrastructure to keep bottles clean, the dilution of CMF when money ran short, and sickness and death due

to lack of protection against infectious disease conferred by breastfeeding. The devastating impacts of these tactics spurred global outrage, led to the Nestlé boycott, and ultimately to laying the foundations of contemporary global health efforts to protect, promote, and support breastfeeding and regulate CMF marketing via the World Health Assembly's adoption of the International Code of Breast-milk Substitutes (the Code) in 1981 (2, 21).

Continued challenges in addressing the influence of CMF industry marketing efforts

Over the past four decades, despite continued efforts and subsequent resolutions to the Code few settings have implemented strong protections for breastfeeding (6). While measures for the timely initiation of breastfeeding, exclusivity, and duration reflect progress in many areas of the world, marketing and corporate political activity have also accelerated, raising more profits than ever before (28). The CMF industry is now a USD 55 billion business and has become a powerful player in every realm from scientific and health professional communities to public-private partnerships in nutrition, to policy mechanisms in global economic and trade policies that enables its virtually unchecked growth (28, 29). Self-reported insufficient milk (SRIM) is a key reason why mothers introduce CMF and stop breastfeeding sooner than they desire, and half of breastfeeding mothers report SRIM (5). Although there are multiple inadequacies in the health system and workplace protections, which also influence these outcomes, marketing is a key driver (6).

A common strategy employed in CMF marketing is to reframe normal human infant behavior as problematic, and then position CMF as the solution to this problem. For instance, CMF advertisements commonly refer to addressing crying and fussiness, and improving sleep (6). These are typical infant behaviors that require responsive care—not CMF (5). Introducing CMF undermines exclusive breastfeeding and displaces opportunities for breastfeeding and therefore stimulating milk production, leading to premature breastfeeding cessation (5).

Recently, the science on human milk has received considerable industry attention and funding. This work focuses on the components of milk that can be added to CMF (30–32). The addition of these components is then marketed to parents to claim that the product is “more similar” to human milk and will produce healthier and more intelligent infants and children—even in the absence of scientific support for these claims (6). The reductive, component-based approaches to human milk abstract away the complex dynamics and variability of the living substance of human milk and the breastfeeding process itself. Human milk reflects a wealth of evolutionary adaptations that have shaped human milk in the context of breastfeeding—originating out of the bodily proximity of infants and their mothers and in response to the broader biosocial environment (19, 33). Efforts to extract human milk and its components as *products* out of the *process* of breastfeeding reflect tactics built on the foundations of commercial exploitation of infant feeding (1, 15, 34). These tactics rely on the separation of product from process to ultimately displace breastfeeding and replace it with CMF.

Importantly, few are aware of the range and extent of industry tactics to undermine breastfeeding and expand their markets. This includes the scientific and health professional community who is

subject to industry framings of science and health professional education (6)—all of which become part of the unconscious background for providing guidance and recommendations for infant feeding. For instance, health professional education about breastfeeding may be provided by the CMF industry or its front groups, and the CMF industry frequently sponsors health professional associations, conferences, as well as scientific research (6). At the same time, governments have not provided adequate resources for independent, evidence-based lactation training for health professionals or sufficient investment in research. This leaves health professionals vulnerable to industry influence, and in turn shapes their advice to families. Specialty CMF, such as products claiming to address allergy, for instance, have been particularly successfully marketed to health professionals who, in turn, recommend them to parents (6).

The downplaying of the significance of lactation in human health paired with what may be perceived as scientific authority on the replaceability of breastfeeding is also a powerful tool for persuading policy makers that there is little need for marketing or additional safety regulations (2). This means that industry tactics fade into the cultural background for policy makers who may inadvertently replicate ethnocentric assumptions about lactation and further corporate agendas. This is particularly dangerous because policy change is unlikely in the absence of broader awareness.

As one example, the US medical community has been slow to fully support breastfeeding and the leading pediatric association has an ongoing philanthropy that is partially funded by CMF manufacturers (2). The 2-year recommended duration for breastfeeding per World Health Organization (WHO) guidance was only adopted in US pediatric guidelines in 2022 (1, 2, 35). Even then, the guidance was controversial. It came amid a national CMF crisis that was prompted by the shutdown of a plant that produced a large portion of CMF in the US and was linked to contaminated CMF that sickened and killed some infants (2). For many, the pediatric guidance furthered a sense that agencies expect birthing people to take on even more bodily labor for lactation without any additional support. The US stands out among wealthy nations for its lack of federal paid leave, poor workplace protections, and highly fragmented access to healthcare, which also limits access to skilled lactation support in perinatal care and in the community (36, 37). At the same time, the US has also been a site of aggressive marketing efforts to consumers and health professionals, and industry efforts to capture the regulatory environment which facilitates these efforts (2, 37). The formula crisis has prompted greater media attention to industry efforts to hinder adoption of stronger regulations (2), but there is still limited awareness of broader industry efforts to sow doubt about scientific evidence on breastfeeding, undermine structural support for lactation (e.g., paid leave and regulatory protections) and shape public norms and narratives about breastfeeding (6). Media debates that focus on individualized responsibility around breastfeeding can serve as a diversionary tactic away from corporate responsibility and the need for policy action to create supportive systems and regulations on corporate activity (38).

The urgency of integrating lactation in emergency preparedness and climate change policies

Insufficient appreciation of lactation's enormous role in securing health is reflected in inadequate integration of lactation across public

health domains. For instance, few nations integrated appropriate guidance on breastfeeding into their COVID-19 responses, often leading to maternal-infant separation policies that had a wide range of negative consequences, including on breastfeeding (39). Similarly, protecting promoting and supporting lactation is insufficiently integrated into disaster preparedness and climate mitigation policies. Yet infant and young child mortality is highest in the wake of both slow and fast disasters, which are rapidly accelerating with climate change (40–42). In these settings, it's particularly essential to provide appropriate support for continued breastfeeding, and to avoid unnecessary distribution of CMF, which undermines breastfeeding.

The most recent IPCC report and the Lancet commission (43, 44) both pointed out that the world is going to experience more extreme weather, including storms and drought, greater heat stress, and mass displacement of people due to increasingly hostile conditions that endanger life and limit the ability to grow food and access water. Moreover, further pandemics will be fueled by the expansion of vector-borne disease and habitat encroachment. These effects already disproportionately affect the world's poorest, predominately located in the Global South and poor and marginalized people in the Global North (44, 45). Even in comparatively wealthier settings, each time there are strong storms, flooding, electrical outages, and water shortages or water safety concerns—infants reliant on CMF are at immediate heightened risk for dehydration, hunger, and diarrheal disease (46–48). Inadequate attention to these critical issues means a failure to invest adequate resources into the everyday task of creating an enabling environment for breastfeeding to prevent accelerating harms.

Discussion: enacting change

Enacting change to fully recognize breastfeeding as foundational to health, as well as food and health security, requires simultaneously addressing the chronic underinvestment in creating enabling environments and emergency preparedness and mitigation policies. In some cases, national recommendations may align with World Health Organization recommendations. However, stated support without adequate investment is vastly inadequate to create an environment that makes these recommendations possible.

Investing in health professional training and in health systems that support birthing people is needed so that they are adequately prepared to support lactation and they can implement best practices without industry interference (4). Similarly, paid leave and workplace protections are crucial to be able to continue breastfeeding once it is established (49). Additionally, regulatory reform is necessary to limit the influence of the CMF industry across multiple areas of policy and sectors (28). Investment in multi-sectorial efforts to address everyday challenges have an impact that stretch beyond these scenarios when emergencies strike (4). The more families and communities are supported in breastfeeding practices, the more likely that their infants will survive emergency scenarios and the pressures imposed by climate change and continue to thrive. Furthermore, the more support lactation receives in the perinatal period and early childhood, the better longer-term outcomes for morbidity and mortality. These supports are also pivotal in efforts to address health inequities within settings. The physical, mental health and financial impacts

of these conditions are far greater than the investment required to prevent them (8, 50).

To create momentum for policy change across multiple sectors, public health and healthcare professionals, scientists, and journalists require training in recognizing and addressing the industry playbook that has been deployed to undermine breastfeeding – as well as other areas of public health (51, 52). Scholars and practitioners need to learn that industry tactics are far-reaching and assert influence not only over lactation but all other areas of health, that are explored under the umbrella of the emerging field of commercial determinants of health (38, 51, 53). This training is essential to help create evidence-based framing of discussions of breastfeeding and lactation. Creating scientific, health professional and media environments that present a more accurate, and nuanced understanding of lactation can greatly facilitate societal investment needed to create an enabling environment.

Conclusion

The impact of breastfeeding on the health of infants and young children, their mothers and birthing people, and entire communities is unparalleled (5). Significant investment and education is necessary to scale up investment and support to enable breastfeeding across sectors (5). We must continue to reframe messages around lactation and facilitate conversations to enhance public, scientific, health professional, and policy makers' understanding of the value of lactation as securing food, hydration, and ultimately survival and long-term health.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

- Tomori C, Palmquist AE, Quinn EA. Introduction In: C Tomori, AE Palmquist and EA Quinn, editors. *Breastfeeding: new anthropological approaches*. New York: Routledge (2018). 1–28.
- Tomori C, Palmquist AEL. Racial capitalism and the US formula shortage: a policy analysis of the formula industry as a neocolonial system. *Front Sociol.* (2022) 7:961200. doi: 10.3389/fsoc.2022.961200
- Castaneda Aguilar RA, Dewina R, Diaz-Bonilla C, Edochie IN, Fujs TH, Jolliffe D, et al. *Update to the poverty and inequality platform (PIP)*. Washington, DC: World Bank. (2022).
- Tomori C, Hernández-Cordero S, Busath N, Menon P, Pérez-Escamilla R. What works to protect, promote and support breastfeeding on a large scale: a review of reviews. *Matern Child Nutr.* (2022) 18:e13344. doi: 10.1111/mcn.13344
- Pérez-Escamilla R, Tomori C, Hernández-Cordero S, Baker P, Barros AJ, Begin F, et al. Breastfeeding: crucially important, but increasingly challenged in a market-driven world. *Lancet.* (2023) 401:472–85. doi: 10.1016/S0140-6736(22)01932-8
- Rollins N, Piwoz E, Baker P, Kingston G, Mabaso KM, McCoy D, et al. Marketing of commercial milk formula: a system to capture parents, communities, science, and policy. *Lancet.* (2023) 401:486–502. doi: 10.1016/S0140-6736(22)01931-6
- Victora CG, Bahl R, Barros AJ, França GV, Horton S, Krasevec J, et al. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *Lancet.* (2016) 387:475–90. doi: 10.1016/S0140-6736(15)01024-7
- Rollins NC, Bhandari N, Hajeebhoy N, Horton S, Lutter CK, Martines JC, et al. Why invest, and what it will take to improve breastfeeding practices? *Lancet.* (2016) 387:491–504. doi: 10.1016/S0140-6736(15)01044-2
- Diffenbaugh NS, Burke M. Global warming has increased global economic inequality. *Proc Natl Acad Sci U S A.* (2019) 116:9808–13. doi: 10.1073/pnas.1816020116
- Lakner C, Mahler DG, Negre M, Prydz EB. How much does reducing inequality matter for global poverty? *J Econ Inequal.* (2022) 20:559–85. doi: 10.1007/s10888-021-09510-w
- Myers S, Fanzo J, Wiebe K, Huybers P, Smith M. Current guidance underestimates risk of global environmental change to food security. *BMJ.* (2022):378. doi: 10.1136/bmj-2022-071533
- Hendriks SL, Montgomery H, Benton T, Badiane O, de la Mata GC, Fanzo J, et al. Global environmental climate change, covid-19, and conflict threaten food security and nutrition. *BMJ.* (2022):378. doi: 10.1136/bmj-2022-071534
- Salmon L. Food security for infants and young children: an opportunity for breastfeeding policy? *Int Breastfeed J.* (2015) 10:1–13. doi: 10.1186/s13006-015-0029-6
- Pérez-Escamilla R. Food security and the 2015–2030 sustainable development goals: from human to planetary health: perspectives and opinions. *Curr Dev Nutr.* (2017) 1:e000513. doi: 10.3945/cdn.117.000513
- Tomori C, Quinn EA, Palmquist AEL. Making space for lactation in the anthropology of reproduction In: S Han and C Tomori, editors. *The Routledge handbook of anthropology and reproduction*. New York: Routledge (2022). 527–40.
- Rosenberg K, Trevathan WR. Human evolution and the helpless infant In: K Rosenberg and WR Trevathan, editors. *Costly and cute*. Santa Fe, New Mexico: SAR (2016). 1–28.
- Rosenberg KR. The evolution of human infancy: why it helps to be helpless. *Annu Rev Anthropol.* (2021) 50:423–40. doi: 10.1146/annurev-anthro-111819-105454
- Palmquist A. *Cooperative lactation and the mother-infant nexus. The mother-infant nexus in anthropology*. Cham, Switzerland: Springer (2020) 125–142.
- Tomori C, Palmquist AEL, Quinn EA. *Breastfeeding: new anthropological approaches*. New York: Routledge (2018).
- Hunt NR. "Le Bebe en Brousse": European women, African birth spacing and colonial intervention in breast feeding in the Belgian Congo. *Int J Afr Hist Stud.* (1988) 21:401–32. doi: 10.2307/219448
- Sasson T. Milking the third world? Humanitarianism, capitalism, and the moral economy of the Nestlé boycott milking the third world? *Am Hist Rev.* (2016) 121:1196–224. doi: 10.1093/ahr/121.4.1196
- Valenze D. *Milk: a local and global history*. New Haven, Connecticut: Yale University Press (2011).
- Manderson L. Bottle feeding and ideology in colonial Malaya: the production of change. *Int J Health Serv.* (1982) 12:597–616. doi: 10.2190/0A5U-GCC6-V4BU-28T5
- Wilhelm L. 'One of the Most urgent problems to solve': malnutrition, trans-Imperial nutrition science, and Nestlé's medical pursuits in late colonial Africa. *J Imp Commonw Hist.* (2020) 48:914–33. doi: 10.1080/03086534.2020.1816624
- Wilhelm L, Kubie O, McKenna C. Nestlé's corporate reputation and the long history of infant formula. In: *The Global History of Capitalism*. Oxford: University of Oxford, Oxford Centre for Global History (2019).
- Burnett K, Hay T, Chambers L. Settler colonialism, indigenous peoples and food: Federal Indian policies and nutrition programs in the Canadian north since 1945. *J Colon Colon Hist.* (2016) 17:501–10. doi: 10.1353/cch.2016.0030
- Van Esterik P, O'Connor RA. *The dance of nurture: negotiating infant feeding*. Oxford, New York: Berghahn books (2017).
- Baker P, Russ K, Kang M, Santos TM, Neves PAR, Smith J, et al. Globalization, first-foods systems transformations and corporate power: a synthesis of literature and data on the market and political practices of the transnational baby food industry. *Glob Health.* (2021) 17:58. doi: 10.1186/s12992-021-00708-1
- Russ K, Baker P, Byrd M, Kang M, Siregar RN, Zahid H, et al. What you don't know about the codex can hurt you: how trade policy trumps global health governance in infant and young child nutrition. *Int J Health Policy Manag.* (2021) 10:983–97. doi: 10.34172/ijhpm.2021.109
- Cohen M, Cassidy T. Milk from Mars. The challenges of regulating lab-produced (human) milk. *Food Drug Law J.* (2022) 77:6–50. Available at: <https://heinonline.org/HOL/P?h=hein.journals/foodlj77&i=10>
- Newman S, Nahman M. Nurture commodified? An investigation into commercial human milk supply chains. *Rev Int Polit Econ.* (2022) 29:1967–86. doi: 10.1080/09692290.2020.1864757
- Palmquist AE, Perrin MT, Cassar-Uhl D, Gribble KD, Bond AB, Cassidy T. Current trends in research on human milk exchange for infant feeding. *J Hum Lact.* (2019) 35:453–77. doi: 10.1177/0890334419850820
- Quinn EA. Centering human milk composition as normal human biological variation. *Am J Hum Biol.* (2021) 33:e23564. doi: 10.1002/ajhb.23564
- Van Esterik P. *Beyond the breast-bottle controversy*. New Brunswick, NJ: Rutgers University Press (1989).
- Meek JY, Noble L. And Section on Breastfeeding. Policy statement: breastfeeding and the use of human milk. *Pediatrics.* (2022) 150:e2022057988. doi: 10.1542/peds.2022-057988
- Palmquist AEL, Tomori C, Tumlinson K, Fox C, Chung S, Quinn EA. Pandemic policies and breastfeeding: a cross-sectional study during the onset of COVID-19 in the United States. *Front Sociol.* (2022) 7:958108. doi: 10.3389/fsoc.2022.958108
- Pérez-Escamilla R. What will it take to improve breastfeeding outcomes in the United States without leaving anyone behind? *Am J Public Health.* (2022) 112:S766–9. doi: 10.2105/AJPH.2022.307057
- Gilmore AB, Fabbri A, Baum F, Bertscher A, Bondy K, Chang H-J, et al. Defining and conceptualising the commercial determinants of health. *Lancet.* (2023) 401:1194–213. doi: 10.1016/S0140-6736(23)00013-2
- Hoang DV, Cashin J, Gribble K, Marinelli K, Mathisen R. Misalignment of global COVID-19 breastfeeding and newborn care guidelines with World Health Organization recommendations. *BMJ Nutr Prev Health.* (2020) 3:339. doi: 10.1136/bmjnp-2020-000184
- Dall'Oglio I, Marchetti F, Mascolo R, Amadio P, Gawronski O, Clemente M, et al. Breastfeeding protection, promotion, and support in humanitarian emergencies: a systematic review of literature. *J Hum Lact.* (2020) 36:687–98. doi: 10.1177/0890334419900151
- Mudiyansele SR, Davis D, Kurz E, Atchan M. Infant and young child feeding during natural disasters: a systematic integrative literature review. *Women Birth.* (2022) 35:524–31. doi: 10.1016/j.wombi.2021.12.006
- Hirani SAA, Richter S, Salami BO, Vallianatos H. Breastfeeding in disaster relief camps: an integrative review of literature. *Adv Nurs Sci.* (2019) 42:E1–E12. doi: 10.1097/ANS.0000000000000231
- Romanello M, McGushin A, Di Napoli C, Drummond P, Hughes N, Jamart L, et al. The 2021 report of the lancet countdown on health and climate change: code red for a healthy future. *Lancet.* (2021) 398:1619–62. doi: 10.1016/S0140-6736(21)01787-6
- Pörtner H-O, Roberts DC, Adams H, Adler C, Aldunce P, Ali E, et al. Climate change 2022: impacts, adaptation and vulnerability. *IPCC Sixth Assessment Report* (2022): 37–118.
- Sultana F. Critical climate justice. *Geogr J.* (2022) 188:118–24. doi: 10.1111/geoj.12417
- Palmquist AE. A formula for disaster: PLOS global public health, (2022). Available at: <https://speakingofmedicine.plos.org/2022/05/24/a-formula-for-disaster/> (Accessed May 24, 2022)
- Emergency Nutrition Network. (2017) Operational guidance on infant feeding in emergencies (OG-IFE) version 3.0. Emergency nutrition network. Available at: <http://www.enonline.net/operationalguidance-v3-2017>
- Tomori C. Protecting lactation in a time of climate change and accelerating emergencies. Global Alliance for Nursing and Midwifery (GANM) blogs, Baltimore: Johns Hopkins School of Nursing. (2022). Available at: https://ganm.nursing.jhu.edu/protecting-lactation-in-a-time-of-climate-change-and-accelerating-emergencies/?fbclid=IwAR2Bulc66zLZNIKh8m_XxBw6mOYL3yZ-mpX92hwzWMMlffTOZP2Fr8iZNBa
- Vilar-Compte M, Hernández-Cordero S, Ancira-Moreno M, Burrola-Méndez S, Ferré-Eguiluz I, Omaña I, et al. Breastfeeding at the workplace: a systematic review of interventions to improve workplace environments to facilitate breastfeeding among working women. *Int J Equity Health.* (2021) 20:110. doi: 10.1186/s12939-021-01432-3

50. Walters DD, Phan LTH, Mathisen R. The cost of not breastfeeding: global results from a new tool. *Health Policy Plan.* (2019) 34:407–17. doi: 10.1093/heapol/czz050
51. Lacy-Nichols J, Jones A, Buse K. Taking on commercial determinants of health at the level of actors, practices and systems. *Front Public Health.* 10:981039. doi: 10.3389/fpubh.2022.981039
52. Lacy-Nichols J, Marten R, Crosbie E, Moodie R. The public health playbook: ideas for challenging the corporate playbook. *The lancet. Glob Health.* (2022) 32:ckac129.092. doi: 10.1093/eurpub/ckac129.092
53. Maani N, Petticrew M, Galea S. *The commercial determinants of health.* Oxford: Oxford University Press (2022).



