

Early Breastfeeding Cessation Among Post-partum Women: A Prospective Observational Study

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Abstract

Background: The World Health Organization (WHO) recommends that breastfeeding is initiated within an hour of birth and breastfeeding exclusively is performed for the first six months. However, the exclusive breastfeeding rate is dropping in most countries. In this study, we aimed to assess the breastfeeding cessation rate during the early post-partum period. Moreover, we aimed to prospectively identify the risk factors for early breastfeeding cessation during hospitalization and after discharge.

Methods: This prospective study included all post-partum women who had given birth to full term, singleton, and healthy newborns and were breastfeeding at discharge from Mar – Jun 2020 at King Abdullah bin Abdulaziz University Hospital (KAAUH) in Riyadh, Saudi Arabia. With an instrument that was designed based on previous studies, data were collected at the time of admission and 10 – 14 days and 6 – 8 weeks post-partum.

Results: This study included 136 mothers. The mean age of the participants was 29.5 ± 5.07 years, and the majority of the participants had a bachelor's degree and were unemployed. A total of 37.5% of the participants were exclusively breastfeeding their newborns for the first two weeks; however, this rate later dropped to 19%. However, bottle feeding was performed by two-thirds of the participants for the first 2 weeks, and this rate increased to 80.9% at 6 – 8 weeks post-partum. Many factors, such as maternal age, the mode of delivery and previous breastfeeding experience, were strongly associated with breastfeeding. Bottle feeding was associated with maternal age as well as employment status.

Conclusions: This study reported an unacceptably low exclusive breastfeeding rate within the first two months post-partum. Multiple factors were strongly associated with breastfeeding, and some of them were modifiable. Moreover, more attention should be given to mothers who have a high risk for early breastfeeding cessation, such as employed mothers.

Trial registration: Not applicable

Background

Breastfeeding promotion is considered one of the essential elements of post-partum care. Given that breastfeeding has been observed to benefit both the mother's and infant's health, the World Health Organization (WHO) recommends that breastfeeding is initiated within an hour of birth, exclusive breastfeeding (EBF) is performed for the first six months, and breastfeeding is continued for at least two years [1]. Despite global efforts being made to implement breastfeeding promotion programmes and public policies, the rates of early initiation, the duration, and the exclusivity of breastfeeding have not yet reached the desirable levels [2]. For example, in developed countries, it has been found that between 10% and 30% of mothers fail to continue breastfeeding after the infant is two weeks old [3, 4]. In developing countries, the exclusive breastfeeding rate is two times higher than that in developed countries [5].

These low breastfeeding rates indicate that breastfeeding is a challenging and complex task [6], even when mothers have a strong intention to breastfeed; however, the presence of non-modifiable factors such as a low educational level and socioeconomic deprivation lead to a shortened duration of breastfeeding within the first 6 months of birth [7]. Moreover, returning to work and a lack of support might cause early breastfeeding discontinuation [8, 9], and anatomical-physiological factors, psychological factors and most importantly, difficulties in dealing with the process of breastfeeding are also considered barriers to exclusive breastfeeding [10].

A review article on the patterns and practices of breastfeeding in Saudi Arabia reported two main issues: the lack of enough data and the lack of uniformity in the parameters or indicators studied [11]. One study stated that the breastfeeding initiation rate was 91.7% [12], but the rate of exclusive breastfeeding within the first 6 months was not accurately determined, as the majority of studies involved had cross-sectional designs and did not provide a standard definition for 'exclusive breastfeeding'. However, the rate ranged from 1.7–24.4% [13]. Moreover, there is a paucity of studies on the factors affecting early breastfeeding cessation, especially within the first two weeks – 2 months of birth [14].

Considering these issues, in this study, we aimed to assess the breastfeeding cessation rate during the early post-partum period, i.e., days 10–14 and weeks 6–8. Moreover, we aimed to prospectively identify the risk factors for early breastfeeding discontinuation during hospitalization and after discharge.

Methods

Study area/setting

This study was carried out at King Abdullah bin Abdulaziz University Hospital (KAAUH) at Princess Nourah bint Abdulrahman University (PNU) in Riyadh, Saudi Arabia. This hospital serves as a secondary hospital for both adults and children and provides ambulatory care and inpatient services. In addition, the hospital has three centres of excellence: child development, women's health and adolescent health. The hospital has applied for accreditation as a baby-friendly institute.

Study subjects

Post-partum women who had given birth to full term, singleton, and healthy newborns and were breastfeeding at discharge during the period from Mar – Jun 2020 were included.

Study design

This study was a prospective observational study.

Data collection methods, instruments used, measurements:

Seven days a week, consecutive mother–infant pairs were assessed for eligibility and enrolled by the co-investigators in the maternity unit. Mothers were considered eligible if they had given birth to a full term (i.e., gestational age from 36 to 42 completed weeks), singleton, healthy newborn (birth weight = or more

than 2500 g) and were breastfeeding at discharge. The mother's contact information was recorded for follow-up phone calls.

Three data forms were developed for this study: the first one was administered when the mother was admitted for childbirth and discharged, the second one was administered at 10–14 days post-partum, and the third one was administered at 6–8 weeks post-partum. The co-investigators/s prospectively collected detailed information such as baseline characteristics, breastfeeding counselling practices, and nine clinical predictors that were selected based on their importance according to a literature search.

Upon admission for childbirth, the mothers were interviewed using a data collection instrument composed of three sections. The first section concerned the following sociodemographic variables: maternal age, level of education, parity, mother's employment status, employment sector, economic status, smoking status, BMI and chronic health conditions. The second section concerned breastfeeding-related practices: counselling from a healthcare provider, such as a doctor, health educationist, or nurse/midwife; number of attended antenatal care (ANC) visits/breastfeeding classes; and score on a 10-point Likert scale on the mother's knowledge, perception and beliefs towards breastfeeding. In addition, information related to the current delivery, such as gestational age, whether epidural anaesthesia was administered, the infant's birth weight and the hospital length of stay, was recorded. The third section concerned the feeding status within the first two weeks and 6–8 weeks, and all mothers were contacted at 10–14 days and at 6–8 weeks after discharge to report their breastfeeding status and reasons for using alternatives to breastmilk or stopping breastfeeding.

The instrument was discussed with all investigators so that the investigators asked/explained the questions to the participants in the same way. A pilot study was conducted in 20 subjects to test the face validity of the instrument and to estimate the time required for data collection.

Sample size

Sample size was calculated using an open epi calculator [15]. Given that approximately 3000 pregnant women received antenatal care in KAAUH during the study period and the international breastfeeding cessation rate ranges between 10–30%, the estimated sample size was between 133 and 292 participants, with a level of confidence of 95% ($\alpha = 0.05$).

The sample size was calculated as follows: $n = [DEFF * Np(1-p)] / [(d^2 / Z^2(1-\alpha/2)^2 * (N-1) + p*(1-p)]$.

The population size (N) was calculated to be 3000, with a confidence interval of 5% (absolute +/- %) (d).

The hypothesized % frequency of the outcome in the population (p) was calculated as follows: 10% +/-5, 30% +/-5.

The design effect value (for cluster surveys-DEFF) was 1.

Sampling technique

The study included all women who gave birth to a full term, singleton, and viable newborn from March – June 2020 and agreed to participate. Data were collected until the end of August. The enrolment of mothers was stopped in early June due to the implementation of a COVID-19 protocol; breastfeeding initiation was delayed, and newborns were isolated from their mothers until additional screening and laboratory results were revealed.

Data management and analysis plan

Statistical analyses were performed using JMP14 software (SAS Institute, USA) The data are presented as numbers (%) and means \pm standard deviations (SDs). A multivariate analysis was performed to assess the correlations between two factors.). A chi-square test was used to determine the significance of differences at $P < .05$.

Results

From 17 Mar – 6 Jun 2020, a total of 170 deliveries took place at KAAUH. We excluded 34 mother/infant pairs; 1 pair was excluded because of a preterm birth, 2 pairs involved foetal mortality/morbidity, 10 mothers refused to participate, and 21 pairs were lost to follow-up.

Table 1 shows the demographic and clinical characteristics of the study cohort; the mean age of the participating mothers was 29.5 ± 5.07 years, and the majority had a bachelor's degree and were unemployed. A total of 90% of the mothers were healthy, 99% were non-smokers, and many were overweight (mean BMI 28.6 ± 4.9 kg/m²).