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Rescinding evidence-based care and practices during the initial COVID-19 outbreak in the United States: a qualitative study of the experiences of lactation support providers

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Background: The COVID-19 pandemic disrupted healthcare systems and services including along the childbearing continuum. The aim of this study was to explore the experiences and perceptions of professional lactation support providers who cared for breastfeeding families during the early months of the pandemic (March 2020 – August 2020) in the United States.

Design/methods: We conducted a qualitative survey among active lactation support providers in the United States. Eligible participants spoke English, were Certified Lactation Counselors who maintained an active certification and who provided lactation care and services prior to and after the onset of the COVID-19 pandemic. Participants were recruited via email from the national database of Certified Lactation Counselors obtained from the national certification body. All ten Health and Human Service regions of the United States were included. Demographic data was collected on each respondent. Qualitative survey responses were analyzed thematically following the framework method.

Findings: Six-hundred and seventy-four (674) Certified Lactation Counselors responded to the survey from June to July of 2022. Their responses fell within the overarching theme of rescinding evidence-based care and practices that had been in place prior to the pandemic. Affected care practices included the insertion of limits on access to care and insinuating stigma and bias based on COVID-19 status. Irregular appointment schedules and staffing shortages also affected care. Participants reported that separation of the mother and their infant became the norm. Decisions made by management seemed to be grounded in fear and uncertainty, rather than on the evidence-based principles that had been in place prior to the pandemic.

Conclusion: A lack of coordination, consistency and support, along with fear of the unknown, troubled lactation support providers and impacted their ability to provide evidence-based care and to maintain access to care for all families. The findings of the survey and analysis underscore the importance of adequately preparing for future public health crises by determining how evidence-based care and practices can be preserved in emergent situations.

KEYWORDS

breastfeeding, lactation, counselors, pandemic, COVID-19, maternal–infant separation, policy

1. Introduction

The SARS-CoV-2 virus spread rapidly across the globe in 2019, causing the Coronavirus pandemic (COVID-19). By the end of 2022, over 665 million cases had been confirmed worldwide, along with 6.67 million confirmed deaths (1). In the United States (U.S.) a national emergency was declared on March 13, 2020, causing a wave of partial or full lockdowns in 45 states and the District of Columbia (2). Healthcare providers and essential workers were asked to continue working while others were admonished to remain at home.

During the initial months of the pandemic, the fear of being exposed to the virus, bringing the virus home to loved ones, and falling seriously ill created a chaotic environment in many workplaces, and the context of healthcare was changed as a result (3). Unlike non-essential worksites, hospitals and birthing centers did not have the option of turning away patients or closing their doors. Additionally, the combination of uncertainty of how the virus was transmitted and the lack of knowledge about the management of those sick with the virus led to questions about best practice for care delivery (4). Clearly defined work routines of healthcare providers became disarranged.

One category of healthcare providers who experienced this change was the Certified Lactation Counselor (CLC®). CLCs are professional lactation support providers (LSPs) who construct and maintain conditions that predispose mothers and babies to an uncomplicated breastfeeding experience through counseling, education and support. CLCs provide clinical management of complex breastfeeding situations by assessing, monitoring, evaluating and providing evidence-based interventions (5). In the U.S. there are over 23,000 active CLCs in all 50 states and unincorporated territories working toward meeting the 2030 Healthy People Goals for Breastfeeding (6). CLCs represent the largest cohort of LSPs in the U.S. Despite the fear and uncertainty that COVID-19 presented, babies continued to be born. According to the National Vital Statistics Report, there were 3,613,647 births in the U.S. in 2020 (7), approximately 301,137 births per month and nearly 75,284 births per week. However, evidence has demonstrated that the percentage of exclusively breastfed babies significantly decreased during the pandemic in hospital settings (8). This parallels the observed decrease of lactation support in the hospital and a potential lack of community support for breastfeeding following hospital discharge (9, 10).

Breastfeeding and the provision of human milk is recognized as a foundation of public health. Since their inception, the U.S. Healthy People goals for the nation have included the goal to improve breastfeeding initiation and duration rates and have named this target again for their 2030 goals (11). The Joint Commission's Perinatal Care core measures include reducing the use of formula in the hospital following birth and increasing exclusive breastfeeding as a perinatal quality indicator (12). The public health advantages of breastfeeding as well as the evidence-based practices needed to meet the Healthy People and Joint Commission goals are acknowledged and widely circulated (13).

Initially, the sweeping unknowns of the pandemic led professional organizations, such as the American Academy of Pediatrics (AAP) and the Centers for Disease Control and Prevention (CDC), to recommend the discontinuation of evidence-based practices (14, 15) such as skin-to-skin care in the delivery room and rooming in – two practices that support breastfeeding initiation, duration, and continuation (16). Other evidence-based practices that support breastfeeding were also affected, including companion support during labor, continuity of care and the provision of breastfeeding assessment, evaluation and support (17). The discontinuation of these practices resulted in measurable adverse effects. The COVID Mothers' Study utilized an anonymous survey to gather information on COVID-positive mother–infant dyads worldwide and found that infants who did not directly breastfeed, experience skin-to-skin care, or room-in within arms' reach of the mother were significantly less likely to be exclusively breastfed in the first 3 months of life (18). While the CDC altered their position in October 2020 and declared breastfeeding, keeping mothers and babies together following birth and rooming in safe, new families were not educated about the safety and benefits of breastfeeding, even up to one year into the pandemic (19, 20).

While initial studies on breastfeeding at the start of the pandemic have focused on the decline of breastfeeding initiation rates and the lack of access to care experienced across economic and racial backgrounds, there have been few studies analyzing the unique experiences of LSPs, such as CLCs, during this time (21). The primary objective of the current study is to focus on the unique experiences of CLCs, one specialized member of the healthcare team, as the COVID-19 pandemic began. Further, this research specifically examines the impact of the disruptions of evidence-based care on the experiences of CLCs in both hospital and community-based settings. The secondary objective of the current study is to examine how access to care was disrupted during the initial months of the pandemic, when viewed through the lens of the lactation support provider.

2. Materials and methods

For this qualitative study, the authors recruited CLCs across the U.S. states and territories who worked as a LSP during the initial months of the COVID-19 pandemic. Participants were invited via email to consent to and participate in an online questionnaire developed by the research team. The retrospective survey was conducted between 22 June 2022 and 7 July 2022. Participants were asked about the impact of the pandemic on their work, including policy and procedural changes that were adopted, the impact on their role as a CLC and challenges they faced in the workplace during the first months of the pandemic. Nine-hundred nine (909) CLCs accessed the online questionnaire and gave their consent to participate in the study. Of those, six-hundred and seventy-four (674) (74.1%) respondents completed the questionnaire in its entirety. Participant socio-demographic data was collected from those

TABLE 1 Demographic characteristics of respondents.

	N	%
Gender (n = 674)		
Female	665	98.66
Male	5	0.74
Gender variant/non-conforming	2	0.30
Chose to not respond	2	0.30
Race/ethnicity (n = 674)		
American Indian or Alaska Native	11	1.63
Asian	15	2.23
Black or African American	59	8.75
Hispanic/Latinx	53	7.89
Native Hawaiian or other pacific islander	3	0.45
White or Caucasian	507	75.22
Chose to not respond	14	2.08
Other	12	1.78
Age range (n = 674)		
18–24 years of age	4	0.59
25–34 years of age	181	26.85
35–50 years of age	310	45.99
50 years of age or older	178	26.41
Chose to not respond	1	0.15
Highest level of education (n = 674)		
High school diploma or equivalent (GED)	44	6.53
Associate's degree	121	17.95
Bachelor's degree	319	47.33
Master's degree	165	24.48
PhD	12	1.78
MD	13	1.93
Current occupation (n = 674)		
CLC	348	51.63
Nurse	298	44.21
Nutrition worker	80	11.87
Manager/coordinator	67	9.94
Health educator	89	13.20
IBCLC	40	5.93
Speech language pathologist/occupational therapist	26	3.86
Physician	10	1.48
Social worker	13	1.93
Family advocate	19	2.82
Doula	61	9.05
Midwife	13	1.93
Other	146	21.66
Credentials (n = 674)		
CLC	280	41.54
CLC, RN	303	44.96

(Continued)

TABLE 1 (Continued)

CLC, LPN	14	2.08
CLC, SLP	20	2.97
CLC, MD	9	1.34
CLC, OT	7	1.04
CLC, PT	1	0.15
CLC, DO	1	0.15
CLC, IBCLC	47	6.97
Other	138	20.47

This table contains respondents' demographic data collected. CLC, certified lactation counselor; CLC, DO, certified lactation counselor, doctor of osteopathy; CLC, IBCLC, certified lactation consultant, international board-certified lactation consultant; CLC, LPN, certified lactation consultant, licensed practical nurse; CLC, MD, certified lactation consultant, medical doctor; CLC, OT, certified lactation consultant, occupational therapist; CLC, PT, certified lactation consultant, physical therapist; CLC, RN, certified lactation consultant, registered nurse; CLC, SLP, certified lactation consultant, speech and language pathologist; IBCLC, International Board-Certified Lactation Consultant; MD, medical doctor; PhD, doctor of philosophy.

who completed the questionnaire (Table 1). Qualitative survey responses were analyzed thematically following the framework method. The authors first read and coded the responses line by line to allow familiarization. The second step involved the generation of descriptive themes and initial organization of participant responses into meaningful groups. The third step was the generation of analytical themes – themes that go beyond the simple descriptions of responses. In all three of these steps, the authors sought to understand the lived experiences of the lactation providers surveyed and the relation of those experiences to the pandemic-induced changes in the U.S. healthcare system. In the qualitative survey, respondents who answered “yes” to the initial question of whether or not their workplace implemented restrictions, were then asked to describe the changes in those workplace policies and procedures in their own words. They were also asked to describe how their roles as CLCs changed during that time.

This process was undertaken collectively by all authors. Human studies permission was granted by Curry College's Institutional Review Board on May 6, 2022.

3. Results

The descriptive statistics showing the characteristics of the study sample are presented in Table 1. The sample consisted primarily of female-identifying respondents ($n = 665$, 98.6%) with a mean age range of 35–50 years ($n = 310$, 45.9%). Three quarters of respondents self-identified as White/Caucasian ($n = 507$, 75.2%) and 47.3% held a Bachelor's Degree ($n = 319$). Less than half of respondents practiced lactation counseling and services in a city ($n = 287$, 42.6%). Workplace settings and credentials of respondents varied, with nearly half identifying as both a Registered Nurse (RN) and a CLC ($n = 303$, 44.9%) (Table 1). About half of the respondent's place of work was in a hospital, specifically Postpartum Units ($n = 159$, 23.6%) and Labor and Delivery Units ($n = 158$, 23.4%) (Table 2). The geographic representation of the respondent sample was broad, with the largest cohort working in HHS Region 2 which includes Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin ($n = 152$, 22.5%) (Table 2).

Survey respondents reported that during the initial phase of the pandemic, almost all of their workplaces implemented COVID-19

restrictions in an effort to stop the spread of the virus ($n=656$, 97.3%). Respondents reported changes including disruption in access to care, which was exacerbated by staffing shortages along with insufficient and irregularly available appointments. The delivery of lactation support and services was also interrupted. Social distancing and mandatory stay-at-home orders, including the fear many patients felt during the initial outbreak phase of the pandemic, meant that some patients and clients did not go to their medical facilities, even for standard appointments (22). Respondents described how lactation visits and pediatric care visits were no longer prioritized during the early stages of the pandemic. Additionally, the insinuation of stigma and bias based on COVID-19 status in the care delivery system resulted in differences in how families with and without COVID-19 were treated, particularly in healthcare settings.

Respondents reported that healthcare decision making became based on fear and uncertainty rather than on formerly accepted evidence-based practices. Because social distancing and physical isolation were two of the main strategies utilized to curb the spread of the COVID-19 virus, the evidence-based practice of keeping mother and newborn together changed to an imposed separation (23). Participants indicated that they felt alone and in the dark during the initial outbreak phase of the pandemic, and felt unsupported in their professional roles. Many participants reported feeling unable to follow the rapidly changing slew of information being passed down from above in their healthcare facility.

The two analytic themes which emerged from the thematic synthesis were rescinding of evidence-based practices and the rescinding of access to lactation care.

4. Discussion

This study explored the experiences of a representative sample of CLCs during the initial outbreak of the COVID-19 pandemic, specifically in relation to how their roles changed and the challenges they faced working with all mothers, babies and families. To our knowledge, this is the first study focusing on the unique experiences of LSPs as a specialized member of the healthcare team, with a focus on the adaptations and changes these professionals were asked to make at the start of the pandemic. This study serves as an addition to the research literature regarding healthcare professionals and their experiences working in the field at this time (24–27).

Responses are quoted below in order to amplify the findings and elevate the unique experiences of LSPs. Respondents are differentiated by their assigned number (respondent #). To enable succinct reporting of relevant quotes, omitted words have been indicated by an ellipsis (...) and added text to provide context/ correction is indicated by words in brackets ([]).

4.1. Rescinding of evidence-based practices

Healthcare professionals rely on established, evidence-based practices and guidelines to provide care. Empirical evidence demonstrates that “the principal benefit of (clinical) guidelines is to improve the quality of care received by patients” (28). It has been widely reported that during the initial days of the pandemic,

it was difficult to discern safe and ethically sound treatment options. One review of public health responses to COVID-19 in New York City, USA explored how there was no guidance at all for crisis standards in the metropolitan area, which led to uncertainty and fear among healthcare professionals (29). A review of professional society guidelines illustrates that many did not adhere to the World Health Organization (WHO) recommendations, which recommended that breastfeeding continue as a protective factor for mothers and infants, and other evidence-based practices, such as rooming-in and skin-to-skin contact between mother and infant be continued (30). The CDC was very influential during the pandemic in the U.S. They relayed consistent messaging to the general public on the management of COVID-19 and preventing infection, however, their guidance did not adhere to the WHO recommendations (15). These misaligned professional guidelines resulted in a public view that “the U.S. was inconsistent, ambiguous, or in explicit contradiction...in their recommendations throughout the outlined time period” (31–33). Respondents provided their experience of this lack of guidance as well as the incoherent administration of evidence-based practices in the early months of the pandemic.

“...Providers had little guidance.” (Respondent #415)

“There was a binder on our labor and delivery unit and all policy changes were contained for staff to read and refer to.” (Respondent #3)

“(There was) just a lot of different information coming in.” (Respondent #630)

“There was much discussion about what could be done to improve care but decisions were being implemented from the ‘top’. Nurses/ lactation staff struggled to do what we could to provide the best care possible while avoiding contamination or spread of the virus.” (Respondent #38)

“There was no guidance or support, only restrictions.” (Respondent #345)

COVID-related changes were adapted quickly. Concepts were new and constantly changing. CLCs reported that the reason for new policies and procedures stemmed from the advice of organizations outside of the healthcare system.

Evidence-based practice acknowledges that the breastfeeding experience is most successful when adequate professional and social support is available to the breastfeeding mother (34). The provision of continuous support during labor and birth is an essential component of getting breastfeeding off to an optimal start (35). Upon reflection, healthcare policy makers could have embraced the precautionary principle during the initial phase of the COVID-19 pandemic related to breastfeeding counseling. The precautionary principle suggests that decision-makers should resist practice changes until proposed practice changes can be studied thoroughly. In this context, breastfeeding is the

TABLE 2 Characteristics of respondents' workplace settings and geography.

	<i>N</i>	%
Workplace setting (<i>n</i> = 674)		
Hospital (labor and delivery)	158	23.44
Hospital (postpartum)	159	23.59
Hospital (NICU)	85	12.61
Hospital (other units)	53	7.86
Birth center	23	3.41
Family outpatient office/clinic	40	5.93
OB-GYN office/clinic	35	5.19
WIC office	129	19.14
Pediatric office/clinic	69	10.24
Private practice	76	11.28
Health department	61	9.05
Military healthcare	7	1.04
Community health center	24	3.56
Community support groups	31	4.60
Home visiting program	72	10.68
Head start/early intervention/healthy start	16	2.37
Other	63	9.35
Demographic Region (<i>n</i> = 674)		
HHS Region 1	61	9.05
HHS Region 2	89	13.20
HHS Region 3	48	7.12
HHS Region 4	121	17.95
HHS Region 5	152	22.55
HHS Region 6	50	7.42
HHS Region 7	41	6.08
HHS Region 8	72	10.68
HHS Region 9	28	4.15
HHS Region 10	12	1.78
Geographical workplace (<i>n</i> = 674)		
Rural	110	16.32
Town (less than 10,000 people)	73	10.83
City (10,000–250,000 people)	287	42.58
Large city (over 250,000 people)	135	20.03
Not currently practicing	69	10.24

This table contains the respondents' workplace settings. NICU, neonatal intensive care unit; HHS, health and human services. HHS Region 1 Includes Massachusetts, Connecticut, Maine, New Hampshire, Rhode Island, Vermont. HHS Region 2 Includes New Jersey, New York, Puerto Rico, Virgin Islands. HHS Region 3 Includes Delaware, Washington D.C., Maryland, Pennsylvania, Virginia, West Virginia. HHS Region 4 Includes Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee. HHS Region 5 Includes Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin. HHS Region 6 Includes Arkansas, Louisiana, New Mexico, Oklahoma, Texas. HHS Region 7 Includes Iowa, Kansas, Missouri, Nebraska. HHS Region 8 Includes Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming. HHS Region 9 Includes Arizona, California, Hawaii, Nevada, American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Marshall Islands, Republic of Palau. HHS Region 10 Includes Alaska, Idaho, Oregon, Washington.

precautionary approach. Evidence has demonstrated the risks of not breastfeeding, but at the start of the pandemic, the risks of breastfeeding with COVID-19 were unknown. Therefore, breastfeeding as a public health practice should have been prioritized until evidence was found to dispute that claim. It has since been determined that the survival benefits of breastfeeding greatly outweigh the fatality rates of infants with COVID-19 (36).

The respondents point to the disruption of evidence-based labor and birth practices, including social or professional support, during the birthing process or for lactation care in the postpartum period for all mothers during the pandemic.

“Individuals during the beginning of the pandemic were not allowed to bring partners or children into postpartum visits with OBGYN providers in my area.” (Respondent #45)

“Absolutely no support groups, no in-person appointments.” (Respondent #419)

“...It was constant change, the hospital did allow mothers to EBF (exclusively breastfeed), but it was while the mom was masked, once the feeding was finished, the baby was kept 6 feet away from mothers. It was hard to support a breastfeeding mother, I can only imagine how the mother felt.” (Respondent #137)

“Mothers and infants were being separated and discouraged to breastfeed if COVID positive.” (Respondent #66)

Practice decisions were reportedly made based on fear and uncertainty rather than evidence. The feelings of fear and uncertainty at the beginning of the pandemic were widespread (37). Empirical research explains that “one of the central emotional responses during a pandemic is fear” (38). The experience of LSPs and all of the families they worked with was not unique. National polls conducted at the start of the pandemic revealed a sharp increase in fear and worries related to the virus (37). Changes to policies and procedures in LSP workplaces may have been implemented more so out of fear than on evidence.