Table 1
Demographic and clinical characteristics of the study cohort

Variable	Distributions
Maternal age (years)	
Less than 21	6 (4.4%)
21–24	33 (24.3%)
More than 24	97 (71.3%)
Level of education	
High school degree or less	36 (26.5%)
Bachelor’s degree	88 (64.7%)
Master’s degree	10 (7.3%)
Ph.D. or equivalent	2 (1.5%)
Employment status	
Employed	37 (27.2%)
Unemployed	99 (72.8%)
Employment sector	
Teaching & Academia	24 (64.9%)
Corporate & Business	8 (21.6%)
Healthcare	4 (10.8%)
Other	1 (2.7%)
Average monthly income in SR	
Less than 10000 SR/month	57 (41.9%)
10000–30000 SR/month	73 (53.7%)
More than 30000 SR/month	6 (4.4%)
Chronic diseases	
No	123 (90.4%)
Yes	13 (9.6%)
Smoking status	
No	135 (99.3%)

Variable	Distributions
Yes	1 (0.7%)

All participants were full term, with a mean gestational age of 39.3 ± 1.4 weeks, and the mean parity was 1.7 ± 1.6 child. During pregnancy, the mothers visited the ANC clinic an average of 5.7 ± 3.4 times and the health educator clinics an average of 0.04 ± 0.1 times. The mean length of hospital stay was 2.5 ± 1.7 days, and the mean birth weight was 3.08 ± 0.4 kg. Regarding breastfeeding advice during admission, both the doctors and nurses/midwives had low scores, with scores of 0.2 ± 0.4 and 0.6 ± 0.4 , respectively.

Figure 1 shows the feeding status of the study cohort, and approximately 1/3 of the individuals exclusively breastfed their newborns within the first 2 weeks post-partum; however, this rate dropped to 19% at 6–8 weeks. However, bottle feeding was performed by two-thirds of the mothers within the first 2 weeks: 23.5% performed bottle feeding once only/day, 55.3% performed bottle feeding half of the time, and 21.2% performed bottle feeding only. The bottle-feeding rate increased to 80.9% at 6–8 weeks, representing 51% of the feedings.

Table 2 shows the mothers' beliefs and satisfaction about breastfeeding. Interestingly, despite the high score regarding their knowledge that breastmilk is the best source for infants' nutrition, this factor was not correlated with breastfeeding within the first 2 months post-partum, and this correlation was also not significant for formula milk.

Table 2
Mothers beliefs and satisfaction about breastfeeding promotion

Variable	Likert scale 0–10 (strongly disagree – strongly Agree)	Correlation with breastfeeding status at 10–14 days post- partum	Correlation with breastfeeding status at 6–8 weeks post- partum
Breast milk is the best source of nutrient for infants < 6 months of age	9.3 ± 1.1	0.1623	0.1288
Formula milk is the best source of nutrient for infants < 6 months of age	3.9 ± 2.9	-0.1286	-0.1986
Planning to exclusively breastfeed for 2 months	7.2 ± 3.4	-0.0887	-0.1065
Planning to exclusively breastfeed for 6 months	7.2 ± 3.1	0.3291	0.2714
Having an encouraging and supportive family for breastfeeding	8.1 ± 2.3	-0.0227	-0.0226
Having an encouraging and supportive work environment for breastfeeding	5.4 ± 3.6	0.2204	0.2712
Satisfied about breastfeeding counselling practices in the hospital	5.7 ± 3.6	-0.0310	0.0758
Willing to receive additional advice/attend follow-up visits on breastfeeding	6.8 ± 3.6	0.1279	0.0922

Regarding the factors associated with feeding status, as shown in Table 3, maternal age and the mode of delivery were strongly and statistically significantly associated with bottle feeding. However, other demographic and clinical factors were not associated with feeding status within the first two weeks post-partum. In 6–8 weeks, maternal age was strongly and statistically significantly associated with breastfeeding and the mode of delivery. Other demographic and clinical factors that showed significant associations were employment status, the absence of chronic diseases and previous breastfeeding experience (Table 4).