“...A lot of moms and dads had fear of infecting (their) baby.” (Respondent #630)

“Breastfeeding was discouraged because of the fear of transmission.” (Respondent #353)

“At the time the science was very new, and I believe many providers were unsure and did advise not to breastfeed if the mother had COVID or was exposed to COVID.” (Respondent #44)

“My clients would come to me and would tell me that they really wanted to breastfeed but that the baby was either removed from

their hospital room for fear of transmission or were given bottles of formula because they didn't want to risk transmission in the hospital.” (Respondent #336)

“Mothers being afraid to breastfeed and just, in general, (were) in fear.” (Respondent #659)

Lactation counselors report that they experienced concerning changes in evidence-based care and practices at the onset of the pandemic. These ranged from barriers to all patient interactions because of restrictions in access to care to the abrogation of established routines known to support breastfeeding and continued lactation. The rescinding of evidence-based practices affected lactation support providers' ability to provide support to all families in the hospital and in the community.

4.2. Rescinding of access to care

Evidence-based practices to support breastfeeding include having ongoing access to lactation care and support (13). Respondents in the current study recounted changes in the way lactation care was provided during the initial outbreak of the pandemic. Due to reduced staffing, workplaces and/or governmental organizations began triaging all breastfeeding mothers based on the urgency of their lactation concern. The practice of triaging affected the availability of LSPs and breastfeeding support resources for those mothers. The experiences of other clinical staff working in healthcare settings during this time has been described similarly. For example, Chandy and colleagues' meta-synthesis included 15 qualitative studies of the lived experiences of healthcare providers during COVID-19, which reported unexpected burdens at work and new challenges to face (4). Respondents in the current study reported comparable experiences.

“We were only allowed to help a mother/baby under certain urgent circumstances. Otherwise, we were not allowed to see them in person.” (Respondent #24)

“The days/hours that lactation support was provided was cut down to 4 hours every other day (it had been offered 8 hours every day).” (Respondent #208)

“Our agency's policy restricted all in-person interactions.” (Respondent #655)

“Our lactation consultant at the hospital was furloughed, they considered her non-essential.” (Respondent #641)

Triaging families meant that, in many cases, individuals that were able to have an appointment with a LSP at the start of the pandemic had to meet a certain criteria of urgency, even though breastfeeding is recognized as a public health concern in most of the world, and the

inability of all nursing individuals to meet and work with a LSP undermines the nation's goals to improve and enhance infant nutrition. Similarly, participant responses reflect the systemic undervaluing of breastfeeding as a public health priority in emergency situations and daily maternal and child health care practices.

Standard procedures of care for a newborn and mother are established based on evidence-based outcomes from leading health organizations, including the AAP, CDC and World Health Organization (WHO). Postpartum visits in particular allow a mother the chance to evaluate her breastfeeding experience and to receive often much-needed encouragement and management strategies from the provider, such as their LSP, in order to continue breastfeeding. Standardized care was quickly rescinded in light of the pandemic, especially in the realm of maternal and infant care.

“Patients were not allowed to come back to the hospital for the 2 days weight and color and feeding assessment initially with COVID.” (Respondent #3)

“Women left the hospital earlier than pre-pandemic. They often were discharged after 24 hours. Thus, the support from lactation and nurses on the postpartum unit was not available. Formula was given to the majority of my patients as they left the hospital before their milk came in.” (Respondent #178)

“Patients would not seek treatment during the early period of the pandemic and I saw a lot of patients end up with more serious infections and other issues due to fear of coming to the hospital during that time. We also stopped a lot of outpatient treatment and assistance with breastfeeding and this was hard on our mothers who were struggling to breastfeed.” (Respondent #124)

“Patients were being discharged so quickly from the newborn nursery that it almost seemed like mom's were being set up to fail as they didn't have enough time for education in the hospital.” (Respondent #148)

“I had a mom book a consultation when she was still at the hospital. It was really sad to hear from her that the hospital was short staffed, that there was no CLC that could support her.” (Respondent #559)

Utilization of essential health services tends to decline when a pandemic occurs (39). The current study demonstrates how standard postpartum visits were hurriedly scaled back, and how many mothers feared going into healthcare settings with their newborn infant due to the possibility of COVID-19 transmission. The fear observed through the lens of CLCs in the current study demonstrates the mechanism in which access to care was rolled back.

While CLCs and other healthcare professionals were unable to support breastfeeding parents at the start of the pandemic in the way they once did, the lack of support for the CLCs themselves was evident in the current study.

“Hospitals across the board were understaffed and in the midst of COVID and with PPE (Personal Protective Equipment), I saw a lack of support...” (Respondent #76)

“It was difficult when the DOH's (Department of Health) Community Health Worker home visiting program was de-funded since we relied heavily on them (some CLCs) to visit participants to observe breastfeeding & troubleshoot any bf (breastfeeding) issues-latch, positioning, etc.” (Respondent #159)

“Evidence was offered, but evidence does not appear to take into account social-emotional needs.” (Respondent #348)

“The biggest challenge was in the support provided by our hospital (there was no support for lactation during the pandemic) so many families came to me after weeks of struggling.” (Respondent #460)

“As an employee, I was never tested for COVID or asked if I had symptoms. When there was an outbreak on another unit that revealed 30% of their staff and many patients had a current infection we were changed to N-95 masks. Even with the outbreak, on our unit there was no testing.” (Respondent #392)

The current study reports that CLCs experienced changes to their own ability to access mental and physical healthcare at the start of the pandemic. This trend was seen for many healthcare providers, as explained in a recent meta-analysis and a recent qualitative systematic review of healthcare workers not feeling adequately supported during the pandemic (40, 41).

The U.S. has a history of troubling behavior towards patients based on virology status. The history of the human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) illustrates how quickly those who are sick turn into the “other” (42). LSPs in the current study documented that breastfeeding was discouraged for those presenting with the virus, and how policies around birth and breastfeeding varied drastically between COVID-positive parents and COVID-negative parents.

“If pregnant women were COVID positive they received different care then (those who tested) negative.” (Respondent #633)

“Initially lactating parents were discouraged from caring for and breastfeeding infants when (the) parent was COVID-Positive, especially in the hospital setting. Pumping to maintain supply was not often discussed or encouraged.” (Respondent #228)

“For COVID positive moms, at the beginning were told to not have any contact with (the) baby for 24 hours until (the) baby was tested for Covid. She could pump but not be close to (the) baby.” (Respondent #254)

“Initially they didn't allow COVID positive patients to breastfeed.” (Respondent #653)

“(Breastfeeding was) only discouraged for COVID positive mothers, but encouraged to pump and dump to establish supply for when recovered from COVID they can breastfeed.” (Respondent #638)

“We placed all babies of COVID 19 + mothers in the NICU and did not allow the mothers to breastfeed or give their expressed milk.” (Respondent #539)

When faced with the unknown of the pandemic, new procedures leaned towards separation, rather than connection, with severe consequences on breastfeeding rates. “In the setting of COVID-19, separation of mother–newborn dyads impact breastfeeding outcomes, with lower rates of breastfeeding both during hospitalization and at home following discharge compared with unseparated mothers and infants” (43). Evidence-based practices to support breastfeeding, pumping and rooming-in were discouraged, thus inhibiting fair and equal access to care for lactating individuals and their babies (13, 44).

5. Strengths and limitations

The demographic characteristics of the respondents indicate that a representative sample of CLCs across the U.S. and territories were included in the survey results. The research may have been limited by the methodology of an optional online survey in that it may not have collected a true representation of all CLCs working in the field at the start of the pandemic. Conversely, as an online survey, this method may have increased access to participation among respondents due to accessibility. Empirical evidence has demonstrated the vast differences in how the pandemic disproportionately affected communities of color, including in the context of breastfeeding. The current qualitative survey did not elicit responses related to racial discrimination, which is a limitation and weakness of the design of the survey and its language.

Self-report bias and recall bias are also potential limitations of the current study. Common self-report biases that may have been present include a lack of introspective ability, response bias and one's individual interpretation of the research questions. Recall bias in the current study may have been present due to the length of time that has passed since the start of the COVID-19 pandemic, or due to memory issues of the respondents.

6. Conclusion

To our knowledge, this is the first study examining the experiences of LSPs in the U.S. at the beginning of the COVID-19 pandemic. This study elucidated CLC experiences during this challenging time, including their perception of the lack of support for themselves as professionals and lack of support for new parents who intended to breastfeed. This study reemphasized the overall lack of support of breastfeeding as a public health goal in the U.S.

The findings of the current study indicate that, in the early days of the COVID-19 pandemic in the U.S., public health goals for breastfeeding were subsumed as evidence-based practice and access to care for breastfeeding families was rescinded. The rescinding of evidence-based practices which support breastfeeding, and the limitations placed by the healthcare reactions on access to care, may result in healthcare consequences that are worse than the pandemic itself (45).

These findings have important considerations for healthcare planning. Consistent and considered emergency management responses, particularly as they relate to pandemics and other viral diseases, should protect and preserve existing evidence-based guidance, particularly in relation to evidence-based care and access to care for breastfeeding and human lactation.

Sharing information and open research about COVID-19 and breastfeeding and the impact the pandemic had on healthcare provider mental and physical health status is key to improving future public health responses in the maternal and child healthcare field (46). The early publication and sharing of knowledge of breastfeeding rates declining and access to lactation care and support being severely limited across the country may have allowed public health organizations and hospital networks to respond more effectively in the later phases of the COVID-19 pandemic, including reclaiming maintaining evidence-based practices and gaps in access to care.

Data availability statement

The datasets analyzed for this study will be made available upon request to interested researchers.

Ethics statement

The studies involving humans were approved by Curry College's Institutional Review Board. The studies were conducted in accordance with the local legislation and institutional requirements. Written

informed consent for participation in this study was provided by the participants.

Author contributions

JG, EM, and KB contributed to conception and design of the study. EM organized the database and wrote the first draft of the manuscript. JG, EM, KB, and KC conducted the thematic analysis. All authors contributed to the article and approved the submitted version.

Conflict of interest

KC and KB are employed by the Healthy Children Project, Inc. The Healthy Children Project Inc. is an academic, non-governmental organization that provides educational opportunities for lactation support providers. EM is employed by the Academy of Lactation Policy and Practice. The Academy of Lactation Policy and Practice is a certification body that provides the Certified Lactation Counselor (CLC) accredited certification program, the Advanced Lactation Consultant (ALC) professional certification program and the Advanced Nurse Lactation Consultant (ANLC) professional certification program.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

1. Coronavirus disease (COVID-19) pandemic. (WWW document), World Health Organization (2019).
2. Stay-at-home orders across the country. (2020). (WWW Document). NBC news.
3. Renfrew MJ, Bradshaw G, Burnett A, Byrom A, Entwistle F, King K, et al. Sustaining quality education and practice learning in a pandemic and beyond: I have never learnt as much in my life, as quickly, ever. *Midwifery*. (2021) 94:102915. doi: 10.1016/j.midw.2020.102915
4. Chandy P, Kanthi E, Pradeep P, Sathianathan P, Jebakamal S, Narchaithi M, et al. Lived experience of health-care providers during COVID-19: a meta-synthesis. *Indian J Psychiatry*. (2022) 64:120–9. doi: 10.4103/indianjpsychiatry.indianjpsychiatry_1403_20
5. Scope of Practice – Certified Lactation Counselor (CLC). (2021). (WWW document). Academy of lactation policy and practice.
6. Statistical Report: Current Number of Certified Lactation Counselors in the U.S. & Territories (WWW document), (2022). Academy of lactation policy and practice.
7. Osterman MJK, Hamilton BE, Martin JA, Driscoll AK, Valenzuela CP. Births: Final data for 2021. In: *National Vital Statistics Reports; vol 72, no 1*. Hyattsville, MD: National Center for Health Statistics (2023).
8. Perrine CG, Chiang KV, Anstey EH, Grossniklaus DA, Boundy EO, Sauber-Schatz EK, et al. Implementation of hospital practices supportive of breastfeeding in the context of COVID-19 – United States, July 15–august 20, 2020. *MMWR Morb Mortal Wkly Rep*. (2020) 69:1767–70. doi: 10.15585/mmwr.mm6947a3
9. Koleilat M, Whaley SE, Clapp C. The impact of COVID-19 on breastfeeding rates in a low-income population. *Breastfeed Med*. (2022) 17:33. doi: 10.1089/bfm.2021.0238
10. Wang J, Ahmed AF, Ramanathan R, Yeh A. The effect of SARS-CoV-2 on the rates of breastfeeding in the newborn nursery. *J Investig Med*. (2022) 70:206–7.
11. Raju TNK. Achieving healthy people 2030 breastfeeding targets in the United States: challenges and opportunities. *J Perinatol*. (2023) 43:74–80. doi: 10.1038/s41372-022-01535-x
12. Perinatal Care Measures. (2023). (WWW document). The joint commission.
13. The Ten Steps to Successful Breastfeeding (WWW Document), Baby-friendly USA (2023).
14. AAP issues guidance on infants born to mothers with suspected or confirmed COVID-19, (2020). (WWW document). American Academy of Pediatrics.
15. Interim Considerations for Infection Prevention and Control of Coronavirus Disease (COVID-19) In Inpatient Obstetric Healthcare Settings (2019) (WWW document). Centers for Disease Control and Prevention.
16. Widström A, Brimdyr K, Svensson K, Cadwell K, Nissen E. Skin-to-skin contact the first hour after birth, underlying implications and clinical practice. *Acta Paediatr*. (2019) 108:1192–204. doi: 10.1111/apa.14754
17. Lok KYW, Chow CLY, Fan HSL, Chan VHS, Tarrant M. Exposure to baby-friendly hospital practices and mothers' achievement of their planned duration of breastfeeding. *BMC Pregnancy Childbirth*. (2020) 20:261. doi: 10.1186/s12884-020-02904-0

18. Bartick MC, Valdés V, Giusti A, Chapin EM, Bhana NB, Hernández-Aguilar M-T, et al. Maternal and infant outcomes associated with maternity practices related to COVID-19: the COVID mothers study. *Breastfeed Med.* (2021) 16:189–99. doi: 10.1089/bfm.2020.0353
19. Care for Breastfeeding People, (2021). (WWW document). Centers for Disease Control and Prevention.
20. Ukoli F, Leavell J, Mayo A, Moore J, Nchami N, Britt A. Encouraging and reinforcing safe breastfeeding practices during the COVID-19 pandemic. *IJERPH.* (2023) 20:1756. doi: 10.3390/ijerph20031756
21. Cinquetti M, Marchiotto C, Fingerle M, Salani M, Adami A, Dainese D, et al. Breastfeeding rates fell in an Italian baby friendly hospital during the 2020 COVID-19 pandemic year and difficulties increased. *Acta Paediatr.* (2023) 112:770–5. doi: 10.1111/apa.16674
22. Anderson KE, McGinty EE, Presskreischer R, Barry CL. Reports of forgone medical care among US adults during the initial phase of the COVID-19 pandemic. *JAMA Netw Open.* (2021) 4:e2034882. doi: 10.1001/jamanetworkopen.2020.34882
23. COVID-19: How to Protect Yourself and Others. (2023). (WWW document). Centers for Disease Control and Prevention.
24. Brown A., Shenker NS. *Breastfeeding support during COVID-19: A summary report in collaboration with the Breastfeeding Network [WWW Document]*, Breastfeeding Network. (2020).
25. Garfield H, Westgate B, Chaudhary R, King M, O'Curry S, Archibald SJ. Parental and staff experiences of restricted parental presence on a neonatal intensive care unit during COVID-19. *Acta Paediatr.* (2021) 110:3308–14. doi: 10.1111/apa.16085
26. Hull N, Kam RL, Gribble KD. Providing breastfeeding support during the COVID-19 pandemic: concerns of mothers who contacted the Australian breastfeeding association. *Breastfeed Rev.* (2020) 28:25–35. doi: 10.1101/2020.07.18.20152256
27. Rao SPN, Minckas N, Medvedev MM, Gathara D, Y NP, Seifu Estifanos A, et al. Small and sick newborn care during the COVID-19 pandemic: global survey and thematic analysis of healthcare providers' voices and experiences. *BMJ Glob Health.* (2021) 6:e004347. doi: 10.1136/bmjgh-2020-004347
28. Woolf SH, Grol R, Hutchinson A, Eccles M, Grimshaw J. Clinical guidelines: potential benefits, limitations, and harms of clinical guidelines. *BMJ.* (1999) 318:527–30. doi: 10.1136/bmj.318.7182.527
29. Powell T, Chuang E. COVID in NYC: what we could do better. *Am J Bioeth.* (2020) 20:62–6. doi: 10.1080/15265161.2020.1764146
30. Home care for patients with suspected or confirmed COVID-19 and management of their contacts. (2020). (WWW document). World Health Organization.
31. Turner S, McGann B, Brockway M. A review of the disruption of breastfeeding supports in response to the COVID-19 pandemic in five Western countries and applications for clinical practice. *Int Breastfeed J.* (2022) 17:38. doi: 10.1186/s13006-022-00478-5
32. Gribble K, Cashin J, Marinelli K, Vu Hoang D, Mathisen R. First do no harm overlooked: analysis of COVID-19 clinical guidance for maternal and newborn care from 101 countries shows breastfeeding widely undermined. *Front Nutr.* (2023) 9:1049610. doi: 10.3389/fnut.2022.1049610
33. Vu Hoang D, Cashin J, Gribble K, Marinelli K, Mathisen R. Misalignment of global COVID-19 breastfeeding and newborn care guidelines with World Health Organization recommendations. *BMJ Nutr Prev Health.* (2020) 3:339–50. doi: 10.1136/bmjnp-2020-000184
34. Patterson JA, Keuler NS, Olson BH. The effect of maternity practices on exclusive breastfeeding rates in U.S. hospitals. *Matern Child Nutr.* (2019) 15:e12670. doi: 10.1111/mcn.12670
35. Lunda P, Minnie CS, Benadé P. Women's experiences of continuous support during childbirth: a meta-synthesis. *BMC Pregnancy Childbirth.* (2018) 18:167. doi: 10.1186/s12884-018-1755-8
36. Rollins N, Minckas N, Jehan F, Raiten D, Thorne C. A public health approach for deciding policy on infant feeding and mother-infant contact in the context of COVID-19. *Lancet Glob Health.* (2021) 9:e552–7. doi: 10.1016/S2214-109X(20)30538-6
37. Asmundson GJG, Taylor S. Coronaphobia: fear and the 2019-nCoV outbreak. *J Anxiety Disord.* (2020) 70:102196. doi: 10.1016/j.janxdis.2020.102196
38. Bavel JJV, Baicker K, Boggio PS, Capraro V, Cichocka A, Cikara M, et al. Using social and behavioural science to support COVID-19 pandemic response. *Nat Hum Behav.* (2020) 4:460–71. doi: 10.1038/s41562-020-0884-z
39. Ballard M, Olsen HE, Millea A, Yang J, Whidden C, Yembrick A, et al. Continuity of community-based healthcare provision during COVID-19: a multicountry interrupted time series analysis. *BMJ Open.* (2022) 12:e052407. doi: 10.1136/bmjopen-2021-052407
40. Billings J, Ching BCF, Gkoka V, Greene T, Bloomfield M. Experiences of frontline healthcare workers and their views about support during COVID-19 and previous pandemics: a systematic review and qualitative meta-synthesis. *BMC Health Serv Res.* (2021) 21:923. doi: 10.1186/s12913-021-06917-z
41. Koontalay A, Suksatan W, Prabsangob K, Sadang JM. Healthcare workers' burdens during the COVID-19 pandemic: a qualitative systematic review. *JMDH.* (2021) 14:3015–25. doi: 10.2147/JMDH.S330041
42. Duffy L. Suffering, shame, and silence: the stigma of HIV/AIDS. *J Assoc Nurses AIDS Care.* (2005) 16:13–20. doi: 10.1016/j.jana.2004.11.002
43. Popofsky S, Noor A, Leavens-Maurer J, Quintos-Alagheband ML, Mock A, Vinci A, et al. Impact of maternal severe acute respiratory syndrome coronavirus 2 detection on breastfeeding due to infant separation at birth. *J Pediatr.* (2020) 226:64–70. doi: 10.1016/j.jpeds.2020.08.004
44. Gribble K, Marinelli K, Tomori C, Gross M. Implications of the COVID-19 pandemic response for breastfeeding, maternal caregiving capacity and infant mental health. *J Hum Lact.* (2020) 36:591–603. doi: 10.1177/0890334420949514
45. Beran D, Aebischer Perone S, Castellsague Perolini M, Chappuis F, Chopard P, Haller DM, et al. Beyond the virus: ensuring continuity of care for people with diabetes during COVID-19. *Prim Care Diabetes.* (2021) 15:16–7. doi: 10.1016/j.pcd.2020.05.014
46. da Silva SJR, do Nascimento JCF, Germano Mendes RP, Guarines KM, Targino Alves da Silva C, da Silva PG, et al. Two years into the COVID-19 pandemic: lessons learned. *ACS Infect Dis.* (2022) 8:1758–814. doi: 10.1021/acsinfecdis.2c00204



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Barriers and enablers to exclusive breastfeeding by mothers in Polokwane, South Africa

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Background: Exclusive breastfeeding (EBF) for six months, with the introduction of appropriate complementary feeding thereafter, and breastfeeding continuing for up to 2 years and beyond, is highly recommended. This could save the lives of up to 1.4 million children each year worldwide. Despite this, breastfeeding rates in South Africa remain sub-optimal, with the recommended target of 50% by the World Health Assembly (WHA) not being achieved. The study aimed to investigate the reasons influencing mothers' practice of exclusive breastfeeding in the Polokwane municipality of Limpopo province in South Africa.