Table 3
Factors associated with feeding status at 10–14 days

Factors	Breastfeeding		P-Value	Bottle –feeding			P-Value
	No	Yes		Once only/day	2–4 times/day	All the feedings	
Maternal age (years)							
Less than 21	2 (1.47%)	4 (2.94%)	.236	0 (0%)	2 (2.3%)	0 (0%)	.035*
21–24	23 (16.91%)	10 (7.35%)		3 (3.53%)	18 (21.18%)	2 (2.35%)	
More than 24	60 (44.12%)	37 (27.21%)		17 (20.00%)	27 (31.76%)	16 (18.82%)	
Level of education							
High school or less	21 (15.44%)	15 (11.03%)	.394	7 (8.24%)	9 (10.59%)	5 (5.88%)	.518
Bachelor's degree	57 (41.91%)	31 (22.79%)		12 (14.12%)	34 (40.00%)	11 (12.94%)	
Master's degree or above	7 (5.15%)	5 (3.68%)		1 (1.18%)	2 (2.35%)	2 (2.35%)	
Employment status							
Employed	27 (19.85%)	10 (7.35%)	.117	4 (4.71%)	18 (21.18%)	5 (5.88%)	.298
Unemployed	58 (42.65%)	41 (30.15%)		16 (18.82%)	29 (34.12%)	13 (15.29%)	
Monthly income							
< 10000 SR	32 (23.53%)	25 (18.38%)	.286	7 (8.24%)	17 (20.00%)	8 (9.41%)	.405
10000–30000 SR	50 (36.76%)	23 (16.91%)		13 (15.29%)	27 (31.76%)	10 (11.76%)	
> 30000 SR	3 (2.21%)	3 (2.21%)		0 (0%)	3 (3.53%)	0 (0%)	
Chronic diseases							
No	76 (55.88%)	47 (34.56%)	.593	17 (20.00%)	43 (50.59%)	16 (18.82%)	.739
Yes	9 (6.62%)	4 (2.94%)		3 (3.53%)	4 (4.71%)	2 (2.35%)	

Factors	Breastfeeding		P-Value	Bottle –feeding			P-Value
	No	Yes		Once only/day	2–4 times/day	All the feedings	
(BMI) (Mean ± SD)	28.9 ± 4.8	28.0 ± 5.0	.286	29.5 ± 4.7	28.5 ± 4.7	29.6 ± 5.1	.584
Smoking status							
No	84 (61.76%)	51 (37.50%)	.331	20 (23.53%)	47 (55.29%)	17 (20.00%)	.207
Yes	1 (0.74%)	0 (0%)		0 (0%)	0 (0%)	1 (1.18%)	
Mode of delivery							
C/S	0 (0%)	1 (0.74%)	.049*	0 (0%)	0 (0%)	0 (0%)	.550
Instrumental	1 (0.74%)	4 (2.94%)		0 (0%)	1 (1.18%)	0 (0%)	
NSVD	84 (61.76%)	46 (33.82%)		20 (23.53%)	46 (54.12%)	18 (21.18%)	
Epidural anaesthesia							
No	69 (50.74%)	43 (31.62%)	.640	17 (20.00%)	38 (44.71%)	14 (16.47%)	.845
Yes	16 (11.76%)	8 (5.88%)		3 (3.53%)	9 (10.59%)	4 (4.71%)	
Previous breastfeeding experience							
Failure	37 (27.21%)	16 (11.76%)	.075	8 (9.41%)	23 (27.06%)	6 (7.06%)	.547
None	30 (22.06%)	15 (11.03%)		6 (7.06%)	15 (17.65%)	9 (10.59%)	
Success	18 (13.24%)	20 (14.71%)		6 (7.06%)	9 (10.59%)	3 (3.53%)	
Pacifier use							
No	46 (33.82%)	26 (19.12%)	.722	11 (12.94%)	28 (32.94%)	7 (8.24%)	.324
Yes	39 (28.68%)	25 (18.38%)		9 (10.59%)	19 (22.35%)	11 (12.94%)	