Methodology: A cross-sectional health facility-based quantitative and descriptive survey was conducted using a validated-structured questionnaire administered to 146 mothers. The data was analyzed using STATA. Chi-square tests were used to determine the relationship between selected demographic variables and their reasons not to breastfeed exclusively.

Results: Although 94% of the mothers had initiated breastfeeding, at the time of data collection 8% had stopped. Of those who had stopped breastfeeding, 5% did so within one month of starting. Thirty-nine percent of mothers' breastfed exclusively, while 61% practiced mixed feeding. A positive association between exclusive breastfeeding practices and the age of the mother were observed, with older mothers more likely to breastfeed. The reasons mothers stopped breastfeeding were: the mother was ill (45%) or they returned to school or work (27%). Reasons for not breastfeeding were cited as: medical conditions, not enough milk, and infant refusal to breastfeed (33%). Mothers believe that HIV-positive women should breastfeed their infants (57%), and health workers were found to be the main source of HIV information to mothers (77%).

Discussion: Exclusive breastfeeding during the first six months was less practiced. Infant formula and solid foods were introduced at an early age, usually within the first month of breastfeeding. This study sheds light on factors influencing the early initiation of breastfeeding and the practice of EBF as practiced in Polokwane.

KEYWORDS

breastfeeding, feeding practices, factors, barriers, enablers

1 Introduction

Breastfeeding is the process of feeding the infant with the mother's milk (1). It is an integral part of the reproductive process with important implications for the health of the mother and baby (2). The feeding of an infant with only breast milk and no additional food, water, or other liquids (except for medicines and vitamins,

if needed) during the first six months of life is termed exclusive breastfeeding (EBF) (3–5). This is the feeding practice for newborns and infants recommended by the World Health Organization (WHO) to reduce infant morbidity and mortality (5–7). EBF is considered superior to the mixed infant feeding method which includes a combination of breastmilk and infant formula and/or other food types (8). The importance of counselling as a strategy to improve breastfeeding practices has been highlighted in the United Nations Children's Fund (UNICEF) and WHO guidelines to improve breastfeeding. The United Nations (UN) also established targets to eliminate malnutrition and increase exclusive breastfeeding (EBF) rates to at least 50% (9, 10). It is recommended that breastfeeding should start within one hour of birth, this helps the infant with all nutrients necessary for growth from colostrum. Colostrum reduces child morbidity and mortality (1, 11).

EBF should be practiced for up to six months and breastfeeding should continue until the child is two years of age (4, 11). EBF is recommended because breast milk contains all the nutrients necessary in the first few months of life (11). Breast milk is the best nutrition for preterm infants in optimizing the growth and development of babies and young children and is an effective intervention for preventing early childhood deaths (2, 5). It is posited that EBF could prevent 1.4 million deaths worldwide among children under the age of five every year if implemented (5).

Even though EBF is the most efficacious type of infant feeding, women around the world still fail to reach the recommended target of 6 months postpartum (1, 7). Furthermore, sub optimally practiced breastfeeding, negatively affects child survival, growth, and development (1, 7). Infants less than two months old who are not breastfed are six times more likely to die from diarrhea and acute respiratory infections than their counterparts (11, 12). Those who are not exclusively breastfed have a high chance of acquiring pneumonia, meningitis, ear infections and dying from childhood-related diseases due to inadequate Timely Initiation of Breastfeeding (TIBF) (11, 12).

Mothers have numerous challenges which may influence their choice to breastfeed. These may include; a perceived lack of breastmilk, cracked or sore nipples, breast engorgement, disapproval and discomfort of breastfeeding in public, and insufficient breastfeeding support from society and healthcare providers (13). In addition, short maternity leave periods for working mothers, difficulties associated with combining breastfeeding and other maternal responsibilities, and emotional stress are also part of the challenges faced by mothers which may negatively affect their choice to breastfeed (12, 13). The South African government has committed itself to improving EBF, but there is a lack of information on reasons why mothers are not exclusively breastfeeding in rural areas of Limpopo (14). This study aimed to investigate the prevalence of EBF and barriers and enablers of EBF among mothers attending primary health care clinics around Polokwane municipality, Limpopo province.

2 Materials and methods

2.1 Study design, population, and sampling

The study was cross-sectional in design and conducted in the Capricorn District of the Limpopo Province in northern South Africa. The municipality consists of townships, suburbs, and villages within an area of 3,766 km² and an estimated population size of 797,127, of which 2% are white, 97% African, and 1% are colored [(15): District Municipality: Capricorn]. The majority of residents of this district are Sepedi speaking (84.9%) followed by 2.97% Afrikaans, 2.60% Xitsonga, 2.03% English, 1.99% isiNdebele, 1.60% other, 1.41 Tshivenda, 1.05% isiZulu, 0.77 Sesotho, 0.67 Setswana [(15): District Municipality: Capricorn]. Polokwane Municipality has an estimated sex ratio of 92.8 males per 100 females.

In this study, a total of five primary health care (PHC) facilities were randomly selected, while the community health Centre (CHC) was automatically included as it was the only referral site within its cluster. The participants were selected using convenient sampling. The study consisted of 146 mothers, paired with their infants from a group of approximately 491 infants who attended six primary health care (PHC) facilities every month in Polokwane, South Africa.

The study participants were informed about the possibility of publishing the findings of the study. The study was approved by the Turfloop Research Ethics Committee (TREC) with reference TREC/115/2017: PG under the University of Limpopo. The Department of Health (DoH) in Limpopo Province granted permission for the study to be conducted in the PHC and CHC facilities. All mothers who participated in the study did so after signing a written full informed consent. In cases where the mother was under age (<18 years) the research team sought consent from them and their legal guardian or parents.

2.1.1 Inclusion criteria

The inclusion criteria for the study were as follows:

- Mothers of infants aged 0–6 months who visited the facility for immunization on the days of data collection
- Mothers who gave written consent to take part in the study.

2.1.2 Exclusion criteria

The exclusion criteria for the study were as follows:

- Infants brought in by caregivers who are neither biological mothers nor primary caregivers
- First-time mothers with infants zero to two weeks – because they may have limited infant feeding experience
- Mothers and caregivers of children over six months of age
- Mothers with an infant with any kind of metabolic disease or genetic disease.

2.2 Data collection

A structured questionnaire was used to collect data adapted from Goosen et al. (16). This was to answer a set of closed-

TABLE 1 Demographic characteristics of the mothers.

	Overall	Age categories of mothers				<i>p</i> -value
		<18 years	18–25 years	26–35 years	>35 years	
Total <i>n</i> (%)	146 (100.0)	8 (5.5)	40 (27.4)	79 (54.1)	19 (13.01)	
Education						
Primary <i>n</i> (%)	2 (1.4)	–	–	2 (100)	–	0.164
High <i>n</i> (%)	58 (39.7)	7 (12)	19 (32.8)	27 (46.6)	5 (8.6)	
Matric <i>n</i> (%)	40 (27.4)	1 (2.5)	9 (22.5)	23 (57.5)	7 (17.5)	
Tertiary <i>n</i> (%)	46 (31.5)	–	12 (26.1)	27 (58.7)	7 (15.2)	
Employment status						
Employed <i>n</i> (%)	50 (34.2)	–	8 (16)	36 (72)	6 (12)	0.006
Unemployed <i>n</i> (%)	96 (65.8)	–	32 (36.4)	43 (48.9)	13 (14.8)	
Birth order						
Firstborn <i>n</i> (%)	53 (36.3)	8 (15.1)	29 (54.7)	16 (30.2)	–	<0.001
Second born <i>n</i> (%)	44 (30.1)	-	10 (22.7)	32 (72.7)	2 (4.5)	
Third born <i>n</i> (%)	26 (17.8)	-	1 (3.8)	20 (76.9)	5 (19.2)	
Fourth born <i>n</i> (%)	16 (11.0)	–	–	10 (62.5)	6 (37.5)	
Fifth born <i>n</i> (%)	7 (4.8)	–	–	1 (14.3)	6 (85.7)	
Support grant						
Yes <i>n</i> (%)	78 (53.4)	5 (6.4)	21 (26.9)	43 (55.1)	9 (11.5)	<0.001
No <i>n</i> (%)	68 (46.6)	3 (4.4)	19 (27.9)	36 (52.9)	10 (14.7)	

ended questions that sought information about the mothers and infants. The questionnaire included questions on socio-demographic information, infant feeding practices, knowledge of caregiving, and medical information. To test for the face validity

of the tool, a pilot study was conducted. The questionnaire was piloted at one of the selected primary health care facilities and the results from the pilot study were used to adjust the questionnaire accordingly.

TABLE 2 Association of mother-infant paired demographics with infant feeding practice.

	Total <i>n</i> (%)	Exclusive breastfeeding practices		<i>p</i> -value
		Exclusive breastfeeding <i>n</i> (%)	Not exclusively breastfeeding <i>n</i> (%)	
Breastfeeding practices		53 (39)	84 (61)	
Infants gender				
Boy <i>n</i> (%)	75 (51.4)	30 (40)	45 (60)	0.945
Girl <i>n</i> (%)	71 (48.6)	28 (39.4)	43 (60.6)	
Age of infant				
0–1 month <i>n</i> (%)	7 (4.8)	5 (71.4)	2 (28.6)	0.065
1–3 months <i>n</i> (%)	67 (45.9)	30 (44.8)	37 (55.2)	
4–6 months <i>n</i> (%)	72 (49.3)	23 (31.9)	49 (68.1)	
Place of infant birth				
Public clinic/hospital <i>n</i> (%)	123 (84.2)	52 (42.3)	71 (57.7)	0.254
Private clinic/hospital <i>n</i> (%)	21 (14.4)	6 (28.6)	15 (71.4)	
Home	2 (1.4)	0 (0)	2 (100)	
Mothers age				
<18 years <i>n</i> (%)	8 (5.5)	1 (13.0)	7 (87.0)	0.036
18–25 years <i>n</i> (%)	40 (27.4)	12 (30.0)	28 (70.0)	
26–35 years <i>n</i> (%)	79 (54.1)	33 (42.0)	46 (58.0)	
>35 years <i>n</i> (%)	19 (13.0)	12 (63.0)	7 (37.0)	
Mothers employment status				
Employed <i>n</i> (%)	50 (34.2)	16 (32.0)	34 (68.0)	0.169
Unemployed <i>n</i> (%)	96 (65.8)	42 (43.8)	54 (56.2)	
Level of education				
Primary school <i>n</i> (%)	2 (1.4)	1 (50.0)	1 (50.0)	0.835
High school <i>n</i> (%)	58 (39.7)	21 (36.2)	37 (63.8)	
Matric <i>n</i> (%)	40 (27.4)	18 (45.0)	22 (55.0)	
Tertiary education <i>n</i> (%)	46 (31.5)	18 (39.1)	28 (60.9)	
Support grant				
Yes <i>n</i> (%)	78 (53.4)	29 (37.2)	49 (62.8)	0.501
No <i>n</i> (%)	68 (46.6)	29 (42.6)	39 (57.4)	

2.3 Statistical analysis

Data were analyzed using STATA statistical software (STATA Corporation, College Station, Texas) version 12. Categorical variables are presented as percentages and continuous variables are expressed as mean \pm SD. χ^2 tests were used to evaluate relationships between different selected variables. The critical value for significance was set at $p < 0.05$ for all analyses. Descriptive statistics were used to summarize the socio-demographic characteristics of the study population, the prevalence of infant feeding practices, and factors influencing these practices. Binary logistic regression was used to determine the association between exclusive breastfeeding and associated factors.

2.4 Results

Table 1 describes the demographic characteristics of the mothers who participated in the study. Out of the 146 mothers who participated in the current study, the majority of participants (54.1%) were in the age category 26–35 years. All participants aged ≤ 18 years were still in high school. Overall, 65.8% of the participants were unemployed with the age group of 26–35 years having the highest percentage of both employment status categories; employed (72%) and unemployed (48.9%). About 33.2% of the participants were first-time mothers. Approximately 53% were receiving child support grants and older mothers were more likely to be receiving child support grants.

Table 2 shows the association of demographics with infant feeding practices. There was no association between the sex of the child and exclusive breastfeeding and, as expected exclusive breastfeeding decreased with the increased age of the infant ($p = 0.065$; insignificant) and was less significantly practiced by mothers of the age category of >35 years ($p = 0.036$). Most infants were delivered at public health facilities (84.22%), followed by those delivered in private health facilities (14.4%) and those delivered at home (1.4%) ($p = 0.254$). The present study found a significant association between an increase in the age of the mother with exclusive breastfeeding ($p = 0.036$), where older mothers were found to exclusively breastfeed when compared to younger mothers. In the age group <18 years, those who practiced mixed feeding were 87% as compared to 13% of EBF. In the age group 18–25 years, those who practiced mixed feeding were 70% as compared to 30% of EBF. In the age group 26–35 years, those who practiced mixed feeding were 58% as compared to 42% of EBF. On the contrary, in the age group >35 years, those who practiced mixed feeding were 37% as compared to 63% of EBF. EBF was practiced less by mothers who delivered at private health facilities (28.6%) when compared to those who delivered at public health facilities (42.3%). Although not significant, 32% of employed mothers practiced EBF and the results of the current study indicate that mothers who were full or part-time employed practiced less EBF. Even though it was not statistically significant, mothers with high school as their highest level of education practiced EBF less.

Table 3: **Table 3** shows that approximately 94.5% of mothers had received advice on how to feed their infants, of which 69% had received this advice during pregnancy. Significantly more mothers (58%) who received breastfeeding advice were not exclusively breastfeeding ($p = 0.018$). Approximately 5% of mothers had not received advice on infant feeding and all these mothers did not exclusively breastfeed their infants. The majority (65.6%) of the mothers reported that they had received infant feeding information during pregnancy compared to 30.4% who received it after delivery. About 92.7% of mothers started breastfeeding their babies immediately after birth. Those who delayed breastfeeding stated reasons such as the mother's illness (57.1%), and infant illness (38.8%) with the last reason being lack a lack of knowledge on how to start breastfeeding (4.1%). Mothers who gave their infants non-prescribed medication were

TABLE 3 Barriers and enablers to the practice of exclusive breastfeeding.

	Total	Infant feeding practices		p-value
		Exclusive breastfeeding	Not exclusive breastfeeding	
Received advice on infant feeding				
Yes <i>n</i> (%)	138 (94.5)	58 (42.0)	80 (58.0)	0.018
No <i>n</i> (%)	8 (5.5)	0 (0.0)	8 (100)	
Timing of feeding advice				
During pregnancy <i>n</i> (%)	96 (69.6)	43 (44.8)	53 (55.2)	0.320
After delivery <i>n</i> (%)	42 (30.4)	15 (35.7)	27 (64.3)	
Infant ever breastfed				
Yes <i>n</i> (%)	137 (93.8)	79 (57.7)	58 (42.3)	0.012
No <i>n</i> (%)	9 (6.2)	0 (0.0)	9 (100)	
Received help to start breastfeeding				
Yes <i>n</i> (%)	80 (58.4)	48 (60.8)	32 (55.2)	0.512
No <i>n</i> (%)	57 (41.6)	31 (39.2)	26 (44.8)	
Start of infant breastfeeding				
Immediately <i>n</i> (%)	127 (92.7)	71 (89.9)	56 (96.6)	0.267
2 h after birth <i>n</i> (%)	8 (5.8)	6 (7.6)	2 (3.5)	
3–6 h after birth <i>n</i> (%)	2 (1.5)	2 (2.5)	0 (0.0)	
Reasons for not breastfeeding after 1 h				
Mother ill <i>n</i> (%)	28 (57.1)	15 (48.4)	13 (72.2)	0.193
Infant was ill <i>n</i> (%)	19 (38.8)	15 (48.4)	4 (22.2)	
Didn't know how to start breastfeeding <i>n</i> (%)	2 (4.1)	1 (3.2)	1 (5.6)	
Should HIV + mothers breastfeed				
Yes <i>n</i> (%)	83 (56.9)	36 (62.1)	47 (53.4)	0.579
No <i>n</i> (%)	55 (37.7)	19 (32.8)	36 (40.9)	
Not sure <i>n</i> (%)	8 (5.4)	5 (5.1)	5 (5.7)	
Give infants non-prescribed medicines				
Yes <i>n</i> (%)	110 (75.3)	25 (69.4)	11 (30.6)	<0.001
No <i>n</i> (%)	36 (24.7)	33 (30.0)	77 (70.0)	
Reasons to give non-prescribed medicines				
Infant grow well <i>n</i> (%)	11 (10.1)	8 (10.5)	3 (9.1)	0.552
Prevent diseases <i>n</i> (%)	89 (81.7)	60 (78.9)	29 (87.9)	
Treat umbilical cord/fontanelle <i>n</i> (%)	6 (5.5)	5 (6.6)	1 (3.0)	
Prevent crying/colic <i>n</i> (%)	3 (2.8)	3 (3.9)	0 (0.0)	

significantly more likely to practice EBF (69.4%) ($p < 0.001$). Reasons for giving non-prescribed medicines included perceived attributes of the medication to make the infant grow well (10.1%), prevent diseases (81.7%), treat umbilical cord/fontanelle (5.5%), and prevent crying/colic (2.8%) with no significant difference between those who practiced exclusive breastfeeding and those who did not.

Table 4: At the time of the interview, eleven mothers, which is 8% of the participants who had initiated breastfeeding at one time, had stopped breastfeeding. Mothers who stopped breastfeeding indicated the following reasons; illness (45.5%), going back to school (27.3%), and not producing enough milk (18.2%).

TABLE 4 Reasons behind feeding choices.

Reasons for stopping breastfeeding	Frequency N (%)
I was ill/with an infectious disease	5 (45.4)
Going back to work/school	3 (27.3)
Not enough milk	2 (18.2)
Breastfeeding conditions	1 (9.1)
Reasons for not breastfeeding (Never initiated breastfeeding)	
Mother was ill/had a medical condition	3 (33.3)
Not enough breast milk	3 (33.3)
The infant refused to be breastfed	3 (33.3)
Reasons for giving solids and liquids	
Not enough milk/infant crying/Breast milk not enough	60 (85.7)
Advice from a family member	4 (5.7)
Advice from a healthcare worker	3 (4.3)
Infant hungry/infant crying/Infant crying/breast milk not enough/advice from a family member	2 (2.9)
Not enough milk	1 (1.4)
Source of infant feeding information	
Media	35 (25.4)
Health worker/media	23 (16.7)
Family/health worker	16 (11.6)
Family	8 (5.7)
Family/media	6 (4.3)
Family/health worker/media	4 (2.9)
Reasons For Breastfeeding	
Breastfeeding is perfect for babies	46 (33.6)
Breastfeeding is the perfect nutrition for babies/OTHER	41 (30.0)
Breastfeeding is perfect for babies/free of charge	11 (8.0)
Other	9 (6.6)
Breastfeeding is perfect for babies/infants who are ill	5 (3.6)
Free of charge/no need to prepare/OTHER	5 (3.6)
Breastfeeding is perfect for babies/free of charge/free of charge/infant was ill/no need to prepare	4 (3)
No need to prepare/OTHER	1 (0.7)
Bonding with the infant	1 (0.7)
Breastfeeding is perfect for babies/free of charge/no need to prepare	3 (2.2)
Breastfeeding is perfect for babies/Free of charge/OTHER	3 (2.2)
Free of charge	3 (2.2)
Breastfeeding is perfect for babies/infants who are ill/OTHER	3 (2.2)
Breastfeeding is perfect for babies/no need to prepare	2 (1.4)
Sources of advice for giving men prescribed medication	
Family member	95 (65.1)
Health worker	10 (6.8)
Family/health worker	5 (3.4)
Did not give un-prescribed medication	36 (24.7)

Mothers who did not breastfeed (never initiated breastfeeding) indicated the following reasons, illness/medical condition (33.3%), and not enough milk (33.3%), and infant refused to be breastfed 220 (33.3%). About 85.7% of mothers gave infants solids food and liquids mainly because they felt they could not produce enough milk and the infants were crying. Most mothers received their infant feeding information from health workers (33.3%), and media (25.4%), and 5.7% of the mothers received the feeding information from their families. Approximately 0.7% of the participants reported that breastfeeding promotes bonding between mother and infant. The most frequently reported reason for breastfeeding was the perception that breast milk was the perfect nutrition/food for infants, followed by that breast milk is free at 33.6% and 30.0% respectively.

Table 5: Binary logistic regression showed that mothers aged >35 years were 12.0 times more likely to practice EBF ($p = 0.034$). Infants aged 4–6 months were 0.2 times less likely to be exclusively breastfed ($p = 0.026$). Women who were not

TABLE 5 Binary logistic regression for determinants of exclusive breastfeeding.

Variables	Exclusive breastfeeding		
	OR	95% CI	p-value
Age of mother			
<18 years	Reference		
18–25 years	3.0	0.33–27.12	0.328
26–35 years	5.0	0.58–42.78	0.140
>35 years	12.0	1.21–118.88	0.034
Age of infant			
0–1 month	Reference		
1–3 months	0.3	0.06–1.79	0.197
4–6 months	0.2	0.03–1.04	0.026
First-time mother			
Yes	Reference		
No	1.7	0.82–3.39	0.029
Employment			
Employed	Reference		
Unemployed	1.3	0.98–1.75	0.011
Level of education			
Tertiary education	Reference		
Primary school	1.6	0.09–26.47	0.760
High school	0.9	0.39–1.96	0.760
Matric	1.3	0.53–3.00	0.582
Received advice on infant feeding			
Yes	Reference		
No	0.4	0.07–0.70	0.018
Received help to start breastfeeding			
Yes	Reference		
No	1.2	0.60–2.29	0.639
Timing of getting advice on breastfeeding			
During pregnancy	Reference		
After delivery	0.7	0.32–1.44	0.033
Should HIV + mothers breastfeed			
Yes	Reference		
No	0.7	0.34–1.39	0.301
Not sure	0.8	0.17–3.49	0.749
Give infants non-prescribed medicines			
No	Reference		
Yes	0.2	0.08–0.43	<0.001

first-time mothers ($p = 0.029$), unemployed ($p = 0.011$), and mothers who received help ($p = 0.639$) to start breastfeeding were more likely to practice EBF. Mothers who did not receive advice on infant feeding ($p = 0.018$), those who received advice on breastfeeding after delivery ($p = 0.033$), and those who gave their infant non-prescribed medications ($p < 0.001$) were less likely to practice exclusive breastfeeding.

3 Discussion

The prevalence of EBF in the present study was 39%, which is higher than the 32% national prevalence (17). However, the findings of the present study are similar to those reported in a study by du Plessis et al (18), which reported a prevalence of 38.5% (18). On the other hand, a study conducted in the North West province, South Africa, reported a low prevalence of EBF at 9.7% in the infant age group of 20–24 weeks (19). The difference may be due to different study settings, sample sizes, EBF policies and practices, and cultural norms. Given the WHO and UNICEF targets of reaching 50% of EBF at a national level by 2025, the strong points of policies, practices, and cultural norms of countries with a high prevalence of EBF could be used to strengthen our policies and practices to meet the WHO and UNICEF targets (19). Whilst the recorded increase in exclusive breastfeeding rates for children under 6 months is positive, the continuing disparities across different reports create uncertainty about the actual progress made (20).

The major reason women gave for not practicing EBF (mixed feeding prevalence 61%) in the current study was that they perceived that they did not have enough milk. Similar findings were reported in a survey conducted in the Eastern Cape, South Africa (21). The survey found that early introduction of food, water, and infant formula milk was common despite a high breastfeeding initiation rate (21). Similarly, Goosen et al. (16), attributed the early introduction of food and water to the mother's perception that the infants needed water or other supplements (16). On the other hand, the reasons for discontinuation of breastfeeding in the current study were that the mothers were ill, returning to either school or the workplace, and breast conditions such as which concurs with other studies (22, 23). In addition, women who are affected by post-natal depression and related mental health challenges stemming from socioeconomic challenges and lack of support were reported to have a higher likelihood to stop breastfeeding in less than three months postpartum (19). On the other hand, the main reasons given by mothers in the current study for breastfeeding their infants were that breastmilk provides adequate nutrition for the infant and that breastmilk is free. Similarly, a study by Modjadji et al. (17), reported breastfeeding as economical and convenient, promoting child growth and development, protecting the infant against illness, and promoting mother-baby bonding (17). Breast milk contains all the nutrients an infant needs, and promotes child survival, health, brain, and motor development (24, 25).

Evidence shows that the prevalence of breastfeeding, including EBF declines as infants get older (6). An increase in the age of the mother was found to be an indicator of EBF in the present study,

where older mothers exclusively breastfed their infants when compared to younger mothers. The Binary logistic regression showed that mothers aged >35 years were 12.0 times more likely to practice EBF. In accordance with the present study, a study conducted in the USA by Jones et al. also reported that the mother's age was strongly associated with the likelihood of breastfeeding exclusively for 6 months (26). Young mothers do not exclusively breastfeed their infants due to their busy lifestyles, being at school, and lack of confidence in breastfeeding (27). In the current study, the prevalence of EBF was high in younger infants (71.4% below 1 month) and it was much lower (31.9%) in infants aged between 3 and 6 months. These rates are still far below the targeted EBF rates of 50% (28, 29). Similarly, the low prevalence at 3–6 months was reported in a study conducted by Joshi et al. (4).

The majority of employed mothers did not practice EBF and the results of the current study indicate that mothers who were full or part-time employed practiced less EBF. In binary logistic regression, unemployed mothers were more likely to practice EBF. This finding is in accordance with the findings of a study conducted by Mandal et al., in the United States of America, which found that full-time employment status was negatively correlated with breastfeeding initiation and duration, suggesting that full-time employment remains a significant barrier to breastfeeding (30). Mothers in a study in Cape Town, South Africa, cited the lack of breastfeeding facilities in public spaces and at work as reasons for failure to exclusively breastfeed their infants (31). In addition, employed mothers face challenges such as the need to return to work early for economic reasons and an unfavorable work environment for expressing and storing milk which makes EBF a challenge for them (32).

In the current study, 64.4% of mothers initiated breastfeeding within one hour after delivery. The initiation rate in the current study is lower compared to the global target of 80% but similar to the national prevalence of 67% in 2016 (33). Initiation of breastfeeding in the first hour post-delivery is recommended as one of the interventions that have the potential to improve infants' nutritional outcomes and reduce infant mortality (34, 35). Early initiation of breastfeeding is associated with sustainable breastfeeding for up to 2 years and beyond (36–38). In the present study, failure to initiate breastfeeding within the first hour was mostly attributed to the mother's illness. Other mothers reported separation from their infants as a cause of delayed initiation as supported by Mukunya et al. (39), who also found a significant association between separation of the mother-baby pair and delayed breastfeeding initiation (39).

Another reason for the delayed initiation of breastfeeding in the current study was a lack of knowledge of how to initiate breastfeeding. Lack of breastfeeding counseling and midwife support has been previously identified as a cause for increased delay in the initiation of breastfeeding (39, 40). These authors emphasize the importance of breastfeeding education during antenatal visits and support by midwives and birth attendants post-delivery to ensure early breastfeeding initiation. Khanlari et al. (41), reported early breastfeeding initiation among mothers who received support from birth attendance immediately after

delivery (41). Other challenges contributing to the lack of breastfeeding knowledge include the discrepancies in the knowledge of breastfeeding by health professionals in relation to WHO recommendations (42). A study by Zweigenthal et al. (42), highlighted the need for ongoing training in breastfeeding and infant feeding counseling, as well as community-based postnatal support initiatives addressing cultural beliefs as a way to promote knowledge of breastfeeding amongst mothers (42).

Even though only about two-thirds of mothers initiated breastfeeding within an hour post-delivery, about 94% of the mothers did initiate breastfeeding at some point post-delivery. Studies indicate that it is a common practice for most mothers to initiate breastfeeding (43, 44). Even though the rate of breastfeeding declines as the infants get older (45). These findings are consistent with the results of a study conducted by Siziba et al. (46) in four provinces of South Africa, which reported breastfeeding initiation at 90% (46). Mothers who were not first-time mothers were more likely to exclusively breastfeed. In agreement with the present study, a study by Balogun et al. (47), reported that first-time mothers with no prior experience of breastfeeding were less likely to practice exclusive breastfeeding, while women with at least one child had a higher likelihood of practicing EBF (47). First-time mothers are likely to lack experience in breastfeeding and knowledge of how to initiate it which could be the reason why in the present study mothers who are not first-time mothers were more likely to practice EBF. In addition, a study by Lutaaya et al. (48), reported the following factors as barriers to EBF in first-time mothers; mothers' perception of babies needing more than milk had the highest percentage, followed by fear of breasts losing shape, having difficulties in EBF, breastfeeding being old fashion and maternal understanding of EBF and its recommended period (48). Mothers who did not receive advice on how to initiate breastfeeding were less likely to practice EBF. Similar findings were reported by Massare et al. (49).

4 Conclusion

Exclusive breastfeeding during the first six months was less practiced. Infant formula and solid foods were introduced at an early age. This study sheds light on factors influencing the early initiation of breastfeeding following delivery and the practice of EBF as practiced in Polokwane.

5 Recommendations in light of key study findings

Given that the present study reported a low prevalence of EBF in comparison to the WHO and UNICEF goals the present study recommends that mothers be educated on the importance of EBF, particularly young ones. The study shows that there is a high use of traditional medicine among mothers; therefore, there is a need to properly implement the South African Traditional Health Act (No. 22 of 2007) with the aim of regulating the prescription of traditional medicine. It would also be beneficial to the country to speed up a review of labor regulations to increase maternity leave

to six months to afford mothers more time for breastfeeding. Workplace support for breastfeeding will be more effective if it includes lactation breaks and breastfeeding rooms. Given that older mothers practice exclusive breastfeeding for a longer duration than younger mothers, there is a need to raise awareness of the significance of exclusive breastfeeding among young mothers.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The study was approved by the Turfloop Research Ethics Committee (TREC) with reference TREC/115/2017:PG. The University of Limpopo and the Department of Health in Limpopo Province granted permission for the study to be conducted and written full informed consent was signed all mothers who participated in the study.

Author contributions

The design of the study including the data management and writing of the article was done as a collaborative effort from all authors involved in the study. ME made substantial contributions to the conception, and design including analysis and interpretation of data while MM made substantial contributions to the acquisition of data, analysis, interpretation of data, and drafting of the manuscript. RGM, CBN, and KPS made substantial contributions to the design including revision of the manuscript. CBN played a substantial role in the data analysis, interpretation, and review of the manuscript. All authors' authors have read and approved the revised manuscript for submission.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

- Alemayehu M, Abreha K, Yebo H, Zemichael K, Gebremichael H. Factors associated with timely initiation and exclusive breast feeding among mothers of axum town, northern Ethiopia. *J Public Health* (2014) 2(5):394. doi: 10.11648/j.sjph.20140205.14
- Neji OI, Nkemdimilim CC, Ferdinand NF. Factors influencing the practice of exclusive breastfeeding among mothers in tertiary health facility in calabar, cross river state, Nigeria. *Am J Nurs*. (2015) 4(1):16. doi: 10.11648/j.ajns.20150401.13
- Danso J. Examining the practice of exclusive breastfeeding among professional working mothers in kumasi metropolis of Ghana. *Int J Nurs*. (2014) 1(1):11–24.
- Joshi PC, Angdembe MR, Das SK, Ahmed S, Faruque ASG, Ahmed T. Prevalence of exclusive breastfeeding and associated factors among mothers in rural Bangladesh: a cross-sectional study. *Int Breastfeed J*. (2014) 9:7. doi: 10.1186/1746-4358-9-7
- Mekuria G, Edris M. Exclusive breastfeeding and associated factors among mothers in Debre Markos, Northwest Ethiopia: a cross-sectional study. *Int Breastfeed J*. (2015) 10(1):1. doi: 10.1186/s13006-014-0027-0
- Asemahagn MA. Determinants of exclusive breastfeeding practices among mothers in azezo district, northwest Ethiopia. *Int Breastfeed J*. (2016) 11:22. doi: 10.1186/s13006-016-0081-x
- Thet MM, Khaing EE, Diamond-Smith N, Sudhinaraset M, Oo S, Aung T. Barriers to exclusive breastfeeding in the ayeayawaddy region in Myanmar: qualitative findings from mothers, grandmothers, and husbands. *Appetite*. (2016) 96:62–69. doi: 10.1016/j.appet.2015.08.044
- Reni DP, Puspitaningsih R, Wati R, Nurachma E. The effectiveness combination of hypnobreastfeeding and breast exercises on breast milk production time in third trimester pregnant women. *PLACENTUM: Jurnal Ilmiah Kesehatan Dan Aplikasinya*. (2023) 11(1):43–51. doi: 10.20961/placentum.v11i1.66967
- Vitalis D, Witten C, Pérez-Escamilla R. Gearing up to improve exclusive breastfeeding practices in South Africa. *PLoS One*. (2022) 17(3):e0265012. doi: 10.1371/journal.pone.0265012
- Vitalis D, Vilar-Compte M, Nyhan K, Pérez-Escamilla R. Breastfeeding inequities in South Africa: can enforcement of the WHO code help address them? - a systematic scoping review. *Int J Equity Health*. (2021) 20(1):114. doi: 10.1186/s12939-021-01441-2
- Tampah-Naah AM, Kumi-Kyereme A, Amo-Adjei J. Maternal challenges of exclusive breastfeeding and complementary feeding in Ghana. *PLoS One*. (2019) 14(5):e0215285. doi: 10.1371/journal.pone.0215285
- Diji AK, Bam V, Asante E, Lomotey AY, Yeboah S, Owusu HA. Challenges and predictors of exclusive breastfeeding among mothers attending the child welfare clinic at a regional hospital in Ghana: a descriptive cross-sectional study. *Int Breastfeed J*. (2017) 12:13. doi: 10.1186/s13006-017-0104-2
- Maastrup R, Hansen BM, Kronborg H, Bojesen SN, Hallum K, Frandsen A, et al. Factors associated with exclusive breastfeeding of preterm infants. Results from a prospective national cohort study. *PLoS One*. (2014) 9(2):e89077. doi: 10.1371/journal.pone.0089077
- Jama NA, Wilford A, Masango Z, Haskins L, Coutsooudis A, Spies L, et al. Enablers and barriers to success among mothers planning to exclusively breastfeed for six months: a qualitative prospective cohort study in KwaZulu-Natal, South Africa. *Int Breastfeed J*. (2017) 12:43. doi: 10.1186/s13006-017-0135-8
- Census. "Census 2011: district municipality: capricorn." (2011). Available at: <https://census2011.adrianfrith.com/place/935> (Accessed August 17, 2023).
- Goosen C, McLachlan M, Schübl C. Infant feeding practices during the first 6 months of life in a low-income area of the western cape province. *South Afr J Child Health*. (2014) 8(2):50. doi: 10.7196/sajch.675
- Modjadji P, Seabela ES, Ntuli B, Madiba S. Beliefs and norms influencing initiation and sustenance of exclusive breastfeeding: experiences of mothers in primary health care facilities in eremelo, South Africa. *Int J Environ Res Public Health*. (2023) 20(2):1513. doi: 10.3390/ijerph20021513
- Du Plessis LM, Herselman MG, McLachlan MH, Nel JH. Selected facets of nutrition during the first 1000 days of life in vulnerable South African communities. *South Afr J Child Health*. (2016) 10(1):37–42. doi: 10.7196/SAJCH.2016.v10i1.984
- Witten C, Claasen N, Kruger HS, Coutsooudis A, Grobler H. Psychosocial barriers and enablers of exclusive breastfeeding: lived experiences of mothers in low-income townships, North West province, South Africa. *Int Breastfeed J*. (2020) 15(1):76. doi: 10.1186/s13006-020-00320-w
- Martin-Wiesner P. "A Policy-Friendly Environment for Breastfeeding." *A Review of South Africa's Progress in Systematising Its International and National Responsibilities to Protect, Promote and Support Breastfeeding*. Johannesburg: DST-NRF Centre of Excellence in Human Development. (2018).
- Sayed N, Burger R, Harper A, Swart EC. Lockdown-associated hunger may be affecting breastfeeding: findings from a large SMS survey in South Africa. *Int J Environ Res Public Health*. (2021) 19(1):351. doi: 10.3390/ijerph19010351
- Lima APE, Castral TC, Leal LP, Javorski M, Sette GCS, Scochi CGS, et al. Exclusive breastfeeding of premature infants and reasons for discontinuation in the first month after hospital discharge. *Rev Gaucha Enferm*. (2019) 40:e20180406. doi: 10.1590/1983-1447.2019.20180406
- Rozga MR, Kerver JM, Olson BH. Self-reported reasons for breastfeeding cessation among low-income women enrolled in a peer counseling breastfeeding support program. *J Hum Lact*. (2015) 31(1):129–37; quiz 189–90. doi: 10.1177/0890334414548070
- Jensen SK, Bouhouch RR, Walson JL, Daelmans B, Bahl R, Darmstadt GL, et al. Enhancing the child survival agenda to promote, protect, and support early child development. *Semin Perinatol*. (2015) 39(5):373–86. doi: 10.1053/j.semperi.2015.06.002
- Vaivada T, Gaffey MF, Bhutta ZA. Promoting early child development with interventions in health and nutrition: a systematic review. *Pediatrics*. (2017) 140(2):e20164308. doi: 10.1542/peds.2016-4308
- Jones JR, Kogan MD, Singh GK, Dee DL, Grummer-Strawn LM. Factors associated with exclusive breastfeeding in the United States. *Pediatrics*. (2011) 128(6):1117–25. doi: 10.1542/peds.2011-0841
- Liben ML, Gemechu YB, Adugnew M, Asrade A, Adamie B, Gebremedin E, et al. Factors associated with exclusive breastfeeding practices among mothers in dubti town, afar regional state, northeast Ethiopia: a community based cross-sectional study. *Int Breastfeed J*. (2016) 11:4. doi: 10.1186/s13006-016-0064-y
- Dhami MV, Ogbo FA, Akombi-Inyang BJ, Torome R, Agho KE. On behalf of the global maternal and child health research collaboration GloMACH. Understanding the enablers and barriers to appropriate infants and young child feeding practices in India: a systematic review. *Nutrients*. (2021) 13(3):825. doi: 10.3390/nu13030825
- World Health Organization. *Reducing Stunting in Children: Equity Considerations for Achieving the Global Nutrition Targets 2025*. Geneva: World Health Organization (2018).
- Mandal B, Roe BE, Fein SB. The differential effects of full-time and part-time work status on breastfeeding. *Health Policy*. (2010) 97(1):79–86. doi: 10.1016/j.healthpol.2010.03.006
- Sowden M, Marais D, Beukes R. Factors influencing high socio-economic class mothers' decision regarding formula-feeding practices in the cape metropole. *South Afr J Clin Nutr*. (2009) 22(1):37–44. doi: 10.1080/16070658.2009.11734215
- Maponya N, van Rensburg ZJ, Du Plessis-Faurie A. Understanding South African mothers' challenges to adhere to exclusive breastfeeding at the workplace: a qualitative study. *Int J Nurs Sci*. (2021) 8(3):339–46. doi: 10.1016/j.ijnss.2021.05.010
- Nieuwoudt S, Manderson L, Norris SA. Infant feeding practices in soweto, South Africa: implications for healthcare providers. *S Afr Med J*. (2018) 108(9):756–62. doi: 10.7196/SAMJ.2018.v108i9.13358
- Christian P, Mullany LC, Hurley KM, Katz J, Black RE. Nutrition and maternal, neonatal, and child health. *Semin Perinatol*. (2015) 39(5):361–72. doi: 10.1053/j.semperi.2015.06.009
- John JR, Mistry SK, Kebede G, Manohar N, Arora A. Determinants of early initiation of breastfeeding in Ethiopia: a population-based study using the 2016 demographic and health survey data. *BMC Pregnancy Childbirth*. (2019) 19(1):69. doi: 10.1186/s12884-019-2211-0
- Ezeh OK, Ogbo FA, Stevens GJ, Tannous WK, Uchechukwu OL, Ghimire PR, et al. Factors associated with the early initiation of breastfeeding in economic community of West African states (ECOWAS). *Nutrients*. (2019) 11(11):2765. doi: 10.3390/nu11112765
- Gebretsadik GG, Tkuwab H, Berhe K, Mulugeta A, Mohammed H, Gebremariam A. Early initiation of breastfeeding, colostrum avoidance, and their associated factors among mothers with under one year old children in rural pastoralist communities of Afar, Northeast Ethiopia: a cross sectional study. *BMC Pregnancy Childbirth*. (2020) 20(1):448. doi: 10.1186/s12884-020-03151-z
- Raihana S, Dibley MJ, Rahman MM, Tahsina T, Siddique MAB, Rahman QS, et al. Early initiation of breastfeeding and severe illness in the early newborn

period: an observational study in rural Bangladesh. *PLoS Med.* (2019) 16(8):e1002904. doi: 10.1371/journal.pmed.1002904