Table 4
Factors associated with feeding status at 6–8 weeks post-partum

Factors	Breastfeeding		P-Value	Bottle –feeding			P-Value
	No	Yes		once only/day	2–4 times/day	All the feedings	
Maternal age (years)							
Less than 21	6 (4.41%)	0 (0%)	.041*	1 (0.91%)	5 (4.55%)	0 (0%)	.083
21–24	30 (22.06%)	3 (2.21%)		5 (4.55%)	18 (16.36%)	7 (6.36%)	
More than 24	74 (54.41%)	23 (16.91%)		11 (10.00%)	33 (30.00%)	30 (27.27%)	
Level of education							
High school or less	32 (23.53%)	4 (2.94%)	.174	6 (5.45%)	18 (16.36%)	8 (7.27%)	.593
Bachelor's degree	70 (51.47%)	18 (13.24%)		10 (9.09%)	33 (30.00%)	27 (24.55%)	
Master's degree or above	8 (5.88%)	4 (2.94%)		1 (0.91%)	5 (4.55%)	2 (1.82%)	
Employment status							
Employed	32 (23.53%)	5 (3.68%)	.296	1 (0.91%)	22 (20.00%)	9 (8.18%)	.011*
Unemployed	78 (57.35%)	21 (15.44%)		16 (14.55%)	34 (30.91%)	28 (25.45%)	
Monthly income							
< 10000 SR	44 (32.35%)	13 (9.56%)	.087	7 (6.36%)	19 (17.27%)	18 (16.36%)	.552
10000–30000 SR	63 (46.32%)	10 (7.35%)		10 (9.09%)	35 (31.82%)	18 (16.36%)	
> 30000 SR	3 (2.21%)	3 (2.21%)		0 (0%)	2 (1.82%)	1 (0.91%)	
Chronic diseases							
No	97 (71.32%)	26 (19.12%)	.015*	16 (14.55%)	47 (42.73%)	34 (30.91%)	.346

Factors	Breastfeeding		P-Value	Bottle –feeding			P-Value
	No	Yes		once only/day	2–4 times/day	All the feedings	
Yes	13 (9.56%)	0 (0%)		1 (0.91%)	9 (8.18%)	3 (2.73%)	
(BMI) (Mean ± SD)	28.6 ± 4.8	28.6 ± 5.2	.964	27.5 ± 3.7	28.7 ± 5.1	29.0 ± 4.9	.592
Smoking status							
No	109 (80.15%)	26 (19.12%)	.513	17 (15.45%)	56 (50.91%)	36 (32.73%)	.333
Yes	1 (0.74%)	0 (0%)		0 (0%)	0 (0%)	1 (0.91%)	
Mode of delivery							
C/S	0 (0%)	1 (0.74%)	.020*	0 (0%)	0 (0%)	0 (0%)	.254
Instrumental	2 (1.47%)	3 (2.21%)		0 (0%)	2 (1.82%)	0 (0%)	
NSVD	108 (79.41%)	22 (16.18%)		17 (15.45%)	54 (49.09%)	37 (33.64%)	
Epidural anaesthesia							
No	92 (67.65%)	20 (14.71%)	.431	16 (14.55%)	46 (41.82%)	30 (27.27%)	.369
Yes	18 (13.24%)	6 (4.41%)		1 (0.91%)	10 (9.09%)	7 (6.36%)	
Previous breastfeeding experience							
Failure	48 (35.29%)	5 (3.68%)	.013*	7 (6.36%)	25 (22.73%)	16 (14.55%)	.938
None	37 (27.21%)	8 (5.8%)		6 (5.45%)	17 (15.45%)	14 (12.73%)	
Success	25 (18.38%)	13 (9.56%)		4 (3.64%)	14 (12.73%)	7 (6.36%)	
Pacifier use							
No	60 (44.12%)	12 (8.82%)	.441	9 (8.18%)	36 (32.73%)	15 (13.64%)	.077
Yes	50 (36.76%)	14 (10.29%)		8 (7.27%)	20 (18.18%)	22 (20.00%)	

Multiple causes have been proposed for breastfeeding cessation in the literature. However, we asked the mothers about the most common causes and allowed them to list others if applicable. The most common causes for breastfeeding cessation within the first two months post-partum included insufficient or a lack of breastmilk (37% and 51%, respectively), followed by maternal fatigue (12%) at both 2 weeks and 6–8 weeks post-partum. Other causes were less frequently reported, such as cracked nipples/painful breasts, the acclimation of infants to other foods and a lack of support. The other causes that were listed by the mothers were sleep deprivation, the mothers' medication intake (pain killers, antibiotics, OCPs), latching difficulty, a lack of experience, the mothers being busy performing other household duties, and infant satiety with formula milk.