39. Mukunya D, Tumwine JK, Nankabirwa V, Ndezi G, Odongo I, Tumuhameye J, et al. Factors associated with delayed initiation of breastfeeding: a survey in Northern Uganda. *Glob Health Action.* (2017) 10(1):1410975. doi: 10.1080/16549716.2017.1410975

40. Syam A, Amiruddin R. Inhibitor factors of early initiation of breastfeeding among mothers in rural district bone, South Sulawesi, Indonesia. *Asian J Epidemiol.* (2014) 8(1):1–8. doi: 10.3923/aje.2015.1.8

41. Khanlari S, Barnett Am B, Ogbo FA, Eastwood J. Re-examination of perinatal mental health policy frameworks for women signalling distress on the Edinburgh postnatal depression scale (EPDS) completed during their antenatal booking-in consultation: a call for population health intervention. *BMC Pregnancy Childbirth.* (2019) 19(1):221. doi: 10.1186/s12884-019-2378-4

42. Zweigenthal V, Strebel A, Hunter-Adams J. Adolescent girls' perceptions of breastfeeding in two low-income periurban communities in South Africa. *Health Care Women Int.* (2019) 40(7-9):995–1011. doi: 10.1080/07399332.2018.1549043

43. Nkoka O, Ntenda PAM, Kanje V, Milanzi EB, Arora A. Determinants of timely initiation of breast milk and exclusive breastfeeding in Malawi: a population-based cross-sectional study. *Int Breastfeed J.* (2019) 14:37. doi: 10.1186/s13006-019-0232-y

44. Wu Y, Wang Y, Huang J, Zhang Z, Wang J, Zhou L, et al. The association between caesarean delivery and the initiation and duration of breastfeeding: a prospective cohort study in China. *Eur J Clin Nutr.* (2018) 72(12):1644–54. doi: 10.1038/s41430-018-0127-9

45. Salih M. Why mothers are not exclusively breast feeding their babies till 6 months of age? Knowledge and practices data from two large cities of the kingdom of Saudi Arabia. *Sudan J Paediatr.* (2018) 1:28–38. doi: 10.24911/SJP.2018.1.5

46. Siziba LP, Jerling J, Hanekom SM, Wentzel-Viljoen E. Low rates of exclusive breastfeeding are still evident in four South African provinces. *South Afr J Clin Nutr.* (2015) 28(4):170–79. doi: 10.1080/16070658.2015.11734557

47. Balogun OO, Dagvadorj A, Anigo KM, Ota E, Sasaki S. Factors influencing breastfeeding exclusivity during the first 6 months of life in developing countries: a quantitative and qualitative systematic review. *Matern Child Nutr.* (2015) 11(4):433–51. doi: 10.1111/mcn.12180

48. Lutaaya MA. *Prevalence and factors hindering first time mothers from exclusively breast feeding in kyabugimbi health centre IV* (Bushenyi district Uganda Thesis). (2017). Kampala International University, Kampala (2017).

49. Massare BA, Hackman NM, Sznajder KK, Kjerulff KH. Helping first-time mothers establish and maintain breastfeeding: access to someone who can provide breastfeeding advice is an important factor. *PLoS One.* (2023) 18(6):e0287023. doi: 10.1371/journal.pone.0287023

50. Behzadifar M, Saki M, Behzadifar M, Mardani M, Yari F, Ebrahimzadeh F, et al. Prevalence of exclusive breastfeeding practice in the first six months of life and its determinants in Iran: a systematic review and meta-analysis. *BMC Pediatr.* (2019) 19(1):384. doi: 10.1186/s12887-019-1776-0

51. Burns N, Grove SK. 2010. *Understanding Nursing Research-EBook: Building an Evidence-Based Practice*. Maryland Heights, MO, United States: Elsevier Health Sciences.

52. Motee A, Ramasawmy D, Pugo-Gunsam P, Jeewon R. An assessment of the breastfeeding practices and infant feeding pattern among mothers in Mauritius. *J Nutr Metab.* (2013) 2013:243852. doi: 10.1155/2013/243852

53. Ratnayake HE, Rowel D. Prevalence of exclusive breastfeeding and barriers for its continuation up to six months in Kandy district, Sri Lanka. *Int Breastfeed J.* (2018) 13:36. doi: 10.1186/s13006-018-0180-y



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"I could not find the strength to resist the pressure of the medical staff, to refuse to give commercial milk formula": a qualitative study on effects of the war on Ukrainian women's infant feeding

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Introduction: During emergencies, breastfeeding protects infants by providing essential nutrients, food security, comfort, and protection and is a priority lifesaving intervention. On February 24, 2022, the war in Ukraine escalated, creating a humanitarian catastrophe. The war has resulted in death, injuries, and mass internal displacement of over 5 million people. A further 8.2 million people have taken refuge in neighboring countries, including Poland. Among those impacted are infants and young children and their mothers. We conducted a study to explore the infant feeding challenges and needs of Ukrainian women affected by the war.

Methods: We conducted a qualitative descriptive study involving in-depth interviews (IDIs) with 75 war-affected Ukrainian mothers who had at least one infant aged less than 12 months at the time of the interview. Eligible mothers were either (1) living as Ukrainian refugees in Poland, having crossed the border from Ukraine on or after February 24, 2022, when the war started ($n = 30$) or (2) living in Ukraine as internally displaced persons or as residents in the community ($n = 45$). All interviews were audio-recorded (either transcribed or had responses summarized as expanded notes) and analyzed using qualitative thematic analysis using a two-step rapid analysis process.

Results: Participants in Ukraine who wanted to initiate breastfeeding right after birth faced opposition from healthcare workers at maternity hospitals. Ukrainian refugees who gave birth in Poland faced language barriers when seeking breastfeeding support. Half of the participants in Ukraine received commercial milk formula (CMF) donations even if they said they did not need them. Most respondents stated that breastfeeding information and support were urgently needed.

Conclusion: Our data suggests that healthcare workers in Ukrainian maternity hospitals require additional training and motivation on delivering breastfeeding support. In addition, lactation consultants in maternity ward are needed in Ukraine, and interpretation support is needed for refugees to overcome language barriers. There is a need to control the indiscriminate donations of commercial milk formula and to ensure that complementary foods and commercial milk formula are available to those that need it. This study confirms the need for actions to ensure infant and young child feeding (IYCF) support is provided during emergencies.

KEYWORDS

infant feeding in emergencies, IYCF-E, breastfeeding, IYCF, breastfeeding in emergencies, infant formula feeding, infant feeding, emergency nutrition

1 Introduction

The deaths of more than 820,000 children younger than 5 years can be prevented each year by improving breastfeeding practices (1). Breastfeeding is the most cost-effective intervention to improve child survival, reduce morbidity, and ensure proper growth and wellbeing. The importance of initiation of breastfeeding within 1 hour of birth, exclusive breastfeeding for the first 6 months of life, and continued breastfeeding for at least 2 years after birth has been well documented (1). In all contexts, breastmilk also lowers children's risk of non-communicable diseases later in life (2). Breastfed children are found to perform better on intelligence tests, have higher school attendance, and have higher incomes in adult life (1, 3). Longer duration of breastfeeding also contributes to the health and wellbeing of the mothers, including reducing the risk of ovarian and breast cancers and helping to space pregnancies (1). The economic consequences of cognitive losses and conservative estimates of reduced treatment costs of childhood diseases suggest that the economic benefits for all countries of promoting breastfeeding are likely to be substantial, and the losses associated with premature cessation of breastfeeding amount to \$302 billion annually, or 0.49 percent of world gross national income (GNI) (4).

During emergencies, breastfeeding is a shield that protects infants by providing food security, comfort, warmth, and protection and is a priority lifesaving intervention (1, 5). However, the emergency response related to infant and young child feeding (IYCF) is often less than adequate. In 2017, fewer than 30 percent of World Health Organization (WHO) member states had relevant IYCF in emergencies (IYCF-E) recommendations (6). Yet, as long ago as in 2001, the Infant Feeding in Emergencies (IFE) Core Group, of which UNICEF and WHO are members, issued the Operational Guidance for Infant and Young Child

Feeding in Emergencies (OG-IFE) (7). In 2004, the WHO issued guiding principles for feeding infants and young children during emergencies (8). In 2010, the World Health Assembly (WHA 63.23) (9) endorsed the OG-IFE. In 2017, the updated OG-IFE was released (7). In 2018, the World Health Assembly (WHA 71.9) urged member states to “take all necessary measures to ensure evidence-based and appropriate infant and young child feeding during emergencies” (10). Also, in 2018, the new Sphere Handbook was issued, which included a specific set of IYCF-E recommendations (11).

More than 20 years since the release of the first IYCF-E Operational Guidance, humanitarian responses have shown some progress in protecting the health of infants and young children through appropriate feeding support. For example, during the Haiti earthquake in 2010, baby tents were introduced to provide a safe place for mothers to breastfeed and for non-breastfed infants (12). Following the 2011 Christchurch, New Zealand earthquake, an emergency day-stay breastfeeding service assisted evacuee women (13). However, many emergency responses have failed to invest in the protection of infants and young children through appropriate IYCF-E support. For example, the women and children affected by the flood that hit the state of Kelantan, Malaysia, in December 2014 were concerned about the lack of privacy for mothers to breastfeed their babies comfortably and the uncontrolled donations of commercial infant formula, teats, and feeding bottles (14).

In Ukraine, the 2014 hostilities in the eastern oblasts of Donetsk and Luhansk affected millions of people, including women and their infants. A study reviewed the IYCF practices of the affected populations and found that, in general, a majority of women had breastfed their children (93.3%). However, the same study found a very low prevalence of critical IYCF-recommended practices, including a low prevalence of exclusive breastfeeding and a very high prevalence of commercial milk formula usage (15). These

findings were comparable with the IYCF situation pre-conflict, where 96.7% of children were ever breastfed, and 21.3% of infants less than 6 months of age were exclusively breastfed (15).

After the 2014 hostilities, efforts were supported by the Government of Ukraine to improve the breastfeeding situation in the country, and the Baby Friendly Hospital Initiative, with the certification covering 30% of the mother and child health facilities, was invested in. In 2021, the President of Ukraine approved a law to comply with the European Regulations that aims to implement the recommendations and standards of the International Code of Marketing of Breastmilk Substitutes (16).

In a recent international conference, the Ministry of Health presented that more than 92% of health facilities in Ukraine were certified Baby-Friendly by the Ministry of Health. Exclusive breastfeeding during the first 6 months was recorded to be between 56 and 76%, suggesting some improvements compared with the period prior to the 2014 conflict (16).

Unfortunately, on February 24, 2022, a new war in Ukraine escalated, creating a humanitarian catastrophe. As of early 2023, there were 17.6 million people in need of humanitarian assistance, including 4.1 million children (17). UN Women also estimates that around 265,000 Ukrainian women were pregnant when the war broke out (18, 19).

We conducted a study to explore the infant feeding challenges and needs of Ukrainian women affected by the war. We included Ukrainian women who remained in Ukraine, and also Ukrainian women who had crossed the border into Poland as refugees after February 24, 2022 when the war started. We did this as we wanted to explore differences in the emergency responses in both countries and how that impacted women's behaviors as they relate to IYCF. The results of our study will inform forums and discussions around the need for more actions and resources to ensure women and their infants are protected and supported to practice safe and appropriate feeding during emergency responses.

2 Materials and methods

2.1 Study design and participants

In this qualitative descriptive study, we conducted in-depth interviews (IDI) with Ukrainian mothers of infants less than 12 months old. We purposively sampled participants to include mothers who had at least one infant aged less than 12 months at the time of the interview and who were either (1) a refugee living in Poland who had crossed the border from Ukraine on or after February 24, 2022, when the war started ("refugee") or (2) living in Ukraine as an internally displaced person in a shelter or as a resident in the community ("participant in Ukraine"). All participants had to be 18 years or older. Local study teams in each country recruited mothers through local networks such as non-governmental organizations, health centers, and hospitals or through Facebook, a social networking site.

There was a total of nine female interviewers (two in Poland and seven in Ukraine). All interviewers had previous interviewing experience and participated in study-specific training, including the review of the IDI guides. The training was conducted virtually by the FHI 360 lead investigator (AI) for the interviewers in Ukraine,

while experienced researchers from the Medical University of Warsaw (AW) and the University of Warsaw (BW) conducted the training for the interviewers in Poland. In both cases, the training lasted half a day. Interviewers were not previously acquainted with the study participants.

2.2 Data collection

We conducted a total of 75 IDIs (30 in Poland and 45 in Ukraine) between September 5 and 26, 2022. We determined this sample size based on previous research that demonstrated that data saturation occurs by 12 interviews for relatively homogenous samples (which for our study was for each country) (20). Given uncertainty regarding the homo- or heterogeneity of our samples, we interviewed more participants than this to ensure data saturation and inclusion of participants from diverse regions in north and central Poland and eastern and western zones in Ukraine. Prior to initiating data collection, interviewers introduced themselves and the study objectives. Participants were then screened for eligibility and if they were eligible, they were then brought through the informed consent form. Participants provided oral informed consent to participate in an audio-recorded IDI. In Poland, IDIs were conducted by phone ($n = 19$) and through web-based platforms (such as Zoom) ($n = 11$), while IDIs in Ukraine were conducted through web-based platforms ($n = 30$) and in-person ($n = 15$). These in-person IDIs in Ukraine were conducted at shelters and social service centers for women and children. One-on-one interviews were conducted in Ukrainian or Russian language, depending on the participants' preference. These interviews lasted between 15 and 77 min.

A semi-structured interview guide was used during the interview. The interview topic domains can be found in Table 1. The interview guide was not pilot-tested but was reviewed by two study team members, both Ukrainian mothers, one of whom is also a refugee in Poland.

The interviewers collected socio-demographic data at the end of each IDI. All IDIs were audio-recorded, and study team

TABLE 1 Topic domains discussed in the interviews with mothers.

- Information on children
 - Number of children
 - Youngest child's age
 - Youngest child's birth country
- Experience with the pregnancy of youngest child and that child's health information
- Feeding practices of the youngest child
 - Feeding plans before birth and whether those plans changed after the child was born
 - Feeding practices of youngest child right after birth
 - Feeding practices of youngest child before war started
 - Influence of war on feeding practices of youngest child
 - Changes of plan to youngest child's diet
- Support
 - Support in feeding youngest child in Ukraine and Poland
 - Suggestions for improvement to support infant feeding and the wellbeing of families during conflict

members transcribed the audio recordings or wrote expanded notes immediately after each IDI in the language that the interviews were conducted. All transcripts and expanded notes were then translated into English by professional Ukrainian translators in Poland and Ukraine. Interviewers reviewed the translated transcripts and expanded notes to ensure translation accuracy. We did not return the transcripts to participants for comments or corrections.

2.3 Data analysis

Qualitative thematic analysis was conducted using a two-step rapid analysis process (21). This two-step rapid analysis approach limits in-depth analysis as compared to traditional thematic analysis, but the approach is still methodologically rigorous (22). In step one, a structured template was developed for each of the two participant types (i.e., refugees in Poland and participants in Ukraine) using Microsoft Excel. In this template, each column corresponds to a topic domain from the IDI guide (Table 1), with a row for each transcript or expanded notes. Three analysts (including AI and CMW) populated the template by reviewing the transcripts/expanded notes one by one to summarize the responses for each topic domain. This allowed responses from different parts of the transcript to be collated under a topic domain. Relevant illustrative quotes were extracted and added to the same cell as the summarized response.

In step two, the same three analysts were assigned different topic domains to review. For each topic domain, analysts reviewed the template entries for that domain and developed summary reports to reduce and interpret the data by participant type (i.e., refugees in Poland and participants in Ukraine) and by whether their youngest child was born before or after the war started in Ukraine. These summary reports described themes and sub-themes and included illustrative quotes. Socio-demographic data were analyzed descriptively by participant type.

While conducting data analysis, we made sure that data saturation had been reached and that there was no need to conduct additional interviews. The participants did not have access to the study findings for their review and feedback. We used the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist to report on the study results (23).

2.4 Ethics approval

Ethical approval was obtained from the Bioethics Committee at Warsaw Medical University (AKB/239/2022). This activity also received a non-research determination by FHI 360's Office of International Research Ethics (IRBNet ID: 1952841-1).

3 Results

3.1 Socio-demographic characteristics

Of the 75 interviews conducted with Ukrainian mothers, 30 were with refugees in Poland and 45 with participants in Ukraine. Refugees in Poland were primarily located in Krakow and Wroclaw,

while participants in Ukraine were from oblasts covered all regions of Ukraine—West, Center, South and East.

Socio-demographic characteristics of mothers are presented in Table 2. The median age for the two participant groups was similar. Refugee mothers had a median of two children, while participants in Ukraine had a median of one child. Most mothers, both refugees and participants in Ukraine (73 and 84%, respectively), had university-level education. About half of the youngest children of refugees and participants in Ukraine were less than 6 months old, while the other half were between 6 and 11.9-months old. Among refugees, under half (43%) of their youngest children were born in Ukraine before the war, while the rest were born after the war, mostly in Poland. Of the participants in Ukraine, half (53%) gave birth to their youngest child in Ukraine before the war, while the other half were born in Ukraine after the war started.

3.2 Feeding practices at birth before the war started

About half of the infants born in Ukraine before the war were exclusively breastfed in the hospital after their birth, while about a quarter were given only commercial milk formula (CMF), and the remaining quarter were fed with a mix of breastmilk and CMF. Participants were asked if they received breastfeeding support right after birth from staff at the health facility where their youngest child was born. Just under a quarter of the participants who gave birth before the war said that they had received breastfeeding support. Mothers who were breastfeeding their infants said that they felt encouraged and motivated by healthcare workers who supported them, as this participant describes:

In the ward, I was supported by the medical staff regarding breastfeeding, encouraged and praised that I was giving my baby expressed milk, because it is very good for the baby (Participant in Ukraine, the child was born in Ukraine before the war).

3.3 Feeding practices at birth after the war started—For infants born in Ukraine

For infants born in Ukraine after the war started, CMF use in hospitals after birth was much more common than before the war, and we assume that it may have replaced partial breastfeeding. Just under half were exclusively breastfed, just under half were given CMF only, and a small number of others were fed a mix of breastmilk and CMF right after birth. Some mothers in Ukraine who wanted to breastfeed faced opposition from healthcare workers who urged mothers to feed with CMF, saying it would be easier because of the war, as described by two participants in Ukraine:

Immediately after birth, they [health care workers] put my child on my chest; we were together even during the air alarm. However, when they went out to the corridor during the air raid, the nurses recommended that all mothers feed CMF to

their infants because of the war. Most mothers agreed and gave CMF brought by the medical staff. However, I did not give CMF to my baby. In order not to argue with medical staff, I just agreed [to feed with CMF] and even bought a pack of CMF and a bottle and simulated feeding with the CMF. I bought CMF and the bottle at my own expense. During a routine check-up at the district pediatrician at the age of 1 month, also during the appointment, the pediatrician recommended giving CMF repeating the same mantra “war—stress—milk may disappear” (Participant in Ukraine, child was born in Ukraine after the war started).

When I gave birth, they [health care workers] fed CMF to the baby in the delivery room. I insisted on breastfeeding my child, but they [health care workers] latched the baby on my breast for 30 s when I asked and then took the baby away after that. My child screamed, and the doctors put pressure on me saying that my breasts were “dry” and the baby needed CMF. I tried to latch the baby by myself, but my breasts hurt a lot during latching. I asked the medical staff to help, but they said, “Don’t fool yourself; there’s nothing in your breasts; don’t torture the child” (Participant in Ukraine, child was born in Ukraine after the war started).

Despite these healthcare workers’ opposition to breastfeeding, there were still a small number of participants in Ukraine who said that they did receive breastfeeding support right after birth from staff at the health facility. As this participant explains:

At the hospital, I started breastfeeding. The nurse immediately came, checked the correctness of the latching. Then after a few days, mastitis began, the midwife came and pumped, it was moderately painful (Participant in Ukraine, child was born in Ukraine after the war started).

3.4 Feeding practices at birth after the war started—For infants born in Poland

For infants born in Poland after the war started, about half of the infants were given only breastmilk, about a quarter were given only CMF, and the remaining quarter were fed with a mix of breastmilk and CMF. This is similar to feeding practices in Ukraine before the war started. Some mothers who gave birth in Poland felt pressure from healthcare workers to give CMF to their newborn infants. A refugee who used to be a healthcare worker in Ukraine before the war said that she had to refuse the offer of the Polish healthcare workers to give CMF to her infant:

Yes, immediately in the delivery room, my child was put to the breast. For the first two or three days, I had colostrum, it was yellow, the infant had enough of it. True, the medical staff offered to feed the infant with CMF, but I refused. I understood that I had to wait a little and my milk would arrive (Refugee, child was born in Poland after the war started).

A few refugees who gave birth in Poland mentioned that they did receive some breastfeeding support right after birth from healthcare workers, as this refugee explained:

About 4 h after giving birth, a consultant came to me. . . She [health care worker] came with a syringe, collected the colostrum, and took it to the child in the intensive care unit. The consultant told me that I had to do the same thing every 3 h: collect the colostrum with a syringe and take it to the intensive care unit, the whole time I stayed in the hospital. Then, when I was discharged, I had to bring [to the hospital] breastmilk once a day. I did so (Refugee, child was born in Poland after the war started).

Refugees who gave birth in Poland had additional challenges with language barriers when trying to get breastfeeding support. One refugee participant recounted her experience stating that if

TABLE 2 Socio-demographic characteristics of mothers (n = 75).

	Refugees (Poland) N = 30	Participants in Ukraine N = 45
Mothers’ median age (range)	33.5 years (18–40 years)	31 years (18–40 years)
Median number of children (range)	2 (1–3)	1 (1–9)
Mother’s highest education		
Secondary/technical	8 (26.67%)	6 (13.33%)
Higher education/university	22 (73.33%)	38 (84.44%)
Age of youngest child at time of interview		
<6 months old	16 (53.33%)	20 (44.44%)
6–11.9 months old	14 (46.67%)	25 (55.56%)
When and where youngest child was born		
Before the war (in Ukraine)	13 (43.33%)	24 (53.33%)
After the war		
In Ukraine	2 (6.67%)	21 (46.67%)
In Poland	15 (50%)	

she had given birth in Ukraine, she would not have experienced language barriers and added stress when she encountered breastfeeding challenges:

They [health care workers] gave me my child and said, “take it,” but I was afraid to take it, because I was afraid to harm it. I don’t know how to put him to my breast. . . I understood that he had to be fed, but I just couldn’t handle it physically and mentally. If I were in Ukraine, within my native walls, there would be no such stress. There would be no language barrier, there would be no stress. Even if for some reason I would also have had a caesarean section, psychologically this moment would have been easier to live (Refugee, child was born in Poland after the war started).

Getting help in the same language was also important for a refugee who recounted her experience at the maternity hospital after she gave birth where there was a lactation counselor and a Ukrainian-speaking psychologist:

There was a lactation specialist in the ward, who came every day and looked at the breasts. She asked if there were any problems, if I was feeding, if I had milk. There was also a Ukrainian-speaking psychologist, and you could talk in Ukrainian, it was very nice (Refugee, child was born in Poland after the war started).

3.5 CMF was provided free at birth

Participants were asked if CMF provided by the health facility at birth was given for free. Most of the refugees in Poland and all participants in Ukraine who were giving CMF to their child said that they received it for free from the health facility. Mothers were asked to share the reasons given by the health facility for giving free CMF. Refugees and participants in Ukraine recalled that the main reason was that it was hospital practice to offer free CMF. Other reasons that refugees in Poland mentioned were that they were given free CMF as their child was experiencing a medical condition and could not be breastfed, the infant was born prematurely, or the mother had undergone a caesarean section delivery. Participants in Ukraine gave different reasons such as believing to have breast conditions that were contraindications to breastfeeding (e.g., inverted nipple even when this for example is not a real contraindication) or that the infant was not gaining weight or that the infant was hungry and crying.

3.6 Feeding practices around the time of the interview

Participants were asked what they fed their children in the 24 h before the interview. Among refugees and participants with children under 6 months old, about one-third said that they were giving only breastmilk, while another one-third said that they were giving a combination of breastmilk and CMF (Table 3). Others

said their infants were fully CMF fed or were given complementary foods in the previous 24 h (early introduction of complementary feeding). Most infants between 6 and 11.9 months for both refugees and those in Ukraine were fed complementary foods together with either breastmilk or CMF.

3.7 Changes to infant feeding because of the war

Participants who were pregnant before the war and gave birth after the war started were asked how they planned to feed their child and if those plans changed because of the war. Most refugees and participants in Ukraine said that they had planned before the war to exclusively breastfeed their child as they understood the importance of breastmilk. However, after the war started and after the infant was born, many refugees and participants in Ukraine said that they had changed their feeding plans. The majority of those who said that their plans changed decided to supplement breastmilk with CMF, with a small number saying that they switched completely to CMF.

A participant in Ukraine shared the feelings of guilt she was still experiencing because she was not able to breastfeed as planned due to the war:

Yes, the war affected the feedings because I had planned to exclusively breastfeed. However, at the hospital, I fed CMF to my child. The reason for that was that I gave birth during the shelling/bombing and then became confused and could not find the strength to resist the pressure of the medical staff, to refuse to give CMF. I still feel guilty [participant starts crying] because of that, that I was not able to protect my infant from unjustified CMF feeding, and this pain has not subsided. My husband and relatives do not understand why I am being so hard on myself because of this; they do not understand what is going on. But I believe that I did not protect my child (Participant in Ukraine, child was born in Ukraine after the war started).

We also asked all participants directly whether the war affected or influenced the way they fed their child. Most of the refugees and participants in Ukraine said that the war did affect the way they are feeding their children. Most commonly reported was the perceived reduction in breastmilk supply because of stress, worry, and anxiety due to the war:

And then the hostilities became more active close to our place. Shelling and explosions came every 5 or 10 min. My mental health got worse. I was constantly nervous. That is why my milk supply dropped. Certainly, the war did affect the situation. My breastmilk production was not sufficient to feed the child (Participant in Ukraine, child was born after the war started in Ukraine).

For some participants in Ukraine, the war also influenced the early introduction of complementary foods early (Table 3) as this participant in Ukraine shared:

TABLE 3 Types of foods participants fed their infants 24 h before the interview by age and participant group (n = 72).

Age/participant group	Breast milk only	Breast milk and foods	CMF only	CMF and foods	Breast milk and CMF	Foods only	Total
Infants under 6 months old							
Refugees	5	1	2	0	5	2	15
Participants in Ukraine	6	5	0	1	4	1	17
Infants 6–11.9 months old							
Refugees	0	6	0	5	2	1	14
Participants in Ukraine	1	8	0	15	1	1	26

There were no responses from 3 participants.

It [war] partially affected because I introduced solid food earlier than planned, because I was very afraid that later there would be no breastmilk due to stress and the child would not have anything to eat, so at least he would have time to get used to “adult food.” I was in fear that the breastmilk would disappear and that it would be impossible to purchase CMF anywhere (Participant in Ukraine, child was born in Ukraine before the war).

Many said that because of the war, it was hard to find or buy food that was appropriate for their infants. Others, especially those in Ukraine, said that the war affected the availability of CMF and made it difficult to find the brand that they had been using. They also said CMF was expensive, and it was difficult to find bottles and safe water to mix the CMF with:

Clearly, the war had an impact. You constantly watch the news; you are afraid that the milk will disappear. I am worried about whether I will be able to buy CMF. CMF is expensive. I constantly think about whether I will have enough to feed my child (Refugee, child was born in Poland after the war started).

I was in fear that the breastmilk would disappear and that it would be impossible to purchase CMF anywhere (Participant in Ukraine, child was born in Ukraine before the war).

3.8 Infant feeding support received in Ukraine during the war

Participants were asked if they had received support with their child's nutrition after the war started and if so, what type of support they received or accessed. Among participants in Ukraine, most said that they had received support. Half of the participants in Ukraine said that they received CMF from volunteers and charitable organizations. These donations were given even if mothers did not need the CMF as this participant in Ukraine explains:

Humanitarian aid provided CMF. I refused to take it, but they said that I had to take it (Participant in Ukraine, child was born in Ukraine after the war started).

Although many mothers appreciated getting CMF, one mother expressed that giving out so many cans of CMF jeopardizes breastfeeding:

Also, I observed that a lot of CMF are given out by charitable foundations. I saw other mothers take CMF and believe that this is not good; this threatens the concept of breastfeeding (Participant in Ukraine, child was born in Ukraine before the war).

Another participant said that her mother took the CMF that was given out by humanitarian aid in case she is not there to breastfeed:

In humanitarian aid, they gave CMF. My mother [participant's mother] also took them. My mother takes care of the CMF, because she has taken the position that if something happens to me, then in emergency cases, the child can be fed [with CMF] by relatives (Participant in Ukraine, child was born in Ukraine after the war started).

Half of the participants in Ukraine also said that they received help from family members who provided support for breastfeeding, cooking, feeding, and bottle-feeding the infant. A participant in Ukraine said that her husband, mother, and mother-in-law supported her to breastfeed and helped with feeding her child with breastmilk she had previously expressed:

I was supported by relatives—my husband, his mother, and my mother. They all advised me to breastfeed the child and gave other tips. This is how they supported me. When I had to go out to register the child, issue a birth certificate, etc.... I pumped milk, and my mother fed the child with a bottle (Participant in Ukraine, child was born in Ukraine before the war).

One-fourth of participants said that they received breastfeeding/nutrition information from the maternity hospital where they gave birth and from pediatricians and other healthcare workers. Others said that they received financial aid from the government to buy food; food from volunteers, charitable organizations, and friends; and psychological and mental health support from friends and organizations. A participant in Ukraine said that receiving counseling from a psychologist really helped

her especially with postpartum depression and building better relationships with her children:

Now the crisis team and psychologist continue supporting my family—with advice, information, and psychological services. I have 1-h individual counseling with a psychologist twice a week. It helps me to cope with postpartum depression and build better relationships with children. I feel better after counseling with a psychologist (Participant in Ukraine, child was born in Ukraine before the war).

A few participants in Ukraine also said that they received breastfeeding counseling from a lactation counselor and nutrition information from the internet, social media, posters, and leaflets.

3.9 Infant feeding support received by refugees in Poland during the war

Among refugees, two-thirds said that they received support with their child's nutrition after the war started. Of these refugees, one-third said that they received information on breastfeeding and nutrition at the maternity hospital and from pediatricians and other healthcare workers. A refugee explained that she went for lectures on breastfeeding and breastfeeding information she had received from informational booklets:

Yes, I have received a package for an infant where all the necessary information was some booklets about the breastfeeding, where you could find out important information, and also went to courses in Poland. I got to one of the lectures where there was just breastfeeding and childcare. Although I had experience with the first child, at this lecture it turned out that I even did something wrong with the first child while breastfeeding was new for me. In Ukraine, they didn't tell me that—they didn't tell me how to feed. I didn't know how to do that. My breasts were just full of milk, they told me to express breastmilk, and at this lecture, I was told that it is necessary to give one breast and the other breast to the child to feed. I didn't know that; I always gave one and for the second feeding to another one, that's how it was (Refugee, child was born in Poland after the war started).

A small number of refugees also received family support for cooking and feeding their infants, nutrition information, counseling by lactation counselors' breastmilk from the milk bank, and psychological and mental health support from friends and organizations. A few refugees also said they received CMF donations.

3.10 Suggestions from participants on infant feeding support that is needed

When mothers were asked what they needed to help them feed their child during the war, breastfeeding information and support were the most frequently reported for both refugees and participants in Ukraine. Mothers said that breastfeeding

information and support can be provided through lectures, courses, consultations (either face-to-face or online), social media, and hotlines. Specifically, they said that pregnant women and mothers of newborn infants need information and support specific to issues surrounding early initiation of breastfeeding, the importance of breastfeeding, when breastmilk comes in after giving birth, how to breastfeed, special diets for breastfeeding mothers, and how to overcome breastfeeding challenges such as how to increase breastmilk supply when the mother is stressed. Mothers also said that healthcare workers in maternity hospitals in Ukraine should be trained on the importance of breastfeeding and how to provide breastfeeding support to mothers. In addition, participants said that it was necessary to have lactation consultants in maternity ward in Ukraine to provide breastfeeding support to mothers who have just given birth and to address problems they face when starting out to breastfeed, as this participant in Ukraine reported:

It'd be great to have at least one consultant, probably at the maternity hospital, to help me find the right positioning for breastfeeding. For people to be able to come and get help if they need it. Many give up on breastfeeding because they can't find the right positioning. They can't do it, so they decide their milk supply is insufficient. Studies have shown that there are few women who are unable to nurse a child for medical reasons. It's mostly because they failed to find the right positioning, the infant couldn't latch on their breasts. . . I mean, I'd like Ukraine to implement a government program, allocate the budget, and give a salary to this person who could help in the maternity hospital (Participant in Ukraine, child was born in Ukraine before the war).

For those in Poland, women said they needed breastfeeding support, especially just after birth, in Ukrainian or Russian language, as this refugee mother explained:

If we are talking about the topic of breastfeeding, it is support for pregnant women or those who have already given birth so that this process is established immediately and correctly. If the hospital declares that it provides support to people from Ukraine who fled the war, then it would be very good if there was a person in the hospital who could help with the issues of breastfeeding. When I was lying in the ward, a Polish midwife came to the Polish woman and helped her with the infant, and I heard it. I felt sad because no one came to me. I did not have time and did not know where to find a Ukrainian- or Russian-speaking specialist who could help me in a familiar language. And I was very sad that no one could help (Refugee, child was born in Poland after the war started).

Refugees and participants in Ukraine said that they believed that providing CMF was needed in some circumstances as some mothers do not have enough breastmilk supply and that CMF is expensive. Women also said that they needed support in the form of complementary food for their children, such as porridge, puree, fresh fruits, and readymade meals for infants over 6 months.

Many participants in Ukraine and some refugees reported a need for psychological support. Participants said that because of

the war, both mothers and their children were feeling anxious and trying to cope with the new realities of war. They felt emotionally unstable, were afraid of the explosions and shelling (for those in Ukraine), and needed psychological support, as this participant illustrated:

We encountered a lot of people, we really want to help everyone, to say at least a kind word. But people are so closed in themselves that they don't even want to listen to anything. All this requires time and some kind of support. Perhaps people want support from their loved ones, but they are not there, or they are far away. And there should probably be a special approach from a stranger because human injuries are very complex. I can't even find the words to express what they need. Maybe just sit, hug, and not even say anything. I think they need such help. They definitely need psychologists, that's 100% (Refugee, child was born in Poland after the war started).

Only participants in Ukraine reported needing feeding support, specifically information on complementary feeding and what they should be feeding their child. They also wanted a platform for mothers who could not breastfeed to contact breastfeeding mothers who are willing to breastfeed the infants of other women (wet nurses). They also said that husbands and grandmothers should be given information on breastfeeding so that they can effectively support breastfeeding mothers. A couple of mothers also spoke about the need to improve access to high quality complementary food and fresh vegetables for their children. Providing shelters in each neighborhood suitable for families with infants was also a need that some participants in Ukraine mentioned. They wanted a shelter where people can stay during an air raid alarm, with a comfortable space for mothers to breastfeed and prepare their children's food, as this participant in Ukraine reports:

It would be nice if there were bomb shelters equipped so that women with children could go down there without worrying whether they'd be able to feed them there. A place for feeding and changing clothes, with napkins, diapers, and CMF, so that moms could mix their infant's CMF, feed the infant, wipe it, change its diapers, something like that. I had to cover myself and feed the infant in front of everyone because there was nowhere to go. There is one room for everyone (Participant in Ukraine, child was born in Ukraine after the war started).

Refugees in Poland also recommended creating a center for assistance for people in emergency situations in Poland, specifically to assist pregnant women, mothers, and women who are there without their male partners and relatives. This center would provide information on where people can go for help, including where to go see a doctor, and should be staffed by Ukrainian and/or Russian speakers:

It would be good if these mothers were provided with informational assistance, help from psychologists, and advice on what to do with their children. For example, I don't know where to call if my child has a fever. I can't explain what I need at the

pharmacy. . . In this way, it is difficult (Refugee, child was born in Poland after the war).

4 Discussion

This qualitative study with 75 Ukrainian women during the first year of the conflict is one of very few documentations of how the war in Ukraine has affected new mothers' experiences of feeding their infants. It provides insights into the type and extent of support that is offered to participants in the Ukrainian war zone and in Poland. In addition, it captured insights on additional assistance mothers believe are needed for women to be able to feed their infants as recommended. Their experience highlights that the humanitarian response has fallen short of meeting the known and urgent needs of infants and their mothers at a time of extreme vulnerability. Their experiences also show that humanitarian agencies have not been well prepared to apply learning's from previous emergencies, including modifying humanitarian responses from conflicts in low- or middle-income countries for high-income country settings.

The significance of our study lies in the fact that is the only study so far that has highlighted the IYCF needs of women and their infants affected by the Ukraine war. The study provides information that the donor community and the humanitarian agencies can use to inform how they are supporting the emergency in Ukraine and in similar contexts. The study highlights the following key findings.

First, many of the women interviewed confirmed that their infant feeding practices were disrupted by the conflict, and that fear, anxiety, and stress were among the main causes. Many mothers believed that stress from the war would affect their milk supply. This is in line with recent evidence that suggests how perceived insufficient milk supply is the most common problem in breastfeeding and is the main reason for women to stop breastfeeding early (24, 25). While stress does not reduce milk production, it can result in a slowing of the let-down and flow of milk (26), meaning that infants may take longer to feed, want to feed more frequently, and are fussier when feeding. This together with behavior changes common in emergencies such as wanting to be held more and waking more overnight is often behind women's concerns about their milk supply (27). This reaffirms the importance of providing breastfeeding counseling and support so that women can understand their infant's behavior changes, regain confidence in their ability to breastfeed and continue breastfeeding (25, 28, 29).

Second, many of the pregnant women who gave birth after the war started and had planned before the war to exclusively breastfeed reported they had to change their plans. Instead of breastfeeding exclusively, they were now supplementing breastmilk with CMF. Some women never initiated breastfeeding, even though they had planned to breastfeed before the war. Participants attributed this in part to the lack of breastfeeding support from the health professionals in birth clinics. For the respondents in Poland, language was an additional barrier to effective breastfeeding support in birth clinics, highlighting the additional challenges that refugee women face in accessing lactation support and benefiting

from it when available. These findings are in line with previously published evidence where access to skilled and knowledgeable health professionals has been lacking in emergencies and other contexts, and the lack of support for establishing breastfeeding created greater vulnerability among this already highly traumatized group (30–34).