Discussion

Studies that aim to identify and predict factors associated with exclusive breastfeeding (EBF) are of great public health significance, given the importance of this feeding method for the health of both the mother and child and the unacceptably low breastfeeding rates in different countries [10]. This study in particular investigated the breastfeeding cessation rate during the early post-partum period. Although all mothers were discharged home and were able to initiate breastfeeding, the EBF rate was only 37.5% within the first two weeks and dropped to 19% in 6–8 weeks post-partum, which is considered unacceptably low compared to international standards [1].

Moreover, the mothers' knowledge about breastfeeding and that breastmilk is the best source of infant nutrition as well as their intent to perform EBF during the first two months of the post-partum period were not reflected in the actual EBF rate. This finding is consistent with those of similar studies involving different cultures confirming that knowledge and intent alone are not sufficient to influence the actual EBF rate [16, 17]. This finding might be explained by different factors. One of the health practice-related factors was the lack of breastfeeding advice from both the doctors and nurses/midwives, which might be reflected in the low satisfaction score about breastfeeding promotion and counselling practices. One study showed that the absence of health care team support led to a low breastfeeding rate. However, the rate improved after an intervention was designed and implemented [18].

Regarding factors associated with feeding status, this study showed that maternal age is strongly and statistically significantly associated with bottle feeding during the first two weeks. However, at 6–8 weeks, maternal age was strongly associated with breastfeeding. One review article on studies performed in Saudi Arabia showed that an older maternal age is a contributing factor for a higher breastfeeding rate [19]. The mode of delivery was significantly associated with breastfeeding during the early 2 months of post-partum. In this cohort, the most common mode of delivery was a normal spontaneous vaginal delivery (NSVD). Different studies have shown that the mode of delivery impacts breastfeeding initiation and duration; the early initiation of breastfeeding (EIBF) within 1 hour is significantly less common among mothers who have caesarean sections (C/S) [20]. Moreover, mothers who give birth via planned

C/S are less likely to intend to breastfeed than are those who have vaginal births or unplanned C/S [21]. One of the factors that influences breastfeeding continuation during the first 2 months post-partum is a previous breastfeeding experience. A previous study showed that mothers who had previous breastfeeding experience were 3.3 times more likely to exclusively breastfeed their infants [9]. On the other hand, the employment status of the mother is associated with bottle feeding, which is seen around the end of maternity leave, i.e., 6–8 weeks post-partum. Multiple studies have reported similar findings [22, 23].

This study reported a number of causes for early breast milk replacement/cessation; one of the most common causes in both the early post-partum period and after 2 months was insufficient or a lack of breastmilk. This finding is consistent with those of other studies [24, 25]. However, such causes are subjective because there are no instruments that directly measure the production of milk and the secretory conditions of the breast [26].

Conclusions

This study reported an unacceptably low exclusive breastfeeding rate during the first two months post-partum. Multiple factors were strongly associated with breastfeeding, and some of them were modifiable, such as mode of delivery and previous breastfeeding experience. Moreover, more attention should be given to mothers who have a high risk for early breastfeeding cessation, such as employed mothers.

Abbreviations

WHO: World Health Organization

EBF: exclusive breastfeeding

KAAUH: King Abdullah bin Abdulaziz University Hospital

PNU: Princess Nourah bint Abdulrahman University

BMI: Body Mass Index

NSVD: Normal Spontaneous Vaginal Delivery

EIBF: Early Initiation of Breastfeeding

C/S: Caesarean Section

Declarations

Ethics approval and consent to participate

The study protocol was approved by the Institutional Review Board at Princess Nourah bint Abdulrahman University (PNU) in Riyadh, Saudi Arabia (IRB-PNU:20-0118). Informed consent was obtained from all study participants.

Consent for publication

Not applicable

Availability of data and materials

All data used in the study are available for interested researchers upon request and approval from the Institutional Review Board at PNU (contact: irb@pnu.edu.sa).

Competing interests

The authors declare that they have no competing interests

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Not applicable

Authors' contributions

AA: study design, manuscript writing

HH: Literature review, data collection and entry

NB: Literature review, data collection and entry

WB: Literature review, data collection and entry

JA: Literature review, data collection and entry

LA: Data analysis

All authors read and approved the final manuscript

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Figures

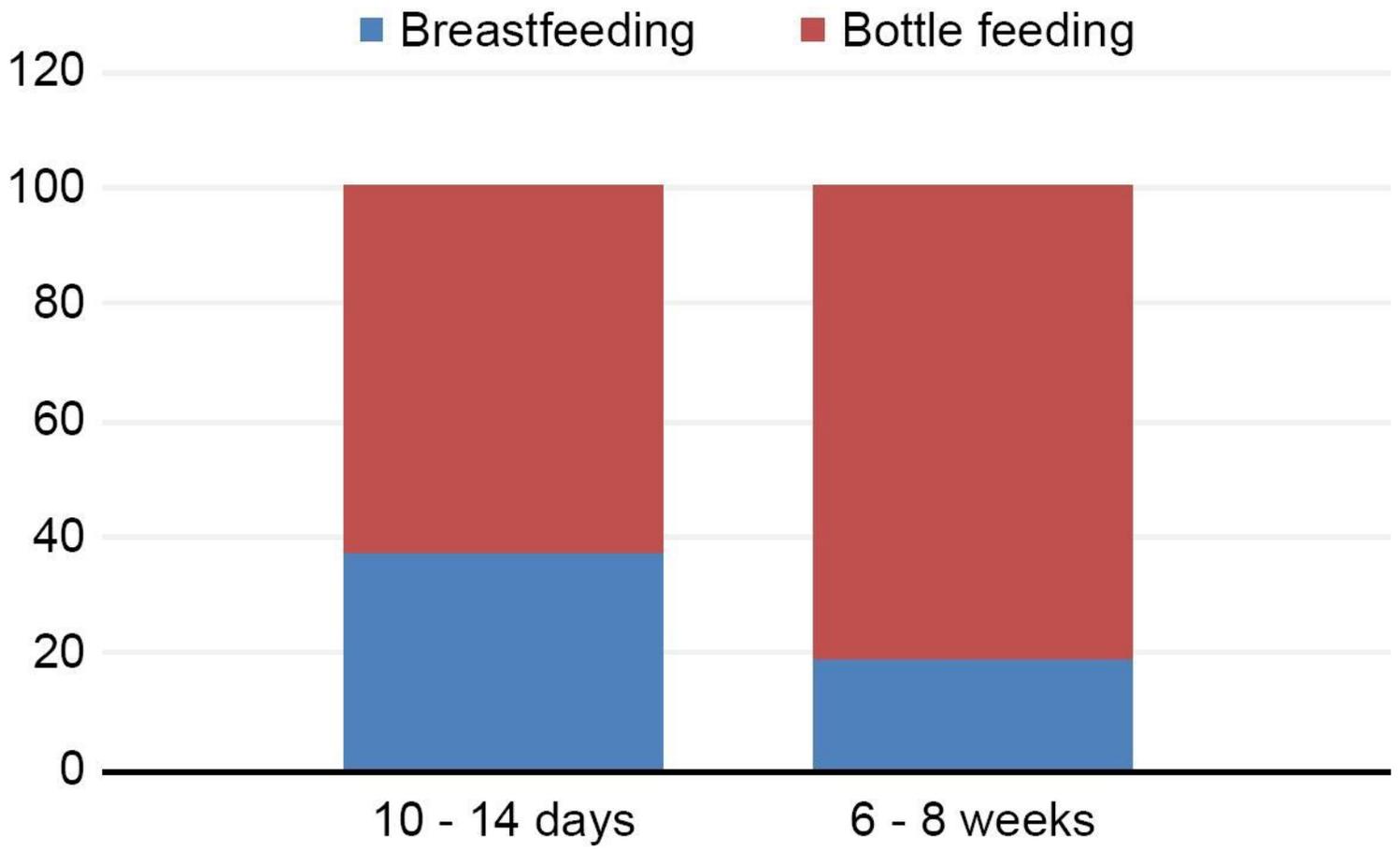


Figure 1

Method of feeding among the study cohort

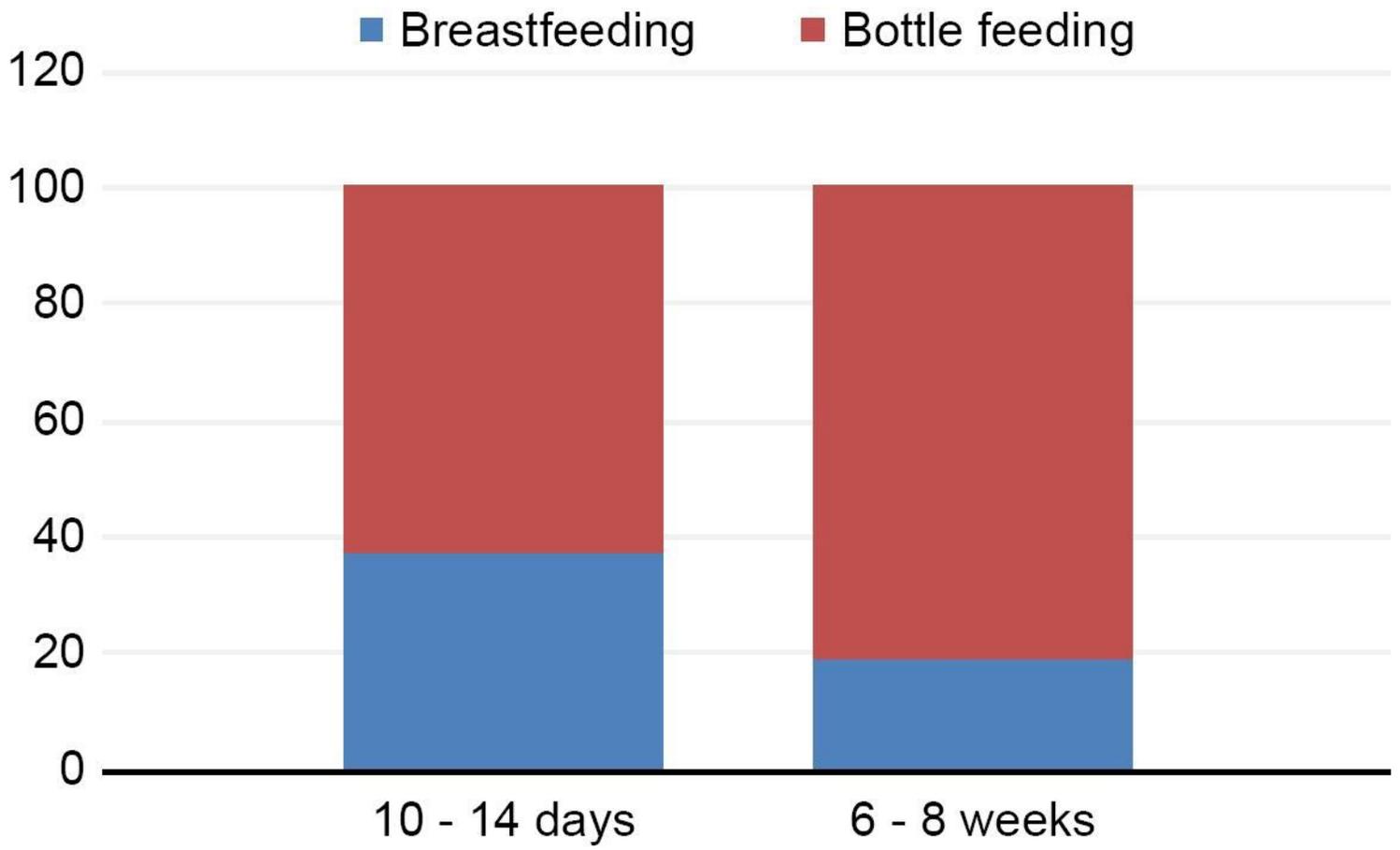


Figure 1

Method of feeding among the study cohort