Third, some participants (in Poland and Ukraine) had concerns about their ability to continue purchasing CMF due to increasing costs and the difficulty of preparing it in a safe way. At the same time, widespread and sometimes unnecessary donations of CMF were cited as the principal infant feeding support received by many of the women living in Ukraine, including some breastfeeding mothers who said that they were forced to receive it. This is in contrast to what was reported by women in Poland where offer of CMF was unusual. This difference may be in part due to very high number of local and international humanitarian agencies providing aid in Ukraine directly to the populations affected by the active conflict, in contrast to the situation in Poland where aid was delivered via the government in selected locations only. While this study was not designed to document the health impact of CMF donations in disaster-affected populations, other studies have, for example, the uncontrolled distribution of CMF in 2006 after the Yogyakarta earthquake, resulted in a documented subsequent increases in diarrhea cases in a population that previously had high breastfeeding prevalence (35).

Indiscriminate donations were also noted in the 2015 European Refugee Crisis, where more than one million migrants and refugees who arrived in Europe received commercial complementary foods and other processed foods. Overall, mothers were dissatisfied with their infant feeding outcomes (36).

Fourth, only one-third of the mothers said that they received any information on infant feeding, and very few mothers received lactation support. Their experience shows that IYCF support provided by the various humanitarian actors and organizations during the current emergency is generally not in line with the standards of the OG-IFE (7). It highlights the need for agencies and organizations to adapt and improve their responses to new situations. In high-middle-income countries, it is important to ensure that the IYCF-E response includes, among others, lactation counseling services accessible across various contact points with mothers and their children, where suitable access to human milk banks in line with the OG-IFE recommendations (7) and a package of services for infants dependent on infant formula in line with the OG-IFE recommendations (7), provision of suitable complementary foods and/or resources (cash or voucher support) to access suitable complementary foods, safe spaces for safe breastfeeding and infant formula feeding preparation and feeding among others.

Fifth, many of the participants asked for breastfeeding counseling support, more information, and guidance on complementary feeding, as well as properly equipped and comfortable shelters to be able to feed their infants comfortably. This reinforces the findings of a 2014 review by Action Contre la Faim (ACF) which identified the importance of “infant-friendly spaces” in emergency evacuation centers (37). “Infant-friendly spaces” were shown to facilitate a comprehensive approach to supporting pregnant and lactating women and young children in emergencies. They also served to prevent or reduce the negative effects of unsolicited and unmonitored distributions of breastmilk

substitutes, as well as provide appropriate and sustainable solutions for non-breastfed infants.

Sixth, many participants in Ukraine and Poland talked about the need for psychological support as they were feeling anxious and stressed in dealing with the realities of the war. This finding is in line with other studies that suggest that conflict-affected populations suffer from psychological distress that directly impacts their ability to care for others, including infants and young children, hence the need for support and counseling (38, 39). Our study illustrates the challenges associated with the IYCF experiences of the women interviewed and how the initial IYCF-E response at the time of the study did not meet the needs of the beneficiaries. The findings are aligned with those of a recent review analyzing the challenges emergency responders still face in implementing IYCF-E programs and the barriers mothers face in breastfeeding or providing breastmilk in disasters, particularly in middle- and high-income countries (40, 41).

Several studies highlighted how maternal psychological distress affects women breastfeeding practices and outcomes (42–45) highlighting the importance of ensuring women affected by a conflict have access to qualified breastfeeding and psychosocial support as key to overcome their fears and concerns during conflicts and other emergencies.

At the same time evidence shows that breastfeeding support can help women to relactate especially when the infant is younger, the gap from when breastfeeding stopped and the woman wants to resume it is short, and the mother is strongly motivated to relactate (46). However, the success of relactation support can be challenged by the acute nature of the emergency and where prevalence of breastfeeding in a country is very low (46).

Various studies have shown that often the emergency response is hampered by indiscriminate donations of CMF, women do not receive adequate support, and are not provided with safe spaces to breastfeed their infants. In studies that reviewed emergencies (35, 36, 40), infant feeding support services, when available, did not meet the global standards or recommendations (40, 41).

Our findings are subject to several limitations. First, most interviews were conducted by phone or on web-based platforms, while some were conducted face-to-face. This lack of consistency in interviewing modalities might have introduced bias such as lack of visual cues in interviews conducted by phone or on web-based platform, or that participants could have felt more comfortable and relaxed by one interview method vs. the other (47, 48). Second, although we tried to recruit as diverse a sample as possible within Ukraine and Poland, our sample was heavily skewed toward highly educated urban mothers. Evidence from low- and middle-income countries has shown that women with no educational attainments have a high level of breastfeeding practices compared with other women with any category of education (49). At the same time, the use of CMF is generally higher among women with higher education levels across in these contexts (49). In Ukraine, however, mothers' higher education seems to have positive rather than negative effects on breastfeeding practices. A previous IYCF study among those displaced during the conflict in 2015 (15) reported that mothers' completed higher education was associated with significantly increased the odds of ever breastfeeding and decreased the odds of bottle feeding. Third, we chose to use a two-step rapid analysis approach using a structured template with Microsoft Excel as it takes less time than traditional thematic

analysis (21). Although this rapid analysis approach may not provide a deeper understanding compared to traditional thematic analysis, studies have shown that the rapid analysis approach is still methodologically rigorous (22). Fourth, we found that some interviews were shorter than others. The shorter interviews were conducted by one specific interviewer who did not ask study participants for clarification or elaboration, resulting in less detailed, poorer data quality for those interviews.

The IYCF-E response interventions and resources serving women and their babies affected by the war in Ukraine at the time of the study largely failed to achieve its basic objectives. At the same time, no IYCF-E interventions and investments were mentioned or documented in Poland at the time of the study. This is despite (i) globally endorsed guidance on how to provide IYCF-E support, (ii) World Health Assembly resolutions stating that proper planning must be in place to provide support, (iii) experience from past emergencies in Ukraine showing that support is needed (15), and (iv) an emergency response with a plethora of resources and involving neighboring European middle- and high-income countries. This study suggests that more implementation research is needed to understand and identify why empirical evidence highlights this recurrent gap in emergency responses.

These findings provide evidence of the need for the global community, including donors, governments, UN agencies, and international and national agencies, to rapidly address the situation by ensuring that mothers and their infants affected by an emergency such as that in Ukraine receive comprehensive, appropriate, and timely IYCF support with an IYCF-E response plan that is context specific and responds to the infant feeding challenges of the Ukrainian women. The study demonstrates the urgent need to scale up the IYCF-E response to reach all women and their infants to meet their nutritional needs. For example, there is a need to engage and invest in local networks of lactation counselors, national organizations, and health professional organizations across Ukraine to increase the reach and coverage of IYCF services and especially strengthen lactation support in birth clinics and hospitals. Regular assessments of IYCF practices and needs of women and their infants affected by the conflict through both quantitative and qualitative research methods are needed to monitor effectiveness of these efforts. Finally, further investigations including larger representative quantitative studies would be useful where it is safe and there is access, to estimate the prevalence of key IYCF-E indicators and practices to establish the quantitative baseline from which success or failure can be measured.

5 Conclusion

In all settings, emergencies shift infants and young children and their caregivers into a “high risk” category by increasing the risk that breastfeeding will be reduced or ceased and that there will be limited or no access to a timely, safe, affordable, and appropriate diet for the child. Planning and preparing for IYCF-E support is essential for all country settings, and needs integration into mainstream responses everywhere, yet as shown above, this is deficient in the Ukraine response. While promoting and supporting breastfeeding and complementary feeding practices, it is crucial that CMF supplies are provided judiciously, and their distribution carefully coordinated and targeted to those with specific needs.

In Ukraine there is an immediate need to ensure that hospitals practice the WHO/UNICEF Baby-Friendly Ten Steps for Successful Breastfeeding and that lactation consultants are deployed to support women and their infants in health facilities, communities, and collective centers. At the same time, indiscriminate CMF donations and pressures on the mother not to breastfeed should not be tolerated. All government and non-government agencies working in Ukraine are encouraged to make IYCF materials on breastfeeding and complementary feeding widely available to women and families and help them access the lactation consultant hotline. It is essential to make locally accepted complementary foods (and CMF when needed) accessible and affordable during the war and displacement. For refugees, it is crucial that interpretation services are available at the hospitals and other relevant health facilities to remove language barriers related to essential health and nutrition services and support.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

AI, TS, and MO'B contributed to the concept and the design of the study. OB contributed to structuring the manuscript and reviewed all the sections of the manuscript. AI and CW performed the data processing, analysis, and drafted all the sections of the manuscript. JS, MV, KG, BW, and AW reviewed all the sections of the manuscript. BW and AW contributed to the design of the study tools. All authors contributed to manuscript review and approved the final version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

- Victora CG, Bahl R, Barros AJ, França GV, Horton S, Krasevec J, et al. Breastfeeding in the 21st century: Epidemiology, mechanisms, and lifelong effect. *Lancet*. (2016) 387:475–90. doi: 10.1016/S0140-6736(15)01024-7
- Horta BL, Loret de Mola C, Victora CG. Long-term consequences of breastfeeding on cholesterol, obesity, systolic blood pressure and type 2 diabetes: A systematic review and meta-analysis. *Acta Paediatr*. (2015) 104:30–7. doi: 10.1111/apa.13133
- Jones G, Steketee RW, Black RE, Bhutta ZA, Morris SS. How many child deaths can we prevent this year? *Lancet*. (2003) 362:65–71. doi: 10.1016/S0140-6736(03)13811-1
- Rollins NC, Bhandari N, Hajeebhoy N, Horton S, Lutter CK, Martines JC, et al. Why invest, and what it will take to improve breastfeeding practices? *Lancet*. (2016) 387:491–504. doi: 10.1016/S0140-6736(15)01044-2
- Horta BL, Bahl R, Martines JC, Victora CG. *Evidence on the long-term effects of breastfeeding: Systematic reviews and meta-analyses*. Geneva: World Health Organization (2007).
- WHO. *Global nutrition policy review 2016-2017: Country progress in creating enabling policy environments for promoting healthy diets and nutrition*. Geneva: World Health Organization (2018).
- IFE Core Group. *Operational guidance on infant feeding in emergencies (OG-IFE) version 3.0*. Washington, DC: IFE Core Group (2017).
- WHO. *Guiding principles for feeding infants and young children during emergencies*. Geneva: WHO (2014).
- World Health Assembly. World health assembly resolution 63.23. *Proceedings of the sixty-third world health assembly*. Geneva: (2010).
- World Health Assembly. World health assembly resolution 71.9. *Proceedings of the seventy-first world health assembly*. Geneva: (2018). doi: 10.1097/01.HJ.0000530642.01935.6f
- Sphere Association. *The sphere handbook: Humanitarian charter and minimum standards in humanitarian response*. 4th ed. Geneva: Sphere Association (2018).
- Ayoya MA, Golden K, Ngnie-Teta I, Moreaux MD, Mamadoultabou A, Koo L, et al. Protecting and improving breastfeeding practices during a major emergency: Lessons learnt from the baby tents in Haiti. *Bull World Health Organ*. (2013) 91:612–7. doi: 10.2471/BLT.12.113936
- Hargest-Slade AC, Gribble KD. Shaken but not broken: Supporting breastfeeding women after the 2011 Christchurch New Zealand earthquake. Breastfeeding review: Professional publication of the nursing mothers'. *Assoc Aust*. (2015) 23:7–13.
- Sulaiman Z, Mohamad N, Ismail TA, Johari N, Hussain NH. Infant feeding concerns in times of natural disaster: Lessons learned from the 2014 flood in Kelantan, Malaysia. *Asia Pac J Clin Nutr*. (2016) 25:625–30. doi: 10.6133/apjcn.092015.08
- Summers A, Bilukha OO. Suboptimal infant and young child feeding practices among internally displaced persons during conflict in eastern Ukraine. *Public Health Nutr*. (2018) 21:917–26. doi: 10.1017/S1368980017003421
- Infant and Young Child Feeding in Emergencies. The emergency in Ukraine, the war: Focus on breastfeeding. *Proceedings of the IYCF-E international conference; 2022 October 22*. Rome: (2022).
- UNICEF. *Ukraine humanitarian situation report No. 26*. New York, NY: UNICEF (2023).
- UN Women. *Global gendered impacts of the Ukraine crisis on energy access and food security and nutrition*. New York, NY: UN Women (2022).
- Rodríguez-Muñoz ME, Chrzan-Dętkoś M, Uka A, García-López HS, Krupelnyska L, Morozova-Larina O, et al. The impact of the war in Ukraine on the perinatal period: Perinatal mental health for refugee women (pmh-rw) protocol. *Front Psychol*. (2023) 14:1152478. doi: 10.3389/fpsyg.2023.1152478
- Guest G, Bunce A, Johnson L. How many interviews are enough?: An experiment with data saturation and variability. *Field Methods*. (2006) 18:59–82. doi: 10.1177/1525822X05279903
- Gale RC, Wu J, Erhardt T, Bounthavong M, Reardon CM, Damschroder LJ, et al. Comparison of rapid vs in-depth qualitative analytic methods from a process evaluation of academic detailing in the veterans health administration. *Implement Sci*. (2019) 14:11. doi: 10.1186/s13012-019-0853-y
- Taylor B, Henshall C, Kenyon S, Litchfield I, Greenfield S. Can rapid approaches to qualitative analysis deliver timely, valid findings to clinical leaders? A mixed methods study comparing rapid and thematic analysis. *BMJ Open*. (2018) 8:e019993. doi: 10.1136/bmjopen-2017-019993
- Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *Int J Quality Health Care*. (2007) 19:349–57. doi: 10.1093/intqhc/mzm042
- Huang Y, Liu Y, Yu XY, Zeng TY. The rates and factors of perceived insufficient milk supply: A systematic review. *Matern Child Nutr*. (2022) 18:e13255. doi: 10.1111/mcn.13255
- Gatti L. Maternal perceptions of insufficient milk supply in breastfeeding. *J Nurs Scholarsh*. (2008) 40:355–63. doi: 10.1111/j.1547-5069.2008.00234.x
- Ueda T, Yokoyama Y, Irahara M, Aono T. Influence of psychological stress on suckling-induced pulsatile oxytocin release. *Obstet Gynecol*. (1994) 84:259–62.
- Gribble K, Hamrosi M, Tawla S. *Want to help the children? Help the parents': Challenges and solutions from the babies and young children in the black summer (BiBS) study*. Sydney, NSW: Australian Breastfeeding Association and Western Sydney University (2023).
- Jones HE, Seaborne MJ, Mhereeg MR, James M, Kennedy NL, Bandyopadhyay A, et al. Breastfeeding initiation and duration through the COVID-19 pandemic, a linked population-level routine data study: The born in wales cohort 2018-2021. *BMJ Paediatr Open*. (2023) 7:e001907. doi: 10.1136/bmjpo-2023-001907
- Chien LY, Lee EY, Coca KP, Paek SC, Hong SA, Chang YS. Impact of COVID-19 on breastfeeding intention and behaviour among postpartum women in five countries. *Women Birth*. (2022) 35:e523–9. doi: 10.1016/j.wombi.2022.06.006
- Andersson N, Paredes-Solis S, Legorreta-Soberanis J, Cockcroft A, Sherr L. Breast-feeding in a complex emergency: Four linked cross-sectional studies during the Bosnian conflict. *Public Health Nutr*. (2010) 13:2097–104. doi: 10.1017/S1368980010001667
- Shaker-Berbari L, Ghattas H, Symon AG, Anderson AS. Infant and young child feeding in emergencies: Organisational policies and activities during the refugee crisis in Lebanon. *Matern Child Nutr*. (2018) 14:e12576. doi: 10.1111/mcn.12576
- Modigell I, Fernandes C, Gayford M. Save the children's IYCF-E rapid response in croatia. *Field Exchange*. (2016) 102:106.
- Dimitrievska V. *Anthrolactology*. (2016). Available online at: <https://anthrolactology.com/2016/02/25/breastfeeding-among-refugee-mothers-on-the-balkan-route/> (accessed May, 2023).
- DeYoung S, Suji M, Southall HG. Maternal perceptions of infant feeding and health in the context of the 2015 Nepal Earthquake. *J Hum Lact*. (2018) 34:242–52. doi: 10.1177/0890334417750144
- Hipgrave DB, Assefa F, Winoto A, Sukotjo S. Donated breast milk substitutes and incidence of diarrhoea among infants and young children after the May 2006 earthquake in Yogyakarta and Central Java. *Public Health Nutr*. (2012) 15:307–15. doi: 10.1017/S1368980010003423

36. Theurich MA, Grote V. Are commercial complementary food distributions to refugees and migrants in Europe conforming to international policies and guidelines on infant and young child feeding in emergencies? *J Hum Lact.* (2017) 33:573–7. doi: 10.1177/0890334417707717
37. De Brabandere A, David A, Dozio E, Bizouerne C. *Baby friendly spaces: Holistic approach for pregnant, lactating women and their very young children in emergency.* Paris: Action contre la Faim (2014).
38. Greene-Cramer B, Summers A, Lopes-Cardozo B, Husain F, Couture A, Bilukha O. Noncommunicable disease burden among conflict-affected adults in Ukraine: A cross-sectional study of prevalence, risk factors, and effect of conflict on severity of disease and access to care. *PLoS One.* (2020) 15:e0231899. doi: 10.1371/journal.pone.0231899
39. Kuznetsova I, Mikheieva O, Catling J, Round J, Babenko S. *The mental health of internally displaced people and the general population in Ukraine.* Birmingham: University of Birmingham (2019).
40. Hwang CH, Iellamo A, Ververs M. Barriers and challenges of infant feeding in disasters in middle- and high-income countries. *Int Breastfeed J.* (2021) 16:62. doi: 10.1186/s13006-021-00398-w
41. Gribble K, Peterson M, Brown D. Emergency preparedness for infant and young child feeding in emergencies (IYCF-E): An Australian audit of emergency plans and guidance. *BMC Public Health.* (2019) 19:1278. doi: 10.1186/s12889-019-7528-0
42. Nagel EM, Howland MA, Pando C, Stang J, Mason SM, Fields DA, et al. Maternal psychological distress and lactation and breastfeeding outcomes: A narrative review. *Clin Ther.* (2022) 44:215–27. doi: 10.1016/j.clinthera.2021.11.007
43. de Jager E, Skouteris H, Broadbent J, Amir L, Mellor K. Psychosocial correlates of exclusive breastfeeding: A systematic review. *Midwifery.* (2013) 29:506–18. doi: 10.1016/j.midw.2012.04.009
44. Dugat VM, Chertok IRA, Haile ZT. Association between stressful life events and exclusive breastfeeding among mothers in the United States. *Breastfeed Med.* (2019) 14:475–81. doi: 10.1089/bfm.2019.0058
45. Mangrio E, Persson K, Bramhagen AC. Sociodemographic, physical, mental and social factors in the cessation of breastfeeding before 6 months: A systematic review. *Scand J Car Sci.* (2018) 32:451–65. doi: 10.1111/scs.12489
46. Amat Camacho N, von Schreeb J, Della Corte F, Kolokotroni O. Interventions to support the re-establishment of breastfeeding and their application in humanitarian settings: A systematic review. *Matern Child Nutr.* (2023) 19:e13440. doi: 10.1111/mcn.13440
47. Novick G. Is there a bias against telephone interviews in qualitative research? *Res Nurs Health.* (2008) 31:391–8. doi: 10.1002/nur.20259
48. Hamilton AB, Finley EP. Qualitative methods in implementation research: an introduction. *Psychiatry Res.* (2019) 280:112516. doi: 10.1016/j.psychres.2019.112516
49. Neves PAR, Barros AJD, Gatica-Domínguez G, Vaz JS, Baker P, Lutter CK. Maternal education and equity in breastfeeding: Trends and patterns in 81 low- and middle-income countries between 2000 and 2019. *Int J Eq Health.* (2021) 20:20. doi: 10.1186/s12939-020-01357-3

